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DISSERTATION

Controlling Telework: An Exploratory Investigation of Portfolios of Control Applied to Remote Knowledge Workers

Jijie Wang
jwang@cis.gsu.edu
Department of Computer Information Systems
J. Mack Robinson College of Business
Georgia State University
35 Broad Street
Atlanta, Georgia, 30303

COMMITTEE MEMBERS
Chair: Dr**.** Daniel Robey: (CIS)
Examiners: Dr. Karlene C. Cousins (FIU– CIS)
Dr. Michael Gallivan (CIS)
Dr. Balasubramaniam Ramesh (CIS)

Table of Contents

Abstract 4
1 Introduction 5
2 Literature Review 8
2.1 The Concept of Control 8
2.2 The Cybernetic Model of Control 9
2.3 Agency Theory 10
2.4 Markets, Bureaucracies, and Clans 12
2.4.1 Three Sources of Controls 12
2.4.2 Concertive Control: An Exemplar of Clan Control 15
2.4.3 The Rise of Community Governance in the Knowledge Economy 16
2.5 Self-Control 18
2.5.1 Self-Management 18
2.5.2 Self-leadership 21
2.6 Portfolios of Controls 22
2.7 Disciplinary Power and Control 24
2.8 Dialectic of Control 25
2.9 Research on Controls in Information Systems Research 26
2.9.1 IS Studies on the Antecedents of Control Modes 27
2.9.2 IS Studies on the Portfolios of Controls 28
2.9.3 IS Studies on the Consequences of Controls 31
2.9.4 IS Studies on Computerized Monitoring Systems 32
2.9.5 IS Studies on the Impact of IT on Organizational Controls 34
2.10 Studies on organizational controls in the context of telework 36
2.11 Summary of Literature Review 37
3 Research Questions 38
4 Research Approach 40
4.1 Research Assumptions and Research Paradigm 40
4.2 Research Methodology 45
4.2.1 Grounded Theory 45
4.2.2 Research site 48
4.2.3 Data Generation 49
4.2.4 Data Analysis 51
5 Results 53
5.1 Social Contexts of the Two Groups 53
5.2 Organizational Controls within the Two Work Teams 56
5.2.1 Outcome Controls 56
5.2.2 Behavioral Control 64
5.2.3 Clan Control 70
5.2.4 Self Control 75
5.2.5 Summary of the Results 77
6 Discussion 80
6.1 Controls in the Telework Environment 80
6.1.1 Outcome Control 80
6.1.2 Behavioral Control 81
6.1.3 Clan Control 83

6.1.4 Self Control 84
6.1.5 Control Portfolio 86
6.2 The Role of the Use Information Technologies in Organizational controls 89
7 Conclusion 93
Appendix 1: The list of the starting codes 97
Appendix 2: The list of the final codes used in the data analyses 100
Reference 102

Abstract

Enabled by the development of information technologies, telecommuting and telework have been incorporated into organizations for around 30 years. However, there still exists resistance to this work arrangement, particularly from middle-level managers. Formal knowledge about how to manage telework is needed to keep the managers better informed. I conducted a qualitative exploratory study to investigate how managers exercise controls in the telework environment and examined the role of the use of information technologies in organizational controls in this work environment. Based on interview data with people from two work groups that participate in telework program, I found that the managers exercise a portfolio of controls that consist all four documented control forms (outcome, behavior, clan and self control), and controlling the employees' adoption and use of information technologies is a new form of behavior control in the telework environment.

1 Introduction

The term "telecommuting" was coined about 30 years ago to refer to the phenomenon that employees can access information in the workplace through technologies without physically being in the workplace (Nilles 1994). Telework refers to work that is done through telecommuting. Enabled by the development of information technologies and driven by the knowledge economy and global business competition, more and more organizations start to incorporate telework into their organization design. According to a WorldatWork group report in 2006, the number of Americans whose employer allows them to work from home at least one day per month increased from 7.6 million in 2004, to 9.9 million in 2005, and to 12.4 million in 2006. The United States Bureau of Transportation Services in 2006 showed that 30 percent of the US labor force work at home at least part of the week (Mello 2007).

Telework brings environmental and societal benefits thanks toreduced commuting. In addition, telework brings benefits to both the employers and the employees. For the employers, the benefits include increased employee productivity, enhanced customer and client service, reduced operation cost, improved resilience to unexpected circumstances, and increased recruitment options. For the employees, Telework leads to a better quality of life, more flexible work schedules, and reduced transportation costs and travel durations (Khaifa and Davidson 2000).

Despite the benefits of Telework listed above, there are still challenges to implement a successful telework program. There is even resistance to telework from many companies (Khaifa and Davidson 2000; Baker, Avery and Crawford 2006). For example, in 2006, HP pulled telecommuting IT staff back to offices (Thibodeau 2006).

With the development of information technologies, technologies no longer restrict Telework, and the major challenge lies on the management side (Baker, Avery et al. 2006).

One of the significant challenges to implement a successful telework program lies in the management of telework. It is found that some managers are resistant to change and hesitant to change managerial practices. Some managers stick to the old management practices of managing by walking around (Mears 2007) and still have the traditional managerial attitude that workers need to be seen to be considered working (Lupton and Haynes 2000).

The hesitance and suspicion of telework in practitioners is affected by the lack of formal knowledge about managerial controls in telework (Jessup and Robey 2002). The following questions remain unanswered. When the cost of physically monitoring mobile and distributed workforce becomes high, how will management adapt their controls? Will management simply rely on output control rather than evaluate work behaviors and presence? Will management evaluate work based on the digital trace of the work created by information technologies? Will management engage in compulsive monitoring with the help of anytime/anywhere access? Or will managers encourage and facilitate employees to engage in self-control behaviors? Answers to these questions are of great practical value to management in organizations implementing telework programs.

Besides practical implications, answers to the above questions are of great value to advancing our understanding of theories of organizational controls, which very likely need to be changed or adapted for the telework environment. Telework loosens the spatial and temporal constraints of work, separates managers and employees to some degree, and

redefines the notion of "work" and "workplace". Traditional control theories may not directly apply, and thus need to be re-evaluated, elaborated and updated.

Moreover, Orlikowski and Barley (2001) comment that literatures on telecommuting either focus on organizational and institutional issues of telecommuting but neglect technology advancement, or emphasize innovation enabling information technologies but ignore organizational issues. They call for more research on the issue of telecommuting to incorporate both organization theory and the use of information technologies. Prior studies have shown that the adoption and use of information technologies can have impact on organizational controls (Orlikowski 1991). In telework, using information technologies is an essential part of work because the employees rely on these technologies to work and communicate. Therefore, it is worthwhile to explore the relationship between information technology use and organizational controls. Will the employers control the employees' use of technologies? Will using technologies become part of the control process? We intend to answer these questions in this research.

In summary, telework has become increasingly popular in today's organizations. In order for the telework program to benefit both the employers and the employees, managers of teleworking employees need to implement effective organizational controls. Traditional organizational theories do not directly apply because telework changes the organizational environment. Therefore, we plan to conduct a study to explore the control issues in telework. Specially, we intend to answer the following two questions:

1) How do organizational controls operate in the telework environment?
2) What is the relationship between organizational controls and the use of information technologies in the telework environment?

In order to answer these two research questions, I conducted a qualitative empirical study and develop a theoretical account about the organizational controls in telework to further elaborate and extend organizational control theories.

2 Literature Review

Because the focus of the study is organizational controls in telework environments, I draw on control theories in organization studies as our theoretical basis. I discuss the concept of control; review three dominant theoretical views about control; discuss self-control as an alternative control method; summarize the recent development in control theory regarding control portfolios; and review the research in information systems on controls. Moreover, I describe two critical perspectives on controls, disciplinary power and the dialectic of control.

2.1 The Concept of Control

Webster's New Collegiate Dictionary defines that "to control" means "to exercise restraining or directing influence over: regulate." In organization studies, theories on controls are studied from classical, modern, symbolic-interpretive, and postmodern perspectives (Hatch 1997). In the organization theory, organizational control has been interpreted in various ways. The dominant view is from Tannenbaum, who regarded control as the sum of interpersonal influence relations in an organization (Tannenbaum 1968). He stated:

> "Organization implies control. A social organization is an ordered arrangement of individual human interactions. Control processes help circumscribe idiosyncratic behaviors and keep them conformant to the rational plan of the organization. Organizations require a certain amount of conformity as well as the integration of diverse activities. It is the function of control to bring about conformance to organization requirements and achievement of the ultimate purpose of the

> organization. The coordination and order out of the diverse interests and potentially diffuse behaviors of members is largely a function of control." (Tannenbaum 1968, page 3)

The basic assumption underlying control theory is that individuals participating in an organization have divergent interests and goals. It is likely that these divergent interests and goals are incongruent with the organization's goal. Therefore, in order to ensure that organizational members work dependably, organizations need to implement controls to direct individual efforts to meet the organization's goal (Ouchi 1979; Ouchi 1980). Control can be applied to different levels, such as individuals and groups.

2.2 The Cybernetic Model of Control

One way to conceptualize a control system is to perceive it as a cybernetic system (Beer 1959; Green and Welsh 1988). In cybernetics, the current state of a system is compared against the desired state, and an adjustment is made if any discrepancy between the two is detected. For example, a thermostat is designed to compare the current room temperature with the desired temperature and turn the heating/cooling unit on or off depending on the difference between the current and desired temperatures (Hatch 1997).

In a cybernetic control system, organizations first set up targets or standards of acceptable behaviors and/or outputs according to organizational goals. Then organizations monitor work tasks conducted by employees. Organizations evaluate behaviors and/or outputs of employees based on the target or standard, and then provide feedback to employees. If an employee's behavior or output deviates from the standards, the organization will take the corrective measure to adjust the employees' actions. Sometimes if the deviation is due to unfair standards, the organization will also revise the

standards. The focus of the control system is performance evaluation and feedback systems on work tasks (Robey and Sales 1994; Hatch 1997).

According to the contents of the target or standard, the control system can be categorized as output or behavior control. These two types of controls are often categorized as formal controls (Kirsh 1996). Output control focuses on the result of task activity and relies on the measurement of task output. In organizations using output control, output needs to have high measurability and should be easily associated with either individuals or groups (Ouchi 1979; Hatch 1997). When these two conditions do not apply, organizations can use behavior control, in which behaviors that are associated with high performance are identified and established as targets or standards. In organizations using behavior control, the task observablility needs to be high, meaning that the process of transforming from input to output needs to be well-understood by organizations (Ouchi 1979; Hatch 1997; Turner and Makhija 2006). When both output measurability and task observability are low, organizations will have difficulty with both behavior and outcome controls (Hatch 1997). One typical case is creative and innovative work, in which output is too unique to make comparisons to a standard, and the behaviors rendering good performance are hard to define (Robey and Sales 1994).

2.3 Agency Theory

Agency theory conceptualizes the control problem around the relationship between organization's owners (called principals), and managers (called agents). Managers are perceived as agents because they are expected to act in the principals' interests rather than their own when making decisions on behalf of the principal. An agency problem refers to the risk that managers will serve their own interest rather than

their principal's. Agency theories focus on ways to control the agents' self-serving behaviors and assure the interests of the principals (Ross 1973). Although agency theorists form their theories in terms of the relationships between organizations' owners and top management, the theory can be generalized to lower levels of management and their subordinates (Jensen and Meckling 1976; Eisenhardt 1985).

In agency theory, contracts are used to align the agents' self-interests with the interests of their principals (Eisenhardt 1985; Hatch 1997). Contracts specify measures and promise rewards so that agents' own interests are served when they fulfill the demands of the contracts. Through the contract, principals delegate work to their agents for an agreed price, and their divergent interests are aligned. When principals are not or cannot be continuously present, they are open to opportunism by agents who may not perform as agreed, that is, they may shirk (Hatch 1997).

In agency theory, principals rely on information to know whether their agents are shirking. Complete information means that the principals know exactly whether the agents are performing to the specification of the contract, while incomplete information means that they do not know exactly. If the principals' information is incomplete, agents may have temptation to shirk. Although direct observation can provide complete information, it takes time and effort and principals cannot do so because the monitoring costs are too high. To deal with incomplete information situations, the principals have two options. They can either purchase surveillance mechanisms, or they can reward their agents based on outcomes instead of behaviors (Eisenhardt 1985; Hatch 1997).

From the perspective of agency theory, the issue of whether to use behavior or outcome control is a matter of the costs associated with collecting the information

required to minimize the chance that the agents will shirk (Eisenhardt 1985; Hatch 1997). Behavior controls require surveillance mechanisms and information systems. When tasks are non-routine, such mechanisms and systems are difficult to build. Output control is less costly if the output can be easily measured. Since outcome not only depends on the agents' behaviors but also depends on the conditions in the environment. When agents are under outcome control, they share the uncontrollable risk with the principals (Hatch 1997).

2.4 Markets, Bureaucracies, and Clans

2.4.1 Three Sources of Controls

Ouchi (1979; 1980) conceptualizes three distinguishable sources of control mechanisms: markets, bureaucracies and clans. Organizations that implement market control use price competition as a control mechanism. Profit centers are created within a multi-divisional organization, and outputs from one subdivision are transferred to the next based on internal "transfer price" (Hatch 1997). Organizations that implement bureaucracy control rely on rules, procedures, documentations, and surveillance as control. They make rules about either the standards of task process or the quantity and quality of the task output, and provide supervisors authority to exercise close personal surveillance and direction over subordinates. Organizations that implement clan mechanisms facilitate their employees to obtain high internal commitment to the firm's objective, cultures, norms, and values mainly through the employee selection, promotion, and socialization processes. In clan control, explicit surveillance and evaluations can be removed because employees internalize the organization's goal. Socialization between organization members is essential in the internalization process. Ouchi (1979; 1980)

observes that all organizations exercise a combination of the three control strategies, but each organization favors one strategy over the other two.

Ouchi (1979) discusses the social and informational requirements for the three sources of controls. The social requirement for market control is the norm of reciprocity, meaning that both parties involved in a transaction should be honest with each other and understand that cheating behaviors will lead to severe punishment. Without the norm of reciprocity, cheating behaviors will elevate the cost of transactions and eventually lead to market failure. The social requirement for bureaucratic control includes legitimate authority in addition to the norm of reciprocity. Under bureaucratic control, employees work in exchange for salary as those under market control. Furthermore, they also agree to give up part of their autonomy and legitimately allow their supervisors to monitor and direct their work activities. Clan control has the strictest social requirements. It not only requires the norm of reciprocity and legitimate authority, but also requires agreement on values and beliefs. In clan control, there are no explicit price mechanisms or explicit rules and procedures. It requires an implicit agreement about the proper behaviors and high level commitment to those socially prescribed behaviors.

Among the three controls, clan control is the most demanding and market control is the least demanding in terms of the social requirements. However, the opposite is true in terms of the informational requirements. In market control, internal transfer prices need to be provided to support the transactions between departments within a single organization. Explicit information systems such as accounting information systems and other implicit information systems are demanded to provide the transfer prices information. In reality, because of technological interdependence and uncertainty,

arriving at a transfer price is not always feasible. Thus organizations will implement bureaucratic control, creating explicit sets of rules to establish standards about behaviors and output. Organizations implementing bureaucratic control need to create rules and communicate these rules to their employees, and they need information systems to monitor, evaluate and provide feedback to employees. In clan control, information is contained in the rituals, stories, and ceremonies, and it does not require a large staff of accounting and information systems experts to create and maintain complex information systems for the purpose of control. However, the information about values and norms is subtle, meaning that it cannot be easily obtained by newcomers. Therefore, socialization between employees is essential in clan control.

Ouchi (1979) outlines the relationship between forms of commitment and the three types of control. He points out that the commitment levels are high for both market and clan control. Under market control, employees internalize that they work toward their self-interests; under clan control, employees internalize the organizational goals and are even willing to sacrifice their self-interests. The employee commitment level is low under bureaucratic control. Employees can accept their supervisors' monitoring, direction and advice without internalization. In other words, compliance is the minimum commitment level required. However, a control heavily depending on explicit monitoring, evaluation, and feedback has the risk of offending people's sense of autonomy and of self-control.

Costs involved in the three different types of controls vary. Market control carries low cost for searching and selecting employees and low cost of monitoring and surveillance. Market control works well when people work for their self-interest, so the requirements for selecting employees do not have to be very restrictive. There is little

monitoring and surveillance so the cost is low. However, market control bears high cost of information system in order to provide transfer price information. In bureaucratic control, the cost of searching for and selecting people is low. Once people get employed, they receive intensive training and monitoring and direction from their supervisors. However, the cost of developing and running a supervisory system to monitor, evaluate, and correct people behaviors is high. In clan control, it is critical to select the right people into the organization, so it bears high cost of searching for and selecting people as well as socializing people. Because clan control depends on people's willingness to conform to organization goals rather than on explicit monitoring and surveillance system, the cost of bureaucracy is low while the cost of facilitating people's internalization of organization's objectives, culture, and beliefs is high.

2.4.2 Concertive Control: An Exemplar of Clan Control

One exemplar of clan control is concertive control in self-managing teams. Concertive control refers to notion that workers control themselves by collaborating to develop their own control (Tompskins and Cheney 1985; Barker 1993). In the process of establishing and exercising concertive control, first workers interact and reach a negotiated consensus about proper behaviors. They do so by internalizing a set of core values of their organizations, such as those found in their corporate vision. Subsequently, this negotiated consensus produces and reproduces value-based discourse among workers, and normative rules emerge. Next, workers within a work team follow these rationalized normative rules to reward proper behaviors and sanction inappropriate ones. Thus, workers behave within the parameters of the value systems and the discourse that they generate (Barker 1993).

The key difference between concertive control and bureaucratic control is the locus of the authority - the legitimate source of control. Under a bureaucratic system, rational rules are created and maintained by supervisors. Under concertive control, they come from the value consensus of the group's or the organization's members (Barker 1993). The successful implementation of concertive control requires a high level of collaboration and high degree of self-management. This form of control is probably less apparent but more powerful because every team member, not just the supervisor, can assume the controller's role.

2.4.3 The Rise of Community Governance in the Knowledge Economy

Adler (2001) argues that recent conceptualization of trends in organization forms overemphasizes the importance of markets, hierarchies, and hybrid intermediate forms of these two, while ignoring a third type of organization and its coordination mechanism – the community form of organization with trust as coordination mechanism. Different institutions combine the three organization forms/coordination mechanisms in different proportions. Furthermore, he argues that as the economy becomes more knowledge intensive, it is expected that high-trust institutional forms will proliferate and be more effective than market and hierarchy forms of organizations.

The community form of organization is an informal organization that constitutes its members as a community. In community organizations, trust is the key coordinating mechanism. In short, trust is confidence in another's goodwill. Moreover, Adler argues that the most effective form of trust is reflective trust rather than traditionalistic, "blind" trust. With three types of coordination mechanisms, market/price, bureaucracy/hierarchy,

and community/trust, institutions can be mapped in three dimensions according to their salience of the different coordination mechanisms.

In addition, Adler (2001) hypothesizes that as our economy grows more knowledge-intensive, community/trust becomes a more effective means of organizational governance than market/price and bureaucracy/hierarchy. In today's economy, as the educational level of the workforce rises and the scientific and technical knowledge represented in equipment and products grows, knowledge creation and dissemination become critical activities within and across organizations.

The "public good" nature of knowledge determines that market/price and bureaucracy/hierarchy are not as effective as community/trust. In the market form of organization, price mechanism is used to optimize the production and allocation of products; however, it does not work well with knowledge. As a public good, knowledge does not diminish and cease to be available to others after it is consumed by one consumer. Reliance on market/price mode creates a trade-off between production and allocation of knowledge. On one hand, establishing strong intellectual property rights can optimize the production of knowledge by creating incentive of knowledge generation. However, the cost of maintaining such rights is high and blocks wide access to the knowledge, which ironically limits the successful allocation of knowledge resources (Adler 2001).

In the hierarchy form of organization, authority is the primary coordinating mechanism. Under hierarchy, knowledge is often treated as a scarce resource and therefore located along with decision rights in either specialized functional units or at higher organizational levels. Such an institutional structure may work efficiently when

dealing with routine tasks, but is inefficient for non-routine innovative tasks. Even if authority mandates the free availability of knowledge and solves the knowledge allocation problem, it cannot create the incentive to create knowledge (Adler 2001) .

Community/trust is a more efficient mechanism when facilitating knowledge-intensive activities, because trust can both reduce transaction costs by replacing contracts with handshakes and reduce agency risks by replacing fear of shirking and misrepresentation with mutual confidence (Adler 2001). Therefore, trust mitigates the coordination difficulty created by the characteristics of knowledge as a public good. As knowledge management becomes increasingly important in today's organizations, trust becomes increasingly attractive as a coordination mechanism.

2.5 Self-Control

In addition to three sources of control initiated from the organization, employee self-control can be seen as a fourth form of control. In this section, I review literatures about self-management and self-leadership. The former concept is often used interchangeably with "self-control", while the later concept includes "self-control" but also goes beyond it.

2.5.1 Self-Management

Self-management in organizational contexts refers to the phenomenon that a person behaves in a way congruent with organizational goals without being subject to external controls. In self-management, individual employees set up standards and then monitor, evaluate and reward their own behaviors. The evaluation standards in self-management can come from past performance, the observed performance of others, and

socially acquired performance criteria (Mahoney 1974). In a work environment, supervisors often cannot control all the factors influencing employees' behaviors. If employees can specify contingencies to influence their own behaviors, these self-influenced behaviors can be a substitute for formal leadership (Manz and Sims Jr 1980).

The consequences resulting from self-management have two levels: those directly involved in the self-controlling process, and those resulting from the outcome of self-controlling behaviors. All people exercise self-control sometimes. Self-management occurs in many situations, even when external controls are strong (Mills 1983). Thoresen and Mahoney (1974) conclude that most successful self-control methods typically involve some interaction with external control.

The benefits of self-management to employees are to avoid "over attribution" (Manz and Sims Jr 1980). Over attribution is the tendency that people explain others' behaviors by internal personal dispositions, while explaining their own behavior in terms of external situations (Jones 1976). When employees take responsibility for their own behaviors, observer bias can be limited. Self-management is a cost-effective management method for organizations. However, organizations need to direct self-management behaviors to avoid dysfunctional self-management.

There are two major self-management strategies: environmental planning, referring to changing factors in the environment so that positive behaviors are more likely to occur, and behavioral programming, referring to rewarding or correcting oneself based on performance (Manz and Sims Jr 1980). Five procedures to implement these two strategies are: 1) self-observation: systematic data gathering about one's own behavior in order to establish the basis for self-evaluation; 2) specifying goals, especially publicly; 3)

cueing strategies - limiting environmental factors that lead to undesirable behavior while increasing those evoking desirable behavior, 4) incentive modification - self-reward and self-punishment, and 5) rehearsal - systematic practice of a desired performance (Manz and Sims Jr 1980).

Organization managers/leaders can help their subordinates to engage in self-management behavior. Leaders should be role models in this process, and their strategies change as .the subordinates become more capable of self-management during the process. At the beginning, leaders reinforce behaviors that lead to good performance, and then they gradually shift to reinforce the strategies or processes of self-management such as goal setting and self-reinforcement (Manz and Sims Jr 1980).

Several factors can affect the appropriateness of using self-management, including nature of the task, nature of the problem, the availability of time, and the importance of subordinate development (Manz and Sims Jr 1980). It is more suitable to use self-management when the nature of the task is creative, analytical, or intellectual in nature. Self-management is appropriate when organizations are solving unstructured problems; the information needed to solve the problems comes from subordinates; the solutions to the problems must be accepted by subordinates to ensure implementation; and subordinates internalize organizational goals (Manz and Sims Jr 1980). The availability of time is an important factor that determines the importance of subordinate self-management. In short-term efficiency mode, self-management is de-emphasized, while in development mode, self-management is emphasized as an investment in the future.

Self-management is appropriate for situations in which organizations cannot adequately measure the behavioral performance or standardize the work process (Mills 1983). In these situations the behavioral and outcome controls are not feasible. For example, when the tasks conducted by employees involve interactions with customer/client, employees are likely to confront unexpected, unfamiliar, and novel events because the reciprocal transactions between the client and the employee generate an environment with high uncertainty (Mills 1983).

2.5.2 Self-leadership

Manz (1980) argues that self-influence is the ultimate system of control in organizations and proposes a broader view of self-leadership. First, he argues that the self-control system can be regarded as the focal point in organizational control systems. All organizations exercise external control, either by implementing formal controls such as behavior or outcome control, or by influencing employees with informal clan control. Meanwhile, each employee possesses his/her own self-control system, which functions similar to organizational formal control systems, and has his/her own natural motivations, beliefs, and values, which are similar to components in clan control. Organizational control systems influence people but they do not directly determine people's actions. Ultimately, "the impact of organizational control mechanisms is determined by the way they influence, in intended as well as unintended ways, the self-control systems within organization members" (Manz, 1986, p 586). In this sense, self-control is tightly integrated into organizational control systems and can be regarded as the focal point of organizational control.

Second, Manz (1986) proposes an expanded self-leadership view. This view not only includes self-imposed strategies for managing tasks lacking intrinsic motivation but also includes self-influence processes that capitalize on the intrinsic motivational value of task activities. He further clarifies three interrelated concepts about self-control. The concept of self-regulation refers to the cybernetic control process conducted by employees to manage their own behaviors. The concept of self-management focuses on the strategies to facilitate one's own behaviors to meet standards. Self-leadership represents a broader view, which includes self-management strategies, but also goes beyond a behavioral focus to address how appropriate or how desirable the standards are themselves.

Self-leadership recognizes the importance of intrinsic motivations, the rewards that result from performing the activities themselves Manz (1986). Three important motivation factors include feelings of competence, self-control and purpose. Several strategies can be used to address these three intrinsic motivational aspects: 1) allowing employees to choose their own work contexts or environments, 2) building natural rewards into the process of performing a task, and 3) encouraging employees to psychologically focus on the pleasant aspects of the work.

2.6 Portfolios of Controls

Storey (1985) suggests that control usually works in levels and cycles, so that if one level of control fails in an organization, then other forms will assume dominance. The same ideas have been developed by more recent studies on organizational controls, which suggest that a portfolio of controls that combines different forms of control works more effectively than just a single form of control.

Adler (2001) agrees with Ouchi (1979; 1980) that there exist three combinations of organization forms and controls, which are market/price, hierarchy/authority, and community/trust. However, he disagrees with Ouchi that each organization only favors one type of control. He argues that different institutions combine the three forms/mechanisms in different proportions. More importantly, he proposes that as the economy becomes increasingly knowledge intensive, there is a trend toward greater reliance on trust rather than the other two types of controls.

Cardinal, Sitkin et al. (2004) examine the creation and evolution of organizational control during organizational founding process. They show how organizational controls are created and evolve through specific phases of the founding period, and provide data and insights about what drives shifts in the use of various types of controls. Among other contributions, they define the balance of controls as a harmonious use of multiple forms of control, and find that an imbalance among formal and informal controls is the key driver of shifts in control configurations. This study shows that informal and formal controls need to co-exist to create effective control portfolios that lead to good organization performance.

In addition, studies that investigate control issues in IT development projects have explored the idea of the portfolio of controls in depth. These studies will be reviewed in the section 3.9.2.

After reviewing the dominant views on controls and the recent development on control theory, the following two sections turn to two other perspectives on controls: disciplinary power and the dialectic of control.

2.7 Disciplinary Power and Control

Foucault (1979) uses the term "disciplinary power" to refer to the notion that individuals and groups often discipline themselves unconsciously even without visible external control present at the moment. Under disciplinary power, conformance to control is not obtained by physically and personally exercising power over the ones being controlled. Instead, social actors interpret that they should be subject to control and choose to behave properly even if alternative courses of action might relieve their oppression (Robey and Boudreau 1999).

One of the key characteristics of power and control under disciplinary power is their invisibility. In this situation, controls are exercised indirectly and impersonally. The controls might be excised through institutional, technical, or normative regulations, and an example can be people who are forced to follow the work procedures embedded within an information technology tool that they have to use (Orlikowski 1991). Foucault (1979) explains that, traditionally, power and controls were often very visible, and those who were controlled were less visible. The ones who were controlled "received light only from that portion of power that was conceded to them or from the reflection of it that for a moment they carried" (Foucault, 1979, p187). In this sentence, Foucault used a metaphor to describe the visibility/invisibility of the power. The power is like the light from a lighthouse, and those being controlled are in the dark most of the time and they are only visible at the moments that the power is exercised on them. However, disciplinary power is the opposite. It "is exercised through its invisibility; at the same time it imposed on those whom it subjects a principle of compulsory visibility." Disciplinary power makes those who are controlled very visible, assuring that power can

be exercised on them. “It is the fact of being constantly seen, of being able always to be seen, that maintains the disciplined individual in his subjection” (Foucault, 1979, p187).

2.8 Dialectic of Control

Based on the central notion from structuration theory that a human agent has the capability to choose to act in alternative ways, Giddens (1979; 1984) uses the term “dialectic of control” to describe the intrinsic relationship between agency and power. Giddens argues that power relations are always two-way.

> “However subordinate an actor may be in a social relationship, the very fact of involvement in that relationship gives him or her certain amount of power over the other. Those in subordinate positions in social systems are frequently adept at converting whatever resources they possess into some degree of control over the conditions of reproduction of those social systems.” (Giddens 1979, p 6)

Giddens explains the notion of dialectic of control in the context of critiquing Max Weber’s conception of bureaucracy, although he believes that the notion has a broader scope. Giddens primarily focuses on two elements of Weber’s conception: the hierarchy of offices, and the significance of bureaucratic rules.

First, Weber suggests that both authority and power in bureaucracies become ‘drained off’ towards the top. Bureaucracy causes a progressive decline in autonomy in the lower levels of the hierarchy. Giddens critiques that in modern bureaucratic systems, there is much space for those assuming subordinate roles to acquire or regain control over their organizational tasks than Weber recognizes. “The more tightly-knit and inflexible the formal relations of authority within an organization, in fact, the more the possible openings for circumventing them” (Giddens 1979, p145). Giddens also argues that the formal authority relations within bureaucracies are not consensually accepted through all levels of the organization. Instead, these dominant symbol-systems are usually accepted

predominantly by those in the higher authority position. Those in the subordinate positions still have autonomy and can maintain the element of control by resisting or distancing themselves from oppressive tasks, which represents an extension of control.

Second, Giddens argues that although the written rules exist within bureaucratic organizations as an important component, the rules do not follow or interpret themselves, and often do not provide much more of a focus for conflict than Weber acknowledges. Written rules, however strictly designed, often leave spaces for human agents to choose to do otherwise. When agents act following written rules, their actions are enabled and restrained by rules, and at the same time, their actions produce and reproduce those rules. Therefore, Giddens stressed,

> "The dialectic of control operates even in highly repressive forms of collectivity or organization. For it is my argument that the dialect of control is built in to the very nature of agency, or more correctly put, the relation of autonomy and dependence, which agents reproduce in the context of the enactment of definite practices. An agent who does not participate in the dialectic of control, in a minimal fashion, ceases to be an agent." (Giddens 1979, p149)

2.9 Research on Controls in Information Systems Research

Information system researchers conduct research on the control issues in the context of information systems. Much empirical research has been conducted in the context of information systems development (ISD) projects to extend and elaborate control theories. This branch of research contributes to the control theories from various perspectives, including the antecedents of control modes, the portfolios of controls, and the consequences of controls. In addition, information system researchers have explored the impact of information technologies on organizational controls and the development, use and impact of computerized monitoring systems.

2.9.1 IS Studies on the Antecedents of Control Modes

Kirsch (1996) identifies the antecedent conditions that predict the type of controls used in the context of information system development projects. Based on prior theoretical and empirical work on control theory, Kirsch (1996) summarizes four types of controls (behavior, outcome, clan, and self control), and integrates different theoretical perspectives to predict the circumstances under which each type of control will be implemented. While acknowledging that the characteristics of the task and the organizational environment predict the use of various types of control as indicated in prior studies, Kirsch (1996) also argues that control theory is incomplete when applied to a complex, non-routine task such as the management of information systems development. In particular, she proposes that the controller's knowledge of the transformation process of the task is also a key determinant of the type of control chosen. Using data collected from survey responses from 96 participants in 32 system development efforts, Kirsch concludes that (1) behavior observablility, controllers' (in this case, the project sponsor) knowledge about ISD process, and the interaction factor of the two determine the amount of behavior control; (2) the use of outcome control is determined by behavior observability and outcome measurability; and (3) the use of self-control depends on outcome measurability and controllers' knowledge about ISD. No relationship between clan controls and the independent variables was found in this study.

Most of the previous studies investigate the choice of different control modes on direct reporting relationships between ISD project leaders and their superiors in a hierarchical setting. By contrast, Kirsch, Sambamurthy et al. (2002) examine the choice of control modes in the client-IS relationships, which involve both hierarchical and lateral

settings. Based on data gathered from a survey of 69 pairs of clients and IS project leaders, this study re-affirms the antecedent conditions for the use of outcome and behavior controls and provides additional empirical evidence for the use of self and clan controls. The results suggest that the clients encourage IS project leaders to exercise self control when task observability is low and outcome measurability is high, and that clients implement clan control when behavior observability is high and clients have little knowledge of the ISD process. Consistent with Kirsch (1996), understanding of the ISD process is a key factor in controllers' (in this case, the clients) choice of control modes.

2.9.2 IS Studies on the Portfolios of Controls

The idea of portfolios of controls have been investigated by IS researchers in the context of IT project management. Henderson and Lee (1992) examine the relationship between controls and team performance in IS design teams. They argue that controls in IS design teams can be initiated by either team managers or project team members. Managers influence the performance of the team by either behavior control or outcome control, while team members also exercise control in the form of self-control or outcome control. In addition, the authors argue for the combined effects of both managerial control and team-control based on the work of Tannebaum (1968), which proposes that both managerial controls and team-member control can operate concurrently and that their effects are additive. The high degree of managerial control can ensure efficient administration and the high degree of team-member control can foster identification, motivation, and loyalty. Based on empirical data collected from 41 IS design teams, Henderson and Lee (1992) conclude that the combination of managerial control and

team-member control contributes to high team performance, especially when behavior control from management and outcome control from team members are combined.

Kirsch (1997) examines how and why control portfolios vary in the context of IT development projects. Conducting case studies of four IT development projects, she explores how IS and user stakeholders exercise control to manage ISD projects and why they choose to structure portfolios of control modes as they do. The findings show that both users and IS play a critical role in controlling systems development projects, and that all stakeholders implement a portfolio of control modes that typically includes both formal (outcome and behavior) and informal (clan and self) controls. For each control mode, a variety of mixed and overlapping control mechanisms are implemented. When stakeholders construct the control portfolios, they typically start with pre-existing mechanisms of formal controls, and then design new control mechanisms to implement formal control or add informal controls to supplement formal controls. Consistent with prior studies on antecedents of selecting control modes in ISD projects (Kirsch 1996), this study confirms that the choice of particular control mechanisms depends on task characteristics, role expectations (meaning that organization members in certain roles are expected to behave in certain patterns), and project-related knowledge and skills.

Following the work of Kirsch (1997), Choudhury and Sahberwal (2003) explore the control portfolios in outsourced ISD projects. Similar to Kirsch (1997), they examine mechanisms in the portfolios of controls, the change of the portfolios of controls during projects, and factors influencing the change of the portfolios. The difference is that they focus on the outsourced rather than in-house projects. They found that the portfolios of control in outsourced ISD projects have similarities with and differences from those in

traditional ISD projects. Both types of projects are managed by a portfolio of controls. However, outcome controls dominate outsourced projects, especially in the initial stage of the projects. Behavior controls and mechanisms that encourage and enable vendors' self-control are often added in the later stage of projects. Clan controls are less used -- only in situations when the client and vendor have shared goals and when frequent interactions lead to shared values. In general, the outsourced projects tend to start with simple controls but add additional controls after experiencing performance problems. The factors influencing choice of a set of controls are similar to those in the traditional ISD projects. The three most important influencing factors at the start of the project are the client's perception of the vendor's knowledge of the project, the consequent role expectations, and perceptions of difficulty in monitoring vendor behavior. These factors outweigh the potential influence of the controller's project-related knowledge and project size. The vendor's performance in the early stage of project significantly influences the construction of control portfolios in the later stage of the project.

Kirsch (2004) takes a process view of control portfolios in ISD projects. She examines how stakeholders exercise controls during different phases of large IS projects and why control choices change across project phases. The findings show that during the initial phase of a project, control is exercised as "collective sense-making," in which both IS and business stakeholders utilize mostly informal mechanisms of control. During the development phase, IS managers structure hierarchical relationships with subordinates and rely extensively on formal control mechanisms. Kirsch labels this phase as "technical winnowing". During the implementation phase, both IS and business stakeholders employ formal and informal mechanisms to exercise control as "collaborative

coordinating". This study also finds that the factors triggering the changes in control choices from one phase to another lie in the project, stakeholder, and global contexts. As factors change across phases, so too do control choices.

2.9.3 IS Studies on the Consequences of Controls

Nidumolu and Subramani (2003) examine the relationships between the modes of control used in ISD projects and the projects' performance. They differentiate controls along two dimensions: the process approach and the structure approach. They refer to behavior controls (specifying methods) and outcome controls (specifying performance criteria) as the process approach, and refer to control through standardization (centrally devised standards for activities) and decentralization (delegation of authority for decision making) as the structure approach. This study synthesizes these two approaches and suggests four control modes: standardization of methods, standardization of performance criteria, decentralization of methods, and decentralization of performance criteria. By associating these four control modes with projects' performance in a sample of 56 firms in the software industry, the authors find that two control modes, standardization of performance criteria and decentralization of methods lead to better project performance, that is, performance criteria should be uniform across projects while project teams should have the autonomy to choose their own methods. The other two control modes, standardization of methods and decentralization of performance criteria are not related to project performance.

Piccoli and Ives (2003) examine the relationship between behavior control and trust in the context of virtual teams. Behavior control has been found effective in stimulating team performance, fostering cooperation, and improving individual

psychosocial outcomes in traditional co-located teams (Henderson and Lee 1992; Pinto, Pinto and Prescott 1993). However, its effect in virtual teams was unknown before this study. Piccoli and Ives (2003) propose and confirm through their empirical study that the behavior control mechanisms have a significant negative effect on trust in temporary virtual teams, where trust can emerge quickly and deteriorate rapidly. Through in-depth analysis, they find that decline of trust in virtual teams is rooted in instances of reneging and incongruence. Reneging means that a team member knowingly fails to fill her obligations, and incongruence means that a team member's perception of her own obligation differs from her team mate's. Mechanisms of behavior control, such as definition of explicit work assignment, specification of rules and procedures, and the filing of project plans and project reports, makes reneging and incongruence more easily detected by the team and thus appears more salient, leading to trust decline in virtual teams.

2.9.4 IS Studies on Computerized Monitoring Systems

Computer-based monitoring is the practice of collecting performance information on employees through the computers they use at work (George 1996). Much research conducted from the 1980s to 1990s in the field of IS addresses the issue of design, use, and impact of computerized monitoring systems.

Drawing on the cybernetic view of control, Grant and Higgins (1996) propose a multi-dimensional view of computer monitoring systems, which describes monitor designs in terms of object of measurements, tasks measured, recipients of data, reporting period, and message content. The contribution of this multi-dimensional view is that a monitoring system is no longer seen as a uniform black box. Computer monitoring

systems vary along several dimensions, which can be used as independent variables in later studies to investigate the impact of monitoring systems in depth.

Grant and Higgins (1991) also examine the impact of computerized performance monitoring and control systems (CPMCS) on employees' attitudes towards work. Especially, they investigate how the design and use of CPMCSs affect the employees' attitudes toward the relative importance of productivity and the relative importance of customer services. Based on the survey data collected on non-supervisory service workers that performed computer-mediated work and had direct contact with customers, the findings show that the use of CPMCS does not automatically decrease employees' perceived importance of service quality or increase employees' perceived importance of productivity. Instead, many other factors affect employees' attitudes toward various job dimensions. Acceptance of CPMCS by employees is very essential. When a monitoring system is well-designed and appears to be credible, it can increase employees' attitude toward importance of production. Otherwise, a monitoring system lacking credibility and acceptance can lead to employees' resistance and other negative reactions to monitoring.

George (1996) conducted case studies in five organizations that used computer monitoring in practice. He focuses on the following aspects that have inconsistent findings in prior studies: employee attitudes toward computer-based monitoring, potential trade-off between quality of work and quantity of work, relationship between computer-based monitoring, stress and illness, and employee's perceptions of supervision. He finds that the practices of computerized monitoring are not uniform across organizations. How monitoring is practiced and how monitoring data are used in employees' evaluation differ significantly between organizations. Many factors lead to this variation, such as the type

of job, the data used for evaluation, management attitudes, and organizational culture. These variations in turn affect the impact of computer-based monitoring on employees and organizations.

2.9.5 IS Studies on the Impact of IT on Organizational Controls

Orlikowski (1991) examines the impact of information technologies deployed in work processes on the forms of control and forms of organizing. She finds that information technology augments and extends existing mechanisms of control as well as reinforces established forms of organizing. Specifically, when information technology mediates work processes, it creates an information environment that facilitates decentralization and flexible operations, and meanwhile generates a matrix of control by increasing the dependence on centralized knowledge and power.

Coombs, Knights et al. (1992) argue that although information technologies are rarely introduced into organizations for control purposes, they often result in intensification of control by encouraging self-controls among organization members. This agrees with Foucault's "disciplinary power" (Foucault 1979). Coombs, Knights et al. (1992) apply this theoretical idea to interpret a case study on the introduction of information systems to the U.K. National Health Service. The new information system required physicians to conduct extensive cost reporting. By using the information system, physicians shifted their attention toward the issue of resource cost, and subsequently redefined their criteria to select treatments and procedures. Consequently, physicians became dependent on the computer-mediated practices that involved them in the management such as cost control in addition to proving health services.

Information availability and accuracy play an essential role in shaping the organization control system, no matter which control modes are adopted. The use of information systems not only automates work processes but also generate information about the underlying work processes, and therefore previously opaque information such as behaviors and outcomes become much more transparent between parties. Zuboff (1988) characterizes this phenomenon as "informating". According to agency theory and the notion of informating, managers (principals) can successfully implement information systems to increase information transparency and tighten controls in most situations. However, when the employees (agents) are autonomous and managers lack the legitimacy to mandate that their employees use the information systems, problems will occur. Kohli and Kettinger (2004) conducted an action research study to learn how hospital managers can successfully implement information system to monitor and benchmark autonomous physicians' medical practices. They call the process "informating the clan" because physicians are mostly self-managed and subject to concertive control. Eventually the system was implemented successfully after the hospital managers promoted an influential physician to direct the information systems implementation project, customized the interface of the system to improve ease of use, and facilitated discussion of the value of using such system within physician communities. Kohli and Kettinger (2004) conclude that a clan can be informated if the principal can legitimized the "human messenger" and "technical messenger", and facilitate clan-based discussion. In this case, the "human messengers" are the influential physicians, the "technical messengers" are the friendly user interface, and the clan-based discussions are the discussions within physicians' community.

2.10 Studies on Organizational Controls in the Context of Telework

There are a few studies investigating organizational controls in the context of telework. Kurland and Egan (1999) conducted a survey to study the relationships among telecommuting, organizational monitoring strategies (outcome-oriented or behavior-oriented), and organizational justice perceptions (distributive, procedural, or interactional justice). They conclude that monitoring strategies are more strongly associated with organizational justice perceptions than with telecommuting, and procedural and interactional justice perceptions are significantly related to telecommuting. Kurland and Cooper (2002) studied how managers' monitoring strategies (behavior, output, clan) link to telecommuters' professional isolation concerns. Their findings show that supervisors in telework face the challenges to exercise clan strategies such as fostering synergy, replicating informal learning, and creating interpersonal relationships. As a result, telecommuters have fewer professional development opportunities and experience professional isolation in their work. Dimitrova (2003) examines the relationship between control and employees' autonomy in telework. Through interviewing professional, managerial and sales teleworkers, the study finds that the changes in control and autonomy are limited to reconfiguration of the work schedule.

Although these three studies in the context of telework all investigated organizational controls, their focus is to investigate the impact or the consequences of organizational controls on employees, whether it is perceived organizational justice (Kurland and Egan 1999), perceived professional isolation (Kurland and Cooper 2002) or employee autonomy (Dimitrova 2003). The studies only touch on the topic of how organizations exercise control in this relatively new work arrangement. Dimitrova (2003)

concludes that there are no significant changes between the management practices in telework and non-telework. Furthermore, these three studies do not explicitly investigate the role of information technologies in organizational controls in telework. Kurland and Cooper (2002) and Dimitrova (2003) state that they did not find that information technologies change the controls within telework. I believe that more detailed elaboration of the organizational controls in telework is needed because it may explain the resistance of telework programs from middle managers, and it is worthwhile to explore explicitly the role of information technologies because they are the key enablers of telework. Therefore, my research focuses on these two research gaps.

2.11 Summary of Literature Review

In summary, control theories are a key area with a long-term research stream in organization studies. Any organization needs to implement control to align organization members' diverse interests with overall organization goals. To better understand controls in organizations, researchers conceptualize control from different perspectives, such as regarding control as cybernetic systems or theorizing control in terms of principal-agent relationships. Researchers also differentiate among the types of controls. Within formal control systems, controls are categorized as behavior control or output control according to control targets. Market, bureaucracy, and clan are recognized as three sources of controls, each with its own coordination mechanism. In addition, self-control is proposed as an alternative to formal control systems. Traditionally, the research focus of controls investigates contingency factors that predict which controls should be used. Recently, researchers begin to study complex control systems. The research focus moves from

identifying suitable controls according to antecedent factors to combining different controls to establish a portfolio of controls.

Control issues have been studied in the field of information systems. In one stream of research, researchers study controls in the context related to information system design, development or implementation. A system development project is a complex process involving multiple parties with diverse interests, thus providing a suitable empirical context to test and advance control theories. At the same time, these studies also contribute to theoretical understanding of information system related phenomena. Another research stream contains studies of the impact of information technologies on controls. The availability of information technologies changes the organization environment, causing changes to organization controls. This research stream makes theoretical contributions by extending or revising control theories so that they can explain phenomena in new organizational forms enabled by information technologies. IS researchers also apply control theories to study computer-based performance monitoring systems.

Studies also focus on control issues in telework environments, and these studies examine the impact of controls on teleworking employees. As telework gains popularity in organizations, there is a need to study in-depth how organizations exercise controls in this work environment.

3 Research Questions

Telework is becoming increasingly popular because of the trend of knowledge economy, global-wise competition, and innovation in information technologies. Telework programs can benefit both the employers and the employees when successfully

implemented. Telework creates an organization environment that differs from the traditional office-based organization environment. Employees have flexibility to configure their work time and work place. Managers can no longer easily manage by walking around. Face-to-face interactions are decreased to a great degree. These new characteristics of work environments create challenges for managers of telework. We need formal knowledge about the management of telework to inform managers so that the organizations can successfully implement telework programs.

Organizational control is one of the central problems of organization science. Prior theories on organizational controls suggest that there are four different forms of controls, formal controls such as behavior control and output control, and informal controls such as clan control and self-control. Depending on contingency conditions such as task and environment characteristics, different forms of controls operate in different organizational contexts and multiple controls can be combined into control portfolios. Because telework redefines the notion of the workplace and changes the organization environment, traditional control theories may not directly apply. Then how does the telework environment affect the use of different types of controls? Will organizations rely more on outcome control because it is difficult to monitor employee in remote settings? Will organizations rely on informal controls such as trust and employees self-discipline, or will organizations rely on the electronic traces such as contents of emails to obtain the information about the employees' behaviors? How do these different forms of control operate together in telework? In summary, our first research question is:

Research question 1: How do different forms of managerial controls operate in telework?

Moreover, information technologies are the key enablers of telework. In telework, employees rely on information technologies to work and to communicate. Prior studies in IS suggest that the use of information technologies can have an impact on controls. However, it has not been explored how the use of information technologies in telework relates to organizational controls. Are organizational controls embedded within the information technologies that employees use everyday? Do managers control employees' behaviors about how they use information technologies? In summary, our second research question is :

Research Question 2: How does the use of information technologies relate to the organizational controls in telework?

4 Research Approach

4.1 Research Assumptions and Research Paradigm

It is recommended for social science researchers to state explicitly two philosophical assumptions - ontological and epistemological assumptions - because these are the two key assumptions underlying the design of social science research (Orlikowski and Baroudi 1991; Mason 2002). The ontological assumption is the researcher' belief about the nature of the phenomena, entities, or social "reality" under investigation; that is, "whether the empirical world is assumed to be objective and hence independent of humans, or subjective and hence having existence only through the action of humans in creating and recreating it" (Orlikowski and Baroudi 1991). The epistemological assumption is the researcher's belief about the nature of knowledge and evidence of the entities or social "reality" under investigation; that is, it is the researcher's assumption

whether and how social phenomena can be known, and how knowledge can be demonstrated (Mason 2002).

My ontological assumption aligns with that of critical realism. The essence of critical realism is the fusion of "…a stratified 'naturalist' ontology for the natural and social sciences with a non-deterministic, non-Humean notion of causality" (Smith 2006, p20). Critical realism differentiates two types of objects, intransitive objects and transitive objects. Intransitive objects are the things and structures independent of our perception of them. Transitive objects are "the artificial objects fashioned into items of knowledge by the science of the day" (Bhaskar 1998: p.16). Our knowledge (transitive) constitutes a part of the world (intransitive) that objectively exists. The distinction between transitive and intransitive objects allows for the combination of an ontological realism with an epistemological relativism (Archer, Bhaskar, Collier, Lawson and Norrie 1998), meaning that reality is intransitive, theories are fallible and changeable, and we can exercise judgmental rationality to choose among competing theories (Danermark, Ekstrom, Jokobsen and Karlsson 2003).

Critical realism accepts two forms of stratification. The first form of stratification is between mechanisms, the events that they generate, and the subset of events that are actually experienced (Mingers 2004). These three domains are also known as the real (what exists), the actual (events), and the empirical (observable events). At the deepest level, "the real" level, the whole of reality exists, including mechanisms, events, and experiences. The "actual" contains the states and happenings resulting from the activation of the causal powers at "the real" level. Furthermore, "the empirical" are the collection of events in "the actual" that can be observed or experienced. This stratification shows us

that we should not reduce all events to only the observed events, and we should not reduce enduring causal mechanisms to events (Mingers 2004). The second stratification is within the realm of objects themselves (Archer, Bhaskar et al. 1998). Causal relationships at one level (e.g., chemical reactions) can be seen as generated by those of a lower level (atomic valence). These dynamic, open, and stratified systems will interact with each other, and particular structures give rise to certain causal powers or tendencies (Mingers 2004), which are called by Bhaskar "generative mechanisms" (Bhaskar 1979, p. 170). The generative mechanisms interact with each other, and possibly counterbalance each other, causing the presence or absence of actual events. Because of the two forms of stratification, the structure and generative mechanisms of objects decouple from the events that they produce, and the mechanisms in "the real" domain do not pre-determine what will happen at any particular time but rather enable what can possibly happen. In other words, mechanisms are better to be understood as tendencies rather than universal laws (Smith 2006).

The phenomenon under investigation in my research is organizations' controls in telework. I acknowledge the three-level ontological stratification of this phenomenon. At "the real" level, there exist physical objects, social objects and social structures, and their generative mechanisms, which are independent of our perception of them. Physical objects include information technologies that the employees adopt and use. Social objects include users' habits and behaviors. Social structures include rules and resources around control issues in telework. We believe that generative mechanisms exist for control issues in telework. That is, there exist certain causal powers, tendencies, and ways of acting that can explain why and how a certain control will or will not work in telework environment.

These generative mechanisms interact with other generative mechanisms in "the real" to activate the events and happenings about organizations' controls in telework at "the actual" level. As researchers, we can observe the events at "the empirical" level, which is only a subset of events at "the actual level".

Epistemological assumptions are the researcher's beliefs about how social phenomena can be known, and how knowledge can be demonstrated (Mason 2002). Epistemology "…concerns the criteria by which valid knowledge about a phenomenon may be constructed and evaluated" (Orlikowski and Baroudi 1991). My epistemological assumption aligns with that of interpretivism. "A fundamental distinction between the interpretive and positivist world view is the former's primary presumption of social constructionism. Interpretive studies assume that people create and associate their own subjective and inter-subjective meaning as they interact with the world around them" (Orlikowski and Baroudi 1991). Thus, despite the assumption of a real world independent of human perceptions, our knowledge of that world is inevitably affected by social interpretivism.

In my study of organizational controls in telework, although I believe that there are "generative mechanisms" or tendencies independent of human beings, I also believe that the process by which people come to understand and gain knowledge about these "generative mechanisms" is a social construction process. At the same time, researchers' investigation on this issue by gathering data at "the empirical" level is also a social construction process. Therefore, people's account of their perceptions and experiences of the controls in telework are valid evidence of knowledge, and my theoretical interpretation of the phenomena advance the knowledge of the problem area.

Orlikowski and Baroudi (1991) explain that interpretive researchers should avoid imposing externally defined categories on a phenomenon; rather, they should attempt to derive their constructs from the field by in-depth examination of the phenomenon of interest. Walsham (1995a) argues that interpretive studies are suitable for the field of information system because people's perceptions regarding information systems use are essential. . Furthermore, an interpretive paradigm is appropriate for studying social processes because this paradigm is explicitly designed to capture complex, dynamic, social phenomena that are both context and time dependent (Orlikowski and Baroudi 1991). The research problem under investigation in my study is a complex and contextual social process. Therefore, even as I acknowledge the objectivity of "generative mechanisms" underlying the phenomenon, I believe that the phenomenon can be observed and understood by studying my perceptions and interpretations of it, which are subjective. Thus, interpretive inquiry allows me to capture and analyze the organizations' controls and employees' perceptions about the controls in telework.

The interpretive paradigm is not completely homogeneous. Orlikowski and Baroudi (1991) differentiate between two variants of interpretive research: the "weak" and the "strong" constructionist views. From the weak constructionist view, interpretive research is thought to take a complementary position to positivist research. The strong constructionist view claims that interpretive research should replace positivist investigations. Similarly, Walsham (1995a) distinguishes among four different levels of rhetoric qualifying interpretive work. In increasing order of their claims, those levels are: the rhetoric of the exploratory study, the complementary approach rhetoric, the rhetoric of appropriate research issues, and the replacement of positivism rhetoric. My research

stands at the second and third rhetorical positions of Walsham's framework - the complementary approach rhetoric and the rhetoric of appropriate research issues. Under the former rhetoric, interpretive and positivist research are seen as complementary and of an equal status. Under the latter rhetoric, certain research issues fit the interpretive approach, while others better fit the positivist approach. My own interpretive position is "moderate." I view the interpretive approach as more suited to research building theory, and meanwhile I also value different approaches (such as those embodied in the positivist paradigm) to proceed to thorough theory testing, and thus complete the full research cycle (Galliers 1991). In other words, I believe that a qualitative research study is complete in itself and should not be seen only as a pilot study or as preliminary to quantitative research (Bottorff 1997). However, I am not against subjecting the results of qualitative work, including those of the present research, to further empirical testing, evaluation, and generalization. These assumptions are completely consistent with critical realism, which asserts reality as objective and which values multiple research methods (Mingers 2004).

4.2 Research Methodology

4.2.1 Grounded Theory

The research method followed by this study is grounded theory (Glaser and Strauss 1967; Eisenhardt 1989; Yin 1989; Strauss and Corbin 1990). Applying grounded theory research methodology, I studied two work groups with an objective of generating a descriptive and explanatory theory about organizational controls in a telework environment.

The grounded theory method (Strauss and Corbin 1990; Glaser 1992) is a "qualitative research method that uses a systematic set of procedures to develop an

inductively derived theory about a phenomenon" (Strauss and Corbin 1990, p 24). The resulting grounded theory specifies the relationships among concepts and sets of concepts with empirical evidences, and the theory can be in the form of a narrative statement, visual picture, or in a series of hypotheses or propositions (Creswell 1998). The benefit of the grounded theory approach is that the resulting theory is intimately tied to the evidence (Eisenhardt 1989). Three intrinsic procedures in grounded theory are inductive reasoning, interwoven data collection and data analysis, and theoretical sampling.

Using grounded theory, researchers do not specify theory a priori and then confirm the theory empirically. Instead, researchers apply inductive reasoning to discover theory emerging from empirical qualitative data. The method allows researchers to "develop a theoretical account of the general features of a topic while simultaneously grounding the account in empirical observations or data" (Martin and Turner 1986, p 141). This inductive, theory discovery research mode can be particularly useful when no prior theory has been established to date. Although control theories in general have existed for a long time, they could not be directly applied in the new organizational environment because telework differs from a traditional office-based work environment. Therefore, I believe it is appropriate to employ grounded theory approach to elaborate and extend control theories and to generate a theoretical account for the particular phenomenon that I investigated.

Grounded theory requires that data collection be tightly interwoven with data analysis. In the research process, both activities occur simultaneously, and data and theory are constantly compared and contrasted during data collection and analysis. The

emerging theoretical account generated from analysis of data collected in early stages guides the data collection in later stages (Locke 1996). The interwoven nature of data collection and analysis makes it possible for analysis to direct the process of theoretical sampling, which refers to the technique of selecting incidents and informants on the basis of concepts that are relevant to the emerging theoretical account. Theoretical sampling applies both to the selection of the research site selection and the selection of the study informants

The findings of grounded theory studies are detailed and particularistic, but a more general explanation can be produced from the results (Eisenhardt 1989; Leonard-Barton 1990). The generalization here is different from the more typical statistical generalization, which refers to generalizing from a sample to population. Rather, the generalization is "analytic generalization" (Yin 1989), meaning that inductive concepts generated by the field study are combined with insights from existing formal theory (Glaser and Strauss 1967). So what is generalized is the theoretical concepts and patterns. The outcome of my study is a general conceptualization of the organizational controls in telework that should both contribute to our research knowledge and inform IS practice.

Since two schools of thought now exist in the grounded theory approach, grounded theorists often need to take a stand on a specific version of the methodology (Boudreau 1999). The two schools of thought in grounded theory are the Straussian (after Anselm Strauss) and the Glaserian (after Barney Glaser), each presenting different assumptions and methods (Stern 1994). Locke (1996) summarizes the key difference between the two schools. The Straussian school encourages the researchers to take an active, even provocative role when collecting and analyzing the data, whereas the

Glaserian school suggests that researchers should prevent and minimize their impact on the data and allow the data to speak for themselves. In my research, I applied the grounded theory methodology aligned with the Straussian school of thought. First, I agree that it is difficult to pursue research with a "clean slate". Second, my research intends to provide a theoretical account of organizational controls in telework to extend or refine the existing theories on organizational controls, Last, my research is primarily based on the methods and procedures presented in Strauss and Corbin (1990). Thus I followed the Straussian school when conducting this study.

4.2.2 Research Site

In site selection, I followed the strategic sampling technique for qualitative research, which means choosing a site or group that will provide some insights about the main research questions. Because the phenomenon under investigation is organizations' controls in telework, I accessed a site where employees primarily worked at home and away from their managers. Time limitation compels me to investigate a single organization as opposed to many. This is not problematic, given that data generated through the investigation of a single site is likely to be comprehensive enough to conduct a thorough exploration of the control issue in telework.

The research site is two groups within a large corporation, TechCo[1]. TechCo develops innovative information technologies products and services and has employees around the globe. In order to attract and retain talent around the globe and save real estate costs, TechCo promotes telework with their employees. Within corporate resources, there is a division of people, Telework Support Program, working especially for the purpose of

[1] All names are pseudonyms.

supporting TechCo's telework environment. Meanwhile, employees within Telework Support Program also practice telework in their daily work. I accessed two work groups within Telework Support Program, Work Location Service Group and Product Development Group as our research site.

These two groups were ideal for the study because they not only practiced telework but they also promoted it at TechCo. In contrast to groups involved in Software Engineering (who seemed less receptive to being studied), the Telework Support Program was receptive to my efforts to study telework. Therefore, selecting these two groups was aligned with the principle of theoretical sampling.

4.2.3 Data Generation

In this research, I used qualitative interviews as my primary data collection method. Choosing interviews as primary data sources best serves the research goal and agrees with my research methodology strategy. The research question is to investigate and understand the organizations' controls in telework. People's interpretations, perceptions, meanings and understandings of their experiences with controls in telework are the major data I sought to collect. Qualitative interviewing is an effective method to get the inside views from study participants. Moreover, although in theory it would be ideal to conduct observations to complement interview data sources, it was not feasible in practice because the study participants worked primarily at home and were remote from each other and from me.

The targeted interviewees included people who exercise control and people who are controlled in telework. I conducted interviews from June 2007 to December 2007. I first interviewed the primary contact and the director of the Telework Support Program to

understand the general work practice of Telework Support Program, and then I interviewed the directors and employees in two workgroups, Work Location Service Group and Product Development Group, within Telework Support Program. The interviews were conducted face-to-face if possible or via telephone when face-to-face interviews could not be arranged. Each person within the two work groups was interviewed twice, and each interview ranged from 45 minutes to two hours. Table 1 shows the number of interviews. I began each interview with open-ended questions related to our research. For example, to investigate organizational controls in telework, I asked the interviewees, "How does your organization, your managers, and you yourself make sure that you work productively even when you work at home?" In order to investigate how the use of information technologies related to organizational controls in telework, I asked the interviewees, "Describe the adoption and use of a particular information technology in your work and how is your manager involved in this process?" After the starting questions, the interviews were in conversational style and the following questions or probes depended on the answers given by a specific study participant.

Table 1: Study Participants and Interviews

Participants	Interviews
Telework Support Program Director	1
Primary contact in Telework Support Program	1
Work Location Service Group Director	2
Work Location Service group team members (4 people)	8
Product Development Group Director	2
Product Development Group Team members (7 people)	14
Other employees in TechCo (8 people).	8
Total	36

Strauss and Corbin (1990) state that in grounded theory inquiry theoretical

sampling cannot be planned before embarking on the study and the specific sampling decisions should evolve during the research process itself. Therefore, the data collection phase is parallel with the data analysis phase. Analysis of data obtained in the early stage is used to guide data collection in later stages. I followed this principle in my research. I first interviewed people in Location Service Group, conducted preliminary analysis on the data and used the results of the analysis to direct my interviews with people in Product Development Group. I exited the field when I reached "theoretical saturation", meaning that I exited when I could not identify new themes from my interviews.

4.2.4 Data Analysis

The objective of data analysis is to subject the interview transcriptions to interpretation using coding analysis techniques. I conducted data analysis using three phases of coding suggested by Strauss and Corbin (1990): open, axial, and selective coding. My overall research strategy is inductive, meaning that theory is developed through data generation and data analysis (Mason 2002). I did not formulate hypotheses based on the literature prior to my empirical research. I did review the prior literature on controls to increase my sensitivities with regard to the research problem, and these literatures provided me a starting point in my research. Increasing the researcher' sensitivity on the research problem at hand by reading literatures is recommended by Strauss and Corbin (1990).

This research strategy directs my data analysis phase. By iterating from data and theory, I eventually generated theoretical explanations.

<u>Step 1: Open coding</u>

The data analysis started with open coding. The incidents, events, quotes and other instances gathered during data generation were compared to examine similarities and differences. From the transcribed interviews and notes, similar data were grouped together and labeled by categorical codes. In open coding, I first developed an initial list of codes based on my literature review on control theories. The initial list of codes is listed in appendix 1. Control mechanisms of outcome control, behavior control, clan control and self-controls were identified and used as codes. I also coded employees' uses of information technologies. When applying these codes to the interview transcription, there were some incidents and quotes that did not fit into these existing codes, which required that I generated new codes for them.

Step 2: Axial coding

After open coding was finished, I made adjustments by combining redundant codes. I conducted axial coding by organizing data according to the recurring theme and linked the associated concepts to uncover the relationships among categories and subcategories. The results of axial coding were a set of broad categories and associated concepts that described and explained the organizational controls in telework. The codes I used are listed in Appendix 2.

Step 3: Selective coding

After the general concepts and the relationships among these concepts were generated, I conducted selective coding with an objective to uncover larger patterns by integrating all analyses into one "core category". The results of this analysis stage were a story line describing a coherent conceptualization of the main phenomenon. Selective coding was terminated when I reached theoretical saturation, which is indicated by the

fact that no new or relevant data inform a category, the category development is densely populated, and the relationships between categories are supported by adequate evidences.

Multiple Exemplars Data Presentation

In my analysis and results presentation, I used the "multiple exemplars" method (Denzin 1989; Bechky 2006). Multiple exemplars is a qualitative study method that allows the researchers to deconstruct prior conceptions of a particular phenomenon, collect multiple instances that illustrate the concepts under study, and inspect these instances carefully for essential elements or components. The elements are then reassembled into a story line in a logical order. to . In my study, first I provided the description of the social contexts of the both group. Then, rather than analyzing control within each participant group, I collected control instances from both of the participating groups, used these instances as exemplars of control mechanisms, and described them according to control forms.

5 Results

5.1 Social Contexts of the Two Groups

Work Location Service Group. Work Location Service Group (WLSG) group is a work team within TechCo's Telework Support Program. This team works on global work location strategy, meaning that they identify, document, and facilitate the global deployment for TechCo. Since TechCo is a global company and has workers in many countries and areas, this group supports decision making regarding the locations in which TechCo is going to invest or disinvest on a global basis. The typical issues that they address are where TechCo will have workforce, what skill sets will be required for the

workforce, and what infrastructures (including physical, technology, and work practice) will be needed for the new workforce. To achieve this purpose, they conduct research on the demographics of different locations around the world, and constantly monitor trends within the company. Their work activities include online research, gathering data by interviewing internal or external stakeholders, analyzing data, and writing reports.

WLSG is a small group, and the team members are distributed. They have one group director and four group members. The group leader, Kevin, and one of the group members, Mary, live in the Bay area, California and are close to TechCo's headquarters. The other three group members -- Kate, Mathew, and Roan -- live in Colorado near another TechCo campus. Four of the five people (all except Mary) are home-based and thus primarily work at home. Mary is flex-based. She comes to office regularly but has no permanently assigned office. Team member Roan and Kate joined the group one year ago and are relatively new to the group. All members have worked for TechCo for a long period except Mary who has worked for TechCo for only two years.

Since their group is distributed, they rely on technologies for everyday communications. Email and phone are the primary tools. Instant messenger is used among Mary, Mathew, and Kevin. They occasionally use an online collaborative tool called WebEx. They physically meet at least twice a year either in the Bay area or in Colorado. Otherwise they hold weekly teams meetings and one-on-one meetings with their manager electronically.

Product Development Group. The product development group (PDG) is a group within TechCo's Telework Support Program. This group is responsible for designing and developing "products" to support the distributed work environment in TechCo. The

products include real estate design, information technologies, and human resource work practices. The typical work assignments for this group include designing information systems such as office reservation systems, online data collaboration tools, architectures for new office buildings, and new performance mapping and reward systems to fit the telework environment.

There are currently eight people in the group, reduced from 12 by a recent reduction of workforce. Their group includes people from three different backgrounds: real estate (2 people), information technology (5 people), and human resources (1 person). They are a distributed team, all based primarily at home. The manager, Mack, is located on the East coast. One group member lives in Arizona, and another one in New Jersey. The other members of the group are located in the Bay area and live within driving distance of TechCo headquarters. They hold face-to-face meetings at least twice a year, and they hold virtual group meetings every two weeks. Since most of the technology subgroup lives within driving distance of their office building, the have a separate group meeting and social activities on campus every week. Because of the nature of their work, PDG constantly experiments with different information technologies to support telework. Besides using phone and email to communicate, they are mandated by their manager to use an online calendar, video camera, and instant messenger.

After the reduction of the workforce, the nature of work and direction of the group changed. The new plan emphasizes more on the human resource aspect of mobile virtual work, and the technology sub-group is moving away from developing technologies to support Telework and toward researching new technologies that have potential to support virtual work.

5.2 Organizational Controls within the Two Work Teams

I found that these two teams are managed by a combination of four forms of controls: outcome, behavioral, clan and self-controls.

5.2.1 Outcome Controls

5.2.1.1 Goal Setting Process

TechCo had organizational-level policies on goal setting and goal cascading processes. At the beginning of each fiscal year, first the vice-president-level managers set the goals, followed by goals set at the director-level managers and then the employees. The employees became owners or partial owners of the goals. The company encouraged the managers to manage employees according to the goals rather than exercising personal and direct supervision.

Both of the groups followed this goal setting process in their work. The managers acknowledged that the goal setting was of great importance in their work and believed that clear goal setting could reduce the need for constantly monitoring their employees. Kevin, WLSG team director, focused on setting goals and setting associated timeframes to reach these goals, and he expressed that he cared less about his employee's working behaviors on a daily basis as long as the goals were met on time.

> *"I don't mind if they spend 8 o'clock in the morning to 6 o'clock in the night working, or 8 o'clock to 6 o'clock in the zoo, as long as they meet their goals and don't' miss the deadline." Kevin, WLSG team director*

The goals were very detailed. The goals could be about an ongoing projects or routine work. For example, a WLSG team member, had these goals for the following year:

"(the goals) will be continuing on with the GIS project to implement the GIS, get training on the GIS as well as ensure training for others in our group and additionally I will have goals around the financial work I am doing on the budget…." Roan, WLSG team member

The managers strived to set specific and clear goals with their employees, and there were quantifiable metrics around the goals so that they could be easily measured when it came to the performance evaluation time.

"TechCo likes to have sort of quantitative metrics around your goals, so you know. You write one report a quarter…, there is a number associated with it." Roan, WLSG team member.

During the working process, goals were adjusted based on the current trend in the company. Goals set at the beginning of the fiscal year were used as a guideline for their work, but goals were evaluated periodically and priorities could change over time.

"On a quarterly basis, we will formally assess how we did. Do we meet our objectives, do we fall behind? If for some reasons, this thing falls off the agenda, if something else comes up -- we don't need 4000 engineers on Minneapolis, what we want is, 5000 sales people in Oshkosh -- OK. If that's what is been told by the company, let's go down that path instead." Kevin, WLSG team director

At the end of the fiscal year, when it came to the evaluation of the employees' performance, the goals set at the beginning of the year played an important role.

According to Matthew, WLSG team member, there was a detailed performance review about what goals were achieved and what goals were not achieved. When the goals were not met, there was an analysis whether it was intentional or unintentional, whether the goal fell off the priority list and became irrelevant, or it was still relevant but was not achieved. There were also discussions about goals that were supposed to be on the list but were missing, and things that had been done but were not on the list.

5.2.1.2 Focus on Deliverables

In both groups, managers emphasized deliverables. For each work assignment, the managers specified the deliverables and time frame to complete them. The employees were measured on the quality and the timeliness of the deliverables. Mack, PDG team leader, stated that the deliverables in his group were very specific.

> *"They can be very simplistic, such as the physical design standards or the functional requirements for technologies to support [remote] work. They are written documents." Mack, PDG team leader*

The managers believed that specifying and evaluating employees' deliverables could greatly, if not totally, replace monitoring employees' behaviors on a day-to-day basis, and thus they emphasized that they evaluate employees based on the "product" rather than "process".

> *"I am not going to judge you for being in the office for extended periods. I am going to presume I give you work you can get it done...I am going to measure you on your work product." Kevin, WLSG team leader*

Between getting clear instructions for deliverables and turning in deliverables for evaluations, the employees worked rather independently. The management style was

hands-off rather than micro managing. Mack, PDG team leader, expressed that working independently was absolutely critical in his group.

"I am not going to tell you exactly how to build it, or how to create it, I want you to tell me.… That is why we pay you to be expert…In some sense there is this dichotomy that I am going to give you very very quantifiable deliverables, but I want you to work independently to get to them." Mack, PDG team leader

On the employee side, they felt that being evaluated on the quality and timeliness of the deliverables made the work environment more "fair".

"I think it is much more egalitarian when you are at home. You are judged more on the merits of the output." Matthew, WLSG team member

5.2.1.3 Checkpoints

While the employees worked on deliverables that were associated with the goals, there were regular updates about the status of the work, which were referred as "checkpoints". Status update was a policy of the company that specified that the employees should provide status updates every quarter. But in reality the status updates happened more frequently than quarterly.

Much of the work these two groups did was research. Due to the uncertainties and risks involved in research work, often ideal output could not be produced, and sometimes the results of the research could not be immediately deployed. To address this concern, checkpoints were scheduled according to the phase of the project. For example, checkpoints might occur after the research results were delivered but before they were deployed. This was to ensure that work was acknowledged even when it could not be immediately deployed.

"We will research and experiment, and we will do some sort of pilot if necessary. Then we will take it up to these ladders, at the very end, a gateway, somebody will say yes or no (to deploy it). …. For Mack's eyes, he needs to see if that project gets to that point, if it does get to that point (but cannot be deployed immediately), we will just take a look of the research we have done. …We will put it in a folder so people can get to it because people are just not ready for it right now." Chad, PDG team member

The checkpoints could be initiated by either the manager or by the employees. Manager-initiated checkpoints often happened in the regular group meetings or in one-on-one meetings between the managers and the employees. In some cases, the managers required the employees to publish periodic status reports.

"I have a teleconference with my entire team every week, where we go through updates, pass downs… as well as 10 minute reviews with each person about, how was your portfolio work? In addition to that, I have 1 hour calls with each person, where I walk through their portfolio activity. And once a month we publish a full status." Kevin, WLSG team leader

Interestingly, checkpoints were also initiated by the employees. Employees often reported to their managers what they were working on and their progress on the projects even when the managers did not ask them to do so. This phenomenon is commonly seen among the employees in these two groups. For example, Sage worked in Arizona, not only away from his manager, but also away from his peers and any TechCo campuses. He reported that he felt the need to proactively communicate to his managers about his work status after he started working from home.

"Since I have been working from home…I've started to make sure I work proactive in communicating, just to my own boss, what I am working on, what is my status, what I am doing? Even if it is good, even it is I am on track. If it is due in two weeks, one week has expired, I've done a week's worth. I have one week left. I will tell him that, so he knows." Sage, PDG team member

In addition to reporting their positive progress on the projects, the employees also took initiatives to ask for their managers' inputs when the employees could not independently solve a problem.

The major reason behind the employee-initiated checkpoints was the employees' concern about visibility. Almost all the employees who worked at home reported that they needed to take initiative to obtain visibility, and taking initiative to report their work status was one of the important avenues to achieve this. Belinda, PDG team member, periodically made appointments with her director or upper level management to talk about her current work and the directions of her future work.

"You don't want them to forget the work that you are doing and the value you bring to the organization. So having kinda strategic check-ins, it fills a lot of purposes. One, yes, I know about the strategic directions, I am fine with continuing. But two, also reminds them just what it is what I am doing, where I am, that type of thing." Belinda, PDG team member

The second reason behind the employee-initiated checkpoints was that some employees felt that in the telework environment, informal encounters were lacking. In an office-based work setting, informal status updates could happen in casual talks in the hallways or cafeterias. These opportunities for informal encounters were missing in

telework, and so employees took initiatives to report their work status to make up for the lost opportunities. Sage, PDG team member, primarily worked at home and was distant from his boss and any major TechCo campus. He expressed concerns about lacking informal conversations with his boss.

> *"You know, there is something missing…I felt like I could call my boss in Boston any time. I wasn't cut off. But if you never call you boss unless there is something formal or important, and you didn't have a few casual hallway bumps -- those are the things that just stopped happening. You are kinda left with a gap or a hole" Sage, PDG team member*

The major distinction between employee-initiated checkpoints and other outcome control mechanisms was that the other control mechanisms were imposed by the manager, while the employee-initiated check points were initiated by the employees.

5.2.1.4 Issues with Outcome Control

The managers and the employees expressed concerns that, although they relied heavily on outcome controls, sometimes it was difficult or even unjustifiable to apply outcome controls. First, interactions between people and relationship building were important in TechCo. These two groups conducted knowledge work. In addition to producing results, these groups also had responsibility for sharing the knowledge produced with the right people within the company through people interactions. These people elements were difficult to capture within the outcome control.

> *"I think managing by results are probably 80%. That is gotta be 15% based on subjective. The 15% human elements...Do not forget that… it may not be measured in the results oriented piece." Cadee, PDG team member*

Second, the research work done by these two groups involved uncertainties and risks. Even if the employees worked hard, satisfactory outcome might not be easily produced. In this sense, using outcome controls was not justified.

"Some of us are tech professionals that are 10 years or more out of schools. We are solving problems that may not have been solved before… and there are maybe a lot of creativity involved in the solution. What that means is that some percent of the time you try, you will fail." Diamond, PDG team member

Third, because research work was creative and original, the end results could not be easily measured objectively. Thus, results were measured subjectively. This meant that the outcome of the work had low measurability, which made exercising outcome controls unsuitable.

"My own job, making meetings more productive..... So obviously you are talking about white collar productivity and no one knows how to measure that. Maybe Mack did my review and says, 'I think she did a good job.' But I could work for someone else... They weren't that happy…I did exactly the same work, I got different results." Diamond, PDG team member

In summary, these two groups were managed by outcome controls. The outcome control mechanisms included goal setting process, deliverable focus, and checkpoints. Meanwhile, these two groups expressed that the nature of their work, research type of work, made outcome control incomplete to some degree.

5.2.2 Behavioral Control

5.2.2.1 Rules and Protocols

Both work groups set up rules and protocols for appropriate behaviors related to availability, the use of technologies, and the workflow. Rules and protocols were critical for maintaining the efficiency and quality of their work. There were some corporate-level guidelines, but most of the rules and protocols were set up at the team level. Mack, PDG team director, referred these protocols as roadmaps and blueprints for the team.

> *"We have all these roadmaps, blueprints, whatever you want to call it for doing remote work. …we tried it very hard it make it part of our DNA." Mack, PDG team director*

There were clear protocols explicitly set up by the managers, and there were soft rules gradually formed during the work process. Soft rules will be further elaborated in the clan control section. The content of the protocols included availability management, the use of technologies, and workflow. Availability management and the use of technologies will be discussed in more detail in the following sections. Below is an example of the protocols on workflow.

> *"We try to have some sort of protocols, who can and who cannot update something. At the beginning of the project, we are going to define, OK. You are someone who is going to update stuff. You are in charge of the specific part of the project. So you are in charge of these sets of documents." Chad, PDG team member*

When the rules and protocols were not followed, the managers exercised sanctions. For example, in PDG group, there was a rule about using instant messenger

(IM), an online tool with which people can exchange messages instantly. All people were required to be logged into instant messenger during work time. One of the employees in PDG did not follow the protocols about using IM, and he was laid off in workforce reduction. Mack recalled one conversation he had with this person.

> *"I said, 'you just refused to use IM.' 'Well, it isn't something I am comfortable with', then I said, "Get comfortable because I don't know what the hell you are doing 50% of the time.' That did not change. He was so set in his ways… He no longer works for us."Mack, PDG team director*

This example shows that the manager explicitly specified the behavioral standards, and when the employees violated the protocols, there was punishment associated with it.

5.2.2.2 Availability Management

In telework, employees have flexibility to decide their own work time and space. However, being available and accessible during work time and even in extended work time became a behavior standard in both groups. To ensure availability, the managers used three control mechanisms.

First, the managers made themselves highly available to their employees, working as a role model for the employees. Through role modeling, the managers sent the message to their employees that the appropriate behavior in telework was being available.

> *"He (the director) is there when you need to reach him and get a hold of him, ask a question or need guidance. He doesn't make you feel like if you call him out of the blue, that he is still busy, that he cannot give you his time of the day. He is very responsive." Cadee, PDG team member*

Second, the managers set up specific rules and protocols about availability and accessibility. TechCo used a technology that enabled its employees to forward their office phone number to any phone that they were using. Kevin asked all his group members to make themselves available through this phone number during work time. Kevin explained his expectation for his team members on availability.

> *"You have a follow-me-phone. You have a number that goes with you wherever you go. If you step out of the office, I expect this to be with you. During work hours, I need to be able to get hold of you. If you were here in the office, I could walk down the hall way to see you. So I need the ability to get you on the phone. If you go off (the follow-me-phone) in an extended period, I need to know." Kevin, WLSG team director*

The third way of managing availability was through the use of technologies. Various information technologies were used to enable availability management. When employees adopted and used these technologies, they automatically made themselves available and accessible during work time.

The first mechanism was schedule sharing and it was embedded within the use of the online calendar. The online calendar was linked to emails, so everyone got informed by email when anyone within the group updated the calendar.

> *"We usually email back and forth, we keep a master calendar...You know, Matthew is out. Kate will be gone from 2 until 4. Mary has a doctor appointment from 9 to 10. Open emailing. We all share each other's calendars."Kevin, WLSG team director*

The second control mechanism was presence awareness and it was embedded within the use of the IM. The managers required the employees to adopt IM and that employees indicate their presence through it.

> *"We use IM for… presence awareness. It means, OK, I am logging into IM and I am on, and I will log in sometimes when I am sick, and I will say, 'out sick'. So yeah, people know it, I am still in some level of access." Mack, PDG team leader*

The third control mechanism was "the follow-me phone number" embedded within the use of mobile phone and phone forwarding technology. The employees could route a phone number to whichever phone they were using at any moment so that they could be reached anytime anywhere. For example, Cadee, PDG team member, worked in her vacation home in Florida in winter away from her home in Massachusetts and still was available thanks to using these technologies.

> *"Actually most of the people don't know that I work in Florida for most of the winter. You know, I have my cell phone, and my access line is forwarded to my cell phone... You could call me and you think you are calling me in Massachusetts." Cadee, PDG team member*

In summary, being available through information technologies was one of the important behavior standards in telework. The managers managed the employees' availability through role modeling, rules and protocols, and the control mechanisms were embedded in the use of information technologies.

5.2.2.3 Managing the Use of Information Technologies

Because the employees in these two groups were distributed in the telework environment, they relied on information technologies to communicate and work, and therefore the use of information technologies played an important role in the two teams. Managers exercised behavioral control in the form of controlling the adoption and use of these technologies. In this section, we primarily use the adoption and use of IM in PDG team as an exemplar. The reason why we use IM instead of other technologies as exemplar is because IM was more recently adopted than the other technologies such as emails and follow-me-phones. The interviewees were better able to recall and elaborate their experiences with the adoption and use of IM.

IM had multiple uses in the PDG group. It was used for indicating presence and status, for facilitating quick conversations, for working as a supplemental communication channel in teleconferences, and for other purposes.

> *"It (IM) is a presence indicator; it is absolute substitute for hall way conversation; a post-it-'come see me or call me'-stick on the door;…it is the side bar conversation during the meeting." Diamond, PDG team member*

The side bar conversation mentioned by Diamond meant private talks between people sitting close to each other during a formal meeting. In a teleconference, everyone was on the phone, making it impossible to carry on any private talks. With IM, people could have side bar conversations during a teleconference.

The director in the PDG group made it clear to his group members that logging into instant messenger was one of the behavior standards.

"I don't require them to come to the office, I don't require them to punch a time card, but I do require on any working day, they are on their instant messenger. You put 'I am gonna be on vacation', or 'I am gonna be in a conference', 'I am traveling.'"Mack, PDG team director

People in PDG team had various attitudes toward using IM for work purposes. Some of the team members had already adopted this technology in their personal lives, and thus the transition for these people was relatively easy. But some people in the group were reluctant to adopt the technologies for different reasons. Seely, PDG team member, described this variation.

"I used IM previously with other friends, but started to use it with people in the group a few months ago, which is now becoming more natural. There are people who still don't IM and it cannot be natural for them." Seely, PDG team member

Due to the variation in attitudes toward using IM for work, the manager constantly sent email reminders to the whole group stressing the importance of using IM. Gradually, being on IM became the accepted behavior standard.

"Well, Mack had to tell us again and again and again, please use IM. It wasn't easy. Once he pushed us and pushed us, most of us came on IM." Seely, PDG team member

When people violated the behavior standard of using IM, they got "punishment" for the violation. The same story about one person who refused to use instant messenger and later got laid off was repeatedly told by several group members.

The adoption process took time, and the other soft rules about how the technology should be used were gradually formed during the process of technology adoption. In the

case of IM, people first adopted the technology, and then they formed the norm of indicating their status on IM, which was a soft but not an explicit rule. Soft rules, which are part of the clan control, will be discussed further in section about clan control. PDG group member Seely described the process of adopting instant messenger in their group.

> *"In the first two months, we would not even be on IM. The next about three months, not all of us login into IM everyday…This is the sixth month…, now all of us are on IM. We still do not always show our status. For example, we go off for lunch. We don't change the status in IM. I would say it took us 5 months to actually adopt it, and it will take another 2 months to come up with the right norms on IM. When do you change status, you log out." Seely, PDG team member*

After IM was adopted, it became one of the mechanisms to manage availability of the employees, as shown earlier in the availability management section. Mack, the group director, started to rely on IM to manage people's availability.

> *"As the day progresses across the country in particular, you know, Seely comes on early in the morning, Cadee comes on early in the morning, Sage gets in early because he is mountain time, and then Diana, and Belinda, and Chad comes on west coast at different time. I know that now they are available. Mack, PDG team director*

5.2.3 Clan Control

Outcome and behavioral controls are categorized as formal control. Our data also shows that informal controls, including clan control and self control, were exercised in telework. The primary control mechanisms of clan control included employees' selection and promotion, corporate value internalization, trust building, and work norms.

5.2.3.1 Employee Selection and Promotion

Selecting and promoting qualified employees were control mechanisms in both groups. The managers sought two sets of skills when hiring people. First, the managers looked for employees with qualified professional skills. Second, the managers looked for employees with qualities that would be suitable to work in telework environment. These qualities include being highly self-motivated, being able to work independently, and having good communication skills when working virtually.

The reasons why the managers looked for people with such qualities was because they believed that in telework, it was necessary to minimize day-to-day monitoring and supervision. They stressed the employees' independence during work.

> *"I definitely have the right people…they are very independent, which is great. I will continue to make sure whoever we bring in this group…have the same level of independence." Mack, PDG team director*

5.2.3.2 Value Internalization

The second clan control mechanism is to facilitate employees' value internalization, meaning creating an environment so that the employees can understand the company culture and the work process. Value internalization was mainly done through employee socialization. For example, the WLSG team director asked the new members to work in the office when they first joined the team.

> *"It was a year and half ago. I brought somebody in from another company. We had them working on site for the first few weeks, I made arrangement so the members of my team work in that location. (The new members) come in, sit with*

one member from the team…They spent the first 6 weeks to get oriented, indoctrinated." Kevin, WLSG team director

After the employees developed some understanding of the organization, then they gradually went into telework mode.

"In our group, the first step is go flex, go flexible, come to the office for a couple of days a week, work from home for a couple of days a week, but I don't have anybody join my group and go immediately work from home…You are going to go in steps." Kevin, WLSG team director

In this manner, the managers made arrangement to ensure the employees to go through the process of value internalization before they went distributed.

5.2.3.3 Trust and Relationship Building

The managers stated that it was essential to maintain a higher level of trust in the telework environment. The trust was both between managers and employees, and between employees and other employees. Managers trusted that their employees would work accountably even when out of sight. With a high level of trust, the managers did not need to monitor or supervise employees at all times. The managers started out assuming that the employees were trustworthy unless the employee violated the trust.

"If you cannot trust your folks, then you cannot work like this. If you are a manager who has to see everybody everyday and that is what makes them work, makes them productive. Then you couldn't be able to work like this and you shouldn't try, because you are going to drive people insane and that include yourself" Mack W, PDG team director

The employees believed that trust and understanding between peers were also important. The content of their work was interdependent, and higher levels of trust and good relationships within the group helped them to finish the task more efficiently. Because they did not want to damage the trust from the other people, they kept working hard to maintain their reputations.

In this environment, the dominant trust building mechanism was based on historical work performance. Because people were distributed and did not meet face-to-face daily, people trusted other people based on the other person's record of successful completion of tasks on time.

> *"Your work becomes your face, because you are not going to meet them, and it doesn't matter how you drive, what you look like. All it matters is how you work." Seely, PDG team member*

The trust based on historical work performance did not come right away when new members joined the team. Trust building took time. The new members in a team needed to work within the team to establish their reputations and gain the trust from their peers. The new employee needed to build up trust with their work output over time.

> *"Roan is very new to the group, there is probably less trust there. We are distributed, we haven't seen his output yet. We haven't seen him work before. Kate probably has an easier entry just because we all have worked with her in the past." Matthew, WLSG team member*

In addition, although the team only met face-to-face occasionally, face-to-face group meetings were still powerful trust and relationship-building mechanisms. For

example, WLSG team director, Kevin arranged travels for his group members to gather the whole team together so that they had occasional face-to-face meetings.

"To find some way to draw them together to make up for their not bouncing (into) each other in the hallways." Kevin, WLSG team director

Moreover, communication technologies that enhanced the richness of the communication also facilitated relationship building among distributed employees. One example was the use of video cameras in PDG team. Employees in PDG team reported that the use of video cameras enriched their online interactions. When a camera was used in the teleconference, it enriched the communication by adding visual cues.

"We can facilitate the video conference..... The expressions people make, when certain jokes, certain news comes out, reveals a lot in the meeting. So somebody says something about a specific project, and you see somebody frowning, it is easy to key in on that person, to say, 'Hey, what is wrong? Is there something wrong with the project we are proposing?' versus, you are just on the phone, it would just be a dead silence. You cannot really tell why it is a dead silence." Chad, PDG team member

When a video camera was used in one-on-one meetings between the employee and the manager, it also brought value.

"When I have my one-on-one with Mack, it is pretty nice. Basically just seeing him, him interacting with me, I feel more like cohesiveness. You know, I work for this guy. I work for this company." Chad, PDG team member

5.2.3.4 Soft Rules

Another form of clan control was soft rules, which evolved in the process of work. The distinction between soft rules and protocols was that the protocols were specified by the manager, while the work norms were not explicitly specified by the manager or other authorities, but were generated by the employees. Employees created these soft rules because they made the work more efficient, and gradually these soft rules regulated their work and became part of the clan control.

One example of soft rules was "overlap time". Since people were distributed in different time zones, they found that being available and accessible during the time when all the people across time zones work was an efficient way to communicate, therefore the "overlap time" became a soft rule.

> *"I work with people in Boston and Colorado...We scheduled all of our meeting between 11am my time and about 3 o'clock my time, which is our common time. I will make sure I am available at that time. Everyone else does that too. We know we can pick up the phone and talk to somebody." Seely, PDG team member*

5.2.4 Self Control

The fourth form of control is self-control. In these two groups, people primarily worked from home and away from their managers. Each person reported that they had their own self management strategies to ensure work productivity.

5.2.4.1 Configuring Work Time

Some people configured their time to draw boundaries between work and personal life. For example, Kate, WLSG team member, reserved peak time for work

everyday and clearly defined the boundaries between work and life in order to work productively.

"Typical work day for me is from 7:40 or 8 o'clock in the morning, and I typically shut down at 5…. I have a family. I try very hard to stick to the 8-5 time period. To get my job done in that time frame, I don't spend time socializing and networking with people because kids come home and then it is difficult to juggle anything." Kate, WLSG team member

5.2.4.2 Configuring Work Place

Some people configured their space to draw boundaries between work and personal life. For example, Mary, WLSG team member, separated her work and personal life space so that she could concentrate on work.

"I work primarily from SF office in TechCo. I don't typically work at home because I will lose concentration. I am just not very good at working at home, so I come to the office everyday" Mary, WLSG team member

5.2.4.3 Optimally Utilizing Technologies

Information technologies, especially the mobile and wireless technologies, enabled the employees to work anytime anywhere. Some employees in telework optimally utilized these technologies to better use their time. For example, when Matthew, WLSG team member, moved to a new apartment and had no immediate network access, he used his mobiles to conduct work.

"This morning, I was doing most of my emails on my phone. One (email on my way) from the apartment I'm living in at the moment to a nearby coffee shop.

(Then I) had a meeting there, and did a bunch of more work there, you know, downloading some files, and now I am actually back at the apartment, talking to you on the cell phone and working offline of my laptop, and I will switch somewhere to log back in and send a bunch of stuff later, or just connect to my phone and send them over my phone that way." Matthew, WLSG team member

The use of mobile technologies also helped the employees to balance their work and personal life. Kevin, WLSG team director recalled an occasion that he was able to integrate his work and personal life activities.

"I was in a softball championship last week to be with my daughter. Great thing is I can work from the softball field. Because I spent my time on the phone…I have a calendar on it, I have a laptop and I keep everything loaded. When I got there, I just need to find a spot and kick and go, and take a few phone calls and have a discussion with somebody." Kevin, WLSG team director

In summary, employees exercised self-control strategies by configuring their work time and work space, and utilizing the mobile technologies to ensure their work productivities.

5.2.5 Summary of the Results

To summarize, I identified four types of organizational controls in these two teams that I studied. For each type of control, I identified its control mechanisms. Table 2 shows the control type, control mechanism, and the examples from these two teams.

Table 2: Control Mechanisms of Four Forms of Controls in Telework

Control Forms	**Control Mechanisms**	**Definition**	**Illustrated Quotations**
Outcome Controls	Goal Setting Process	Organizational-level policies about goal setting and performance evaluation based on goals	*"……I don't mind if they spend 8 o'clock in the morning to 6 o'clock in the night working, or 8 o'clock to 6 o'clock in the zoo, as long as they meet their goals and don't' miss the deadline." Kevin, WLSG team director*
	Deliverable Focus	The middle-level managers focus on specifying deliverables of work and monitor the timeliness and quality of the deliverables	*"They (the deliverables) can be very simplistic such as the physical design standards, or the functional requirements for technologies to support open work, they are written documents…." Mack, PDG team leader.*
	Checkpoints	It refers to the points in time on which the employees will provide status update of the work. Checkpoints can be initiated by both the managers or the employees.	*"Since I have been working from home… I've started to make sure I work proactive in communicating, just to my own boss, what I am working on, what is my status, what I am doing. Even if it is good, even it is I am on track. If it is due in two weeks, one week has expired, I've done a week worth. I have one week left. I will tell him that, so he knows." Sage, PDG team member*
Behavior Controls	Rules and Protocols	Guidelines and procedures about how to maintain availability, how to use technologies and how to conduct work.	*"We try to have some sort of protocols, who can and who cannot update something. At the beginning of the project, we are going to define, OK. You are someone who is going to update stuff. You are in charge of the specific part of the project. So you are in charge of these sets of documents." Chad, PDG team member.*
	Availability Management	Mechanisms to ensure the employees are available and accessible although away from company and the managers.	*"We use IM for… presence awareness. It means, OK, I am logging into IM and I am on, and I will log in sometimes when I am sick, and I will say, 'out sick'. So yeah, people know it, I am still in some level of access…" Mack, PDG team leader*
	Managing the Use of Information Technologies	The managers control the employees' behaviors about adoption and use of information technologies.	*"I don't require them to come to the office, I don't require them to punch a time card, but I do require on any working day, they are on their instant messenger. You put 'I am gonna be on vacation', or 'I am gonna be in a conference', 'I am traveling.'…"Mack, PDG team director*

Clan Controls	Employee Selection and Promotion	Selecting and promoting the employees that have both credentials for the work and qualities to work in telework environment	*"I definitely have the right people…they are very independent, which is great. I will continue to make sure whoever we bring in this group…have the same level of independence." Mack, PDG team director*
	Value Internalization	The managers facilitate the new employees to understand telework culture and work process	*"It was a year and half ago. I brought somebody in from another company. We had them working on site for the first few weeks, I made arrangement so the members of my team work in that location. (The new members) come in, sit with one member from the team…They spent the first 6 weeks to get oriented, indoctrinated…," Kevin, WLSG team director*
	Trust and Relationship Building	building trust between the managers and the employees, and between employees.	*"Roan is very new to the group, there is probably less trust there. We are distributed, we haven't seen his output yet. We haven't seen him work before. Kate probably has an easier entry just because we all have worked with her in the past." Matthew, WLSG team member*
	Work Norms	implicit soft rules that are created during the work process	*"I work with people in Boston and Colorado...We scheduled all of our meeting between 11am my time and about 3 o'clock my time, which is our common time. I will make sure I am available at that time. Everyone else does that too. We know we can pick up the phone and talk to somebody." Seely, PDG team member*
Self Controls	Configuring work time	configure time between work and personal life so as to work productively	*"Typical work day for me is from 7: 40 or 8 o'clock in the morning, and I typically shut down at 5…. I have a family. I try very hard to stick to the 8-5 time period. To get my job done in that time frame, I don't spend time socializing and networking with people because kids come home and then it is difficult to juggle anything." Kate, WLSG team member*
	Configuring work place	configure space between work and personal life so as to work productively	*"I work primarily from San Francisco office in TechCo. I don't typically work at home because I will lose concentration. I am just not very good at working at home, so I come to the office everyday..." Mary, WLSG team member*
	Optimally using information technologies	Use information technologies to balance work and personal life	*"I was in softball championship last week to be with my daughter. Great thing is I can work from the softball field. Because I spent my time on the phone…I have a calendar on it, I have a laptop and I keep everything loaded. when I got there, I just need to find a spot kick and go, and take a few phone calls and have a discussion with somebody…" Kevin, WLSG team director*

6 Discussion

6.1 Controls in the Telework Environment

In my research site, the employees were distributed and worked from home away from their managers during the majority of their work time. This situation did not liberate them from managerial controls. Instead, my data showed that these employees were subject to all four forms of controls (outcome, behavioral, self, and clan control) identified in the prior literatures in controls. Each control had its detailed control mechanisms and these controls operated together to form a control portfolio in the telework environment.

6.1.1 Outcome Control

The data showed that the managers exercised outcome controls in telework. I identified three outcome control mechanisms, including goal setting process, focus on deliverable, and checkpoints. According to prior studies on the contingency conditions to apply outcome control, outcome controls are suitable when outcome measurability is high (Ouchi 1979; Eisenhardt 1985; Kirsch 1996; Hatch 1997). Meanwhile, my data identified three concerns about applying outcome controls in our research site: 1) The interpersonal interactions could not be captured in outcome control, 2) research work involved risks and uncertainties, and 3) the output of the research work could only be measured subjectively. Due to the first and third concerns, the outcome measurability was not very high in the research site. However, the data showed that the managers still applied and stressed the importance of outcome controls despite the low level of outcome measurability. This contradicts the expectations of prior theories (Ouchi 1979; Eisenhardt

1985) and empirical studies (Kirsch 1996) on contingency conditions for outcome control.

An in-depth analysis of my data revealed that the managers addressed this problem by first making efforts to enhance measurability. They established clear and measurable goals and focused on tangible deliverables. Moreover, the managers established the checkpoints for status updates phase by phase so that the work was recognized even if the research work could not make an immediate impact. More importantly, the managers concurrently applied other forms of control to address issues that outcome controls alone could not address.

Interestingly, the managers perceived that outcome control was the dominant form of control in telework. During the interviews, the managers explicitly answered that they "manage by results". They also perceived that outcome controls could replace behavior controls. They made comments about how they did not care how their employee spent their day as long as outcomes were delivered. However, they contradicted themselves with comments about how they required their employees to stay available through technologies.

6.1.2 Behavioral Control

The data showed that behavioral controls were exercised in the telework environment. The managers stressed that they had rules and protocols to manage the employees. The control mechanisms included availability management and the use of information technologies. Prior studies on contingency conditions of control forms conclude that high level of behavior observability leads to behavior control (Kirsch 1996), (Kirsch 1996; Hatch 1997; Eisenhardt 1985) because when it is easy to observe

behaviors, the cost associated with behavior control is low (Eisenhardt 1985). In telework, employees are distributed and managers are remote, making it difficult if not impossible to observe employees' behaviors on a daily basis in the traditional way. Therefore, traditional behavior controls are not suitable in this environment.

The data show that behavior controls did exist but they were distinct from traditional behavior controls. The managers no longer focused on monitoring the employees' behaviors in the office-based setting, but rather shifted to monitoring employees' availability through technologies and their behaviors of adopting and using technologies in their work. For example, our findings showed that managers used various mechanisms to ensure the employees' availability. Being available through information technologies had become the new behavior standard. The data also showed that the managers mandated their employees to adopt and use instant messenger and exercised punishment when people deviated from the behavior standards. The reasons why the managers in telework focus on these new sets of behaviors are twofold. First, in this environment people heavily rely on information technologies to work and communicate. Second, some aspects of the behaviors about availability and about the adoption and use of information technologies can be easily detected. Taking the use of instant messenger as an example, the managers could detect whether the employees used instant messenger from the managers' own home.

The concept of availability management in telework is aligned with the notion of "disciplinary power" theorized by Foucault (Foucault 1979). In disciplinary power, control is exercised in indirect and subtle ways and people who are controlled experience "compulsive visibility", meaning that at any given time, the people who are being

controlled can potentially be "visible" to the people who control, although power is not exercised at all times. In telework, thanks to the use of information technologies, especially the use of mobile phones and accessline technologies, the employees can be expected to be available anytime anywhere. Although the managers do not monitor employees' availability at all times, employees know that they could be monitored at any time. Despite the literature on the adverse consequences of disciplinary control (Jackson, Gharavi and Klobas 206), our data did not reveal any adverse reactions from the employees.

Interestingly, the managers perceived behavioral control as a costly way to control and frequently said that they did not care about employees' behaviors as long as outputs were produced. Often, they immediately contradicted themselves by stating how they cared deeply about employees' availability and behaviors using technologies. The reasons behind the managers' self-contradictions on behavior controls might be because the managers still think of behavior controls in the traditional office-based setting but have not realized that managing availability and use of technologies are the new forms of behavioral control in the telework environment.

6.1.3 Clan Control

My data showed that clan control is part of the control portfolio in the telework environment. According to control theories (Ouchi 1980; Hatch 1997), clan control is suitable when environments are complex and rapidly changing, uncertainty and ambiguity are consequently high, and surveillance is difficult because of limited understanding of behavior and outputs. My research site fit this profile of organizational environment and task characteristics for clan controls. However, Ouchi's theory (Ouchi

1979; Ouchi 1980) implies that clan control will replace formal behavioral and outcome controls. Clan control is considered to be an informal substitute for formal control systems (Robey and Sales 1994). Our findings contradict this idea by showing that clan control complemented and coexisted with two forms of formal control. I found that the managers still applied outcome controls although the environmental and task characteristics were imperfect for this type of control because they concurrently applied clan control, especially trust, which addressed the limitations of outcome controls.

I identified four clan control mechanisms including employee selection and promotion, value internalization, trust and relationship building, and work norms. These control mechanisms are common clan control mechanisms identified or theorized in prior control studies (Ouchi 1979; Ouchi 1980). Trust is one of the most important clan control mechanisms. I found that the trust building mechanism was primarily based on historical work performance in telework. Adler (2001) theorizes that trust in the knowledge economy is reflective trust rather than blind trust. Norms play a central role and trust is grounded in open dialogue among peers. Reflective trust emphasizes integrity and competency. My data showed that people became trustworthy when they demonstrated competency, which was shown through their quality work product.

6.1.4 Self Control

Self-control is the other informal control besides clan control. My data showed that self control was part of the control portfolio in the telework environment. For example, the employees often disciplined themselves to work in a particular place so that they could concentrate better on work although they were free to work anytime anywhere. These self-control strategies belong to the self-management technique of

environmental planning (Manz 1986), referring to changing factors in the environment so that positive behaviors are more likely to occur. In this environment, employees are given the flexibility to configure their own work time. I found that teleworkers used various strategies to configure their time. Some blended work and personal time, while others set clear boundaries between work and personal time. The goal was to work productively. Thus, time management is an important self-control mechanism. Moreover, mobile technologies such as PDA, cell phone, and laptop are important technologies for telework employees. I found that the telework employees utilized mobile technologies to make better use of their time and balance their work and personal life activities.

My data showed another type of self-control, employee-initiated control, which both relates to and differs from the concept of self control identified in prior literature. Employee initiated controls refer to the phenomenon that the employees take initiative to report to their managers about their work status although it is not required by the managers. Employee-initiated control is similar to traditional self controls in the sense that that both of them are initiated by the employees and not imposed by managers. They are distinct in the sense that the whole process of traditional self control does not involve the manager while employee initiated control involves both the manager and the employee. Both of these controls serve the purpose of ensuring that people work responsibly. However, the driver of the employee-initiated control is that employees desire to gain visibility.

In my research site, the employees considered it important for their managers to understand the value of their work, so they constantly reminded their managers about their work status. Although the employees did not conduct self-reporting for the purpose

of control, this behavior serves the purpose of control in effect. Because employees take initiative to report status with the managers, it increases the frequency of performance monitoring, which is an important component in control design (Robey and Sales 1994) Interestingly, the actions of the employee, people who are being controlled, actually have altered the design of control.

This situation is similar to the notion of dialectic of control proposed by Giddens (1979). Due to human agency, Giddens (1979) theorized that in a relationship of power and control, the one being controlled can also affect control. However, Giddens further explained agency from the perspective that the ones being controlled have autonomy to distance themselves from control. In my study, it is the opposite. The employees being controlled take initiative to report, showing that they are subjecting themselves to even tighter control. In my data, the employees took initiatives to provide status update reports to their managers although they were not asked to do so. These behaviors increased the frequency of monitoring, making the employees subject to tighter control.

6.1.5 Control Portfolio

My data showed that all four different controls (outcome, behavior, clan, self controls) operated together in the telework environment. Each control form had its own control mechanisms, and the four different forms of controls formed a control portfolio. The idea of control portfolio has been studied in the context of information systems development. Henderson and Lee (1992) conclude that the effects of different controls are additive and that the combination of behavior control from management and outcome control from team members contributes to better performance. Kirsch and her colleagues conducted a series of studies on the issue of control portfolio in the context of

information systems development, studying the antecedent conditions that determine the form of controls in the control portfolio (Kirsch 1996), how controls are exercised, and why the managers structure the portfolio of control modes as they do (Kirsch 1997). Other research examines how stakeholders exercise controls during different phases of large IS projects (Kohli and Kettinger 2004). These studies are conducted in the context of information systems development while my study is in the context of telework. Although the study contexts are different, we both found that there exists a control portfolio consisting of different types of controls rather than just a single form of control. In addition, Kirsch emphasizes the antecedent factors that lead to the particular components in the control portfolio.

I found that some controls still exist in the control portfolio even under the condition that the environmental factors and task characteristics are imperfect for these controls. For example, I identified some concerns associated with applying outcome controls in my research site. However, my data showed that outcome control still played an important role in the work environment. This phenomenon seemingly contradicts the prior control theories that specify contingency conditions for specific types of control.

However, a close examination of the data by regarding the control portfolio as a whole can resolve this contradiction. In financial terms, investment portfolios consist of multiple investments because the investments within the portfolio complement each other. The control portfolio works in the same way. In my data, when the manager stated that they "managed by results" (outcome control), they always followed it by saying that their employees were readily available through information technologies (behavior control), and they highly trusted their employees (clan control). It showed that the

managers primarily relied on the outcome control. However, availability management ensured that issues that occurred between the outcome check points could be easily resolved, and that trust can cover the subjective part of the work that cannot be addressed by outcome control. Meanwhile, self control deals with employees' everyday work. Therefore, the four different control forms operate together and complement each other. This explains the apparent contradiction that even where antecedent conditions for outcome control are not present, this control still operates well in this environment. It is because other forms of control within the portfolio complement it.

Cardinal, Sitkin et al (Cardinal, Sitkin et al. 2004) (2004) studied the dynamics of control over time and concluded that the imbalance between formal and informal control triggers control change and the balance between formal and informal controls leads to organization effectiveness. Although my study is cross-sectional, I observed a control portfolio in which formal control and informal control operated together and complemented each other. One example is that the employees reported to their managers about their work status although it was not required by the managers. Because of self reporting, the managers could track the employees' work output without directly asking or monitoring the employees. In this sense, the employee initiated control strengthened outcome controls.

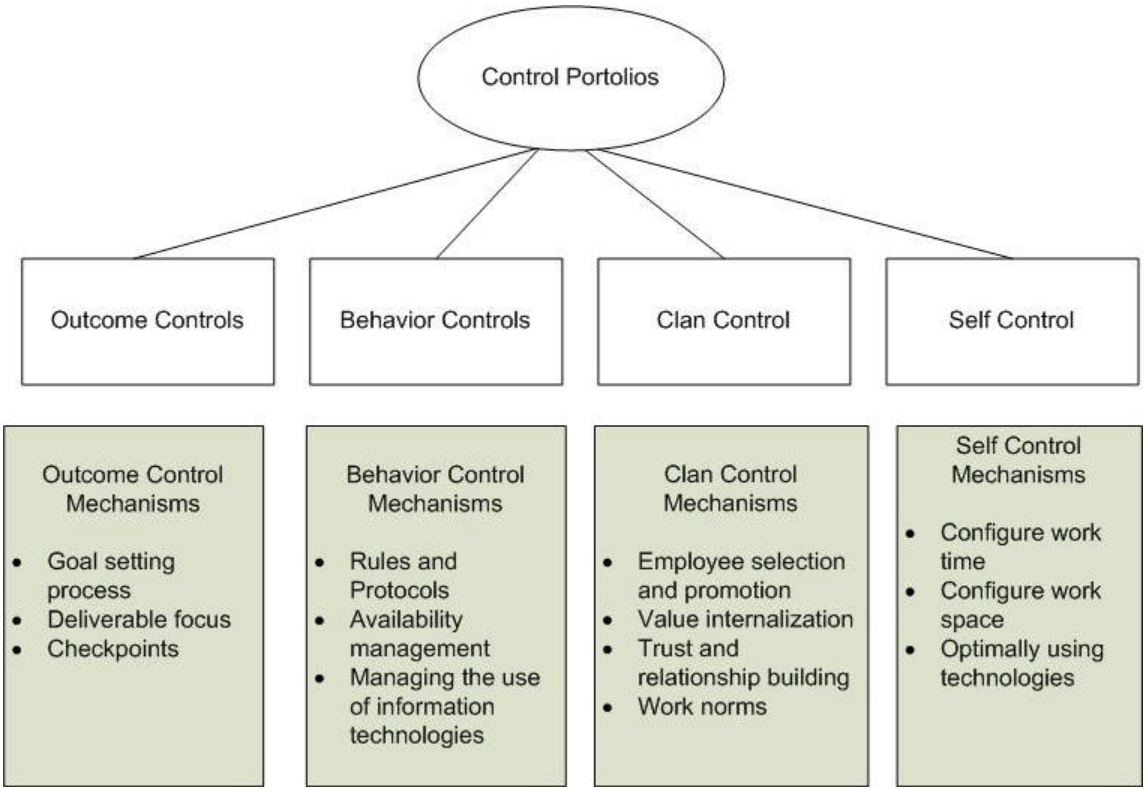

Figure 1: Control Portfolios for Telework in TechCo.

6.2 The Role of the Use of Instant Messenger in Organizational Controls

The data showed that the employees in telework heavily relied on information technologies to work and to communicate. Since using technologies became an important part of work practices, the adoption and use of information technologies was highly related to managerial controls, especially behavioral control.

First, I argue that control over the adoption and use of technologies is a new form of behavioral control in telework. Whether the employees adopted particular information technologies and how the employees used the technologies after adoption are part of work behaviors. The managers can make behavior standards, monitor this behavior, and correct the behaviors if there are deviations. For example, the PDG group manager clearly mandated the team members to adopt instant messenger. The managers in both

LSG and PDG group asked their employees to use, update, and share a public calendar. This phenomenon can be categorized as behavioral control.

Some people speculate that in telework, the cost of monitoring behaviors of the employees is high because of the physical distance between the managers and the employees. However, my findings showed that the use of information technologies enhances the behavior observability and thus makes it possible to exercise behavior controls in a telework work environment. The information about the usage of technologies can be easily obtained even in telework. For example, for remote managers, it is easy to see from somebody's email response timeliness or appearance on instant messenger, whereas watching somebody work in their home is practically impossible. Moreover, when employees use information technologies, they are subject to controls embedded in the technologies. For example, public calendar, follow-me-phone, and instant messenger were used to make the employees highly available, and the use of such technologies was an important mechanism in availability management in TechCo.

There are some prior studies in the field of information systems on the controls and the use of information technologies. Orlikowski (1991) found that the CASE tool use intensified controls on knowledge workers because the employees have to follow the work process embedded in the CASE tool. Coombs, Knights et al. (1992) found that after the adoption of information systems, physicians became dependent on the computer-mediated practices and they were more strongly managed by organizational controls. The technologies studied in Orlikowski (1991) and Coombs, Knights et al. (1992) are CASE tools and medical information systems. These technologies directly aid the work practice. They enforce people to work in a certain way with embedded work process. The

technologies that I studied, by contrast, are communication technologies, and they do not enforce a way of working. My findings agree with the idea that there are controls embedded within a particular information technology but my data also showed that control over the use of information technologies differs from the control embedded within the information technologies.

Take the adoption and use of instant messenger in PDG group as an example. The data showed a process by which instant messenger became implicated in control. First, the manager promoted and enforced the adoption of the technology. The PDG group director said that he forced his team members to use instant messenger. He regularly sent email messages to remind them to log into the instant messenger, and even punished people who refused to do so. This is the control over the use of information technologies. The manager's goal was to eventually use instant messenger to manage people's availability. Second, the employees gradually adopted the technology. In this case, after several months, nearly all people who stayed in the group logged into the instant messenger everyday. Third, people started to develop norms about using the technology in their everyday life. In PDG group, the employees developed a soft rule to indicate their status on instant messenger. Fourth, the controls embedded within the technologies made the use of information technologies become a control mechanism. In this case, the managers use presence awareness as a control mechanism to ensure availability of the employees.

In summary, it is clear that there are two types of controls involved around the use of information technologies. The first is the control over employees' the use, and the second is the control embedded in the technologies. (Orlikowski 1991) differentiates two

types of controls: personal controls and systemic controls. Personal controls are controls exercised from people on people; systemic controls are controls embedded within information technologies and thus are not exercised through personal interaction but through the adoption and use of these technologies. Of the two types of controls I identified in my study, the control over the use of technologies belongs to personal control, and the control embedded in the technologies belongs to the systemic control. The process illustrated in Figure 2 is a process that transforms the personal controls to systemic controls.

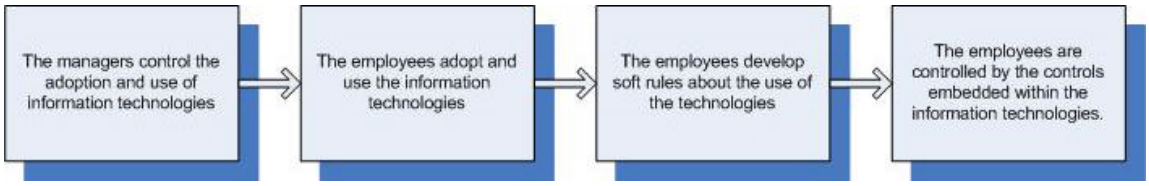

Figure 2: The role of the use of information technologies in organizational controls

The controls embedded within CASE tool in Orlikowski's study and the controls embedded within the instant messenger in my study are slightly different. For the CASE tool, work processes of IT design are embedded within the technology. When designers use the CASE tool, they are forced to follow the embedded work processes. For the instant messenger, the IT artifact provides some general features. For example, a sentence can be written under the users' names after the users log into the instant messenger. These features of instant messengers restrict and or enable the uses of the technology, but they do not constitute work processes. During the process of using the instant messenger technology, PDG group gradually formed a soft rule that the team members should write down their current status, such as "out for lunch", or "Dr. appointment 1-3PM". The members in the PDG group called this rule "presence awareness", and it was used to

control people's availability. Therefore, the controls were embedded within the instant messenger during the use process. The combination of the technological features that the IT designers provide and the soft rule that people create embeds the control. I argue that the controls are transformed to systemic control because, after the technologies are adopted and the rules are formed, the director can control people's availability through their use of the instant messenger without directly and personally interacting with them.

7 Conclusion

I conducted a qualitative study exploring the issue of managerial controls in the telework environment. Based on the data collected through qualitative interviews and analyzed following the grounded theory methodologies, I developed a theoretical account on the issue of managerial controls in the context of telework. I found that rather than relying on a particular control form or a dominant subset of control forms, the managers in telework applied a portfolio of controls that included all four different controls identified in the prior control theories. Each form of control had its own control mechanisms, and different forms of controls had complementary effects and formed a control portfolio. In addition, I found that controlling how employees adopt and use information technologies in their work represents a new form of behavior control that is adapted to the telework environment.

This study is not without limitations. First, the two teams that participated in the study were responsible for supporting the telework environment for their company. The nature of their work made them tend to have favorable attitudes toward telework and managerial controls within Telework, and thus their views may not be representative of all types of teleworkers. However, using these teams in our study served the purpose of

revealing the phenomenon being studied clearly, and thus the selection of these two teams fulfilled the guideline of theoretical sampling within grounded theory. Second, the two teams participating in the study are all stable teams, and my study takes a cross-sectional design. Managerial controls are very likely to be different in different phases of the teams. The dynamics of controls in different phase of the team are not captured within the study. Third, we rely on interview data as the primary data source. Observation data would be helpful to further enrich the data. However, since the study participants are distributed and work in their private space, it is not feasible to obtain observation data.

The results of my study have implications for both research and practice. I developed a theoretical account about how organizations exercise controls in a telework environment and explained the role of using information technologies in organizational controls. My first contribution is that we further elaborate control theories for telework environment by identifying control mechanisms for different forms of controls. Second, I further extend the control theories by redefining behavioral controls in telework. In Telework, the managers and the employees are remote from each other, and the managers cannot personally or directly monitor the employees' behaviors. However, they can track their use of information technologies in their work. Therefore, controlling the behaviors of using technologies is also a form of behavior controls, which have not been identified before. Third, I further clarify the difference between controlling how employees use information technologies and controls embedded within information technologies. The former refers to managerial controls exercised to influence the employees' behaviors of adoption and use of information technologies. The latter means that specific work processes are embedded in the design of information technologies, and thus the

employees' behaviors are restricted or controlled when they use these technologies in their work practices.

The results of my study are of great potential value to managers of telework. One of the resistance factors of telework comes from the middle-level managers, who believe that it is difficult to manage employees who do not work on site. The results of my study showed that actually all four different types of control can operate within telework environment, and that each type of control has detailed control mechanisms. When the managers are informed about the different types of controls operating in the telework environment, they will be more confident about their management and have less resistance to telework. Second, the managers should understand that it is a portfolio of controls that operate together, and that different forms of control may complement each other. Managers should choose from the large pool of control mechanisms and assemble their own control portfolios that are suitable for their organizations. Third, managers should acknowledge the importance of the use of information technologies in telework. Managers should shift their mindset about the notion of behavior control. Managing by walking around is no longer possible in telework environment, but that does not mean that behavior controls cannot operate. Controlling the use of technologies is the new form of behavior controls in this new work environment.

In my research, the employees worked at home for majority of their work time, and all group members within the team were teleworkers. For future research, first, it would be worthwhile to investigate the difference between controls on full-time teleworkers and controls on part-time teleworkers. For example, the difference between controls in teams that consist of teleworkers only and controls in teams that consist of

both teleworkers and the office-based workers could be investigated. A second research avenue would be to conduct longitudinal research to develop a process theory of how organizational controls evolve in a distributed team. My data show that "soft rules" evolved within teleworking teams, but a more extended study of controls over time should reveal a clearer picture of the evolution of the entire control portfolio. Third, teleworkers adopt a variety of information technologies such as online collaboration tools and wireless devices, and thus more studies are needed to explore the impact of different information technologies on organizational controls in the telework environment. Hopefully, as telework workforces grow, the results of my research, as well as those of future research can update control theory and inform the practitioners to successfully manage telework.

Appendix 1: The list of the initial codes

Below is the list of codes that were developed based literature review on control theories.

- Technology Use
    - Email Use
    - Instant Messenger Use
    - Mobile Phone Use
    - Video Use
    - Collaboration Technology Use
- Controls
    - Assumption of controls: The assumption of controls is that people have diverse goals and interests. They might be incongruent with organization's goals. Controls are needed to ensure people to work towards organization's goals.
  - Behavioral control
    - Setting behavioral standards
    - Monitor behaviors
    - Performance evaluation based on behaviors
    - Give feedback about behaviors
    - Task observarability: conditions to exercise control. Whether tasks can be easily observed

  - Outcome control
    - Setting outcome standards
    - Monitor outcomes
    - Performance evaluation based on output
    - Give feedback about output
    - Task measurability
    - Task easy to be associated with individuals or groups

  - Agency theory constructs
      - Contract: Principle specify measures and promise rewards to agents in contracts to align principle's and agent's interests
      - Shirk: Agents act for their own interests when not being observed by principals.
      - Interests incongruence: difference between principal's and agents' interests
      - Delegate: Principals allow agents to act on their behalf.
      - Cost of control: the costs associated with collecting the information required to minimize the chance that the agents will shirk
      - Surveillance mechanisms
      - Information systems

- Three sources of control
    - Market control: use price competition as a control mechanism
    - Bureaucracy control: rules, procedures, documentations, and surveillance as control
    - Clan control: Organizations that implementve clan mechanisms facilitate their employees to obtain high internal commitment to the firm's objective, cultures, norms, and values mainly through the employee selection, promotion, and socialization processes.
    - Cost of selecting employing
    - Cost of surveillance and monitoring

- Self-control
    - Set up standards by oneself
    - Self Monitor behaviors
    - Self Evaluate
    - Self reward
    - Environmental planning: referring to changing factors in the environment so that positive behaviors are more likely to occur
    - Behavioral programming: referring to rewarding or correcting oneself based on performance
        - self-observation: systematic data gathering about one's own behavior in order to establish the basis for self-evaluation
        - specifying goals: specifying goals publicly can be particularly effective
        - cueing strategies: limiting environmental factors that lead to undesirable behavior while increasing those evoking desirable behavior
        - incentive modification: self-reward and self-punishment, and
        - rehearsal: systematic practice of a desired performance
        - Self-leadership: recognizes the importance of intrinsic motivations, the rewards that result from performing the activities themselves

- Clan control
    - Forming Normas
    - Internalize values
    - Employee Selection
    - Employee Promotion
    - Employee Socialization
    - Trust as control
    - Reflective trust

- Concertive control
    - Consensus of appropriate behaviors
    - Value-based discourse
    - negotiated consensus

- Formal controls

- Informal controls

- Disciplinary power
- Compulsive visibility
- Power's invisibility
- Dialectic of controls: power relations, are always two-way.
  - Employee initiated control
  - Written rules versus rules in reality
- Control portfolios
- Control mechanisms

- Strauss & Corbin analysis paradigm

  - Conditions
  - Actions/Interactions
  - Consequences

Appendix 2: The list of the final codes used in the data analyses

Context codes

1. WLSG group
2. PDG group
3. long distance work relationships
4. Telework Support Program
5. personal background
6. work contents
7. Tech. Co. telework culture

Technology use codes

1. access line use
1. cell phone use
2. email use
3. IM adoption
4. IM use
5. mandate use of technology
6. online calendar use
7. online collaboration tool use
8. technology adoption
9. technology resistance
10. technology use
11. laptop use
12. phone use

Control codes

13. availability management
14. behavioral control
15. check points
16. clan control
17. Deliverables
18. desire for face time
19. employee socialization
20. employee autonomy
21. employee initiated control
22. employee selection
23. employee work motivations
24. goal setting
25. individual flexibility
26. internalize value
27. Issues with outcome control
28. lack of informal encounters
29. level plain field

30. long working hours
31. management assumption
32. manager's own experience
33. motivate employees
34. nature of the work
35. the negatives of telework
36. organizational policy
37. outcome control
38. output criterion
39. peer pressure
40. performance evaluation
41. personal skill development
42. proactive communication
43. productivity
44. reasons being remote
45. relationship building
46. remote delay
47. remote management challenge
48. resistance to telework
49. rules and protocols
50. self control
51. Self motivated
52. self perceived productivity
53. social element
54. strategic check-in
55. team performance
56. trust building
57. uncertainty of the work
58. video technology use
59. visibility
60. work life balance
61. work norm
62. work space
63. work time

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