



VIRTUAL ORGANIZATION: A STRATEGIC MANAGEMENT OPTION FOR BUSINESS IN DEVELOPING COUNTRIES

Solomon Nyaanga, Chris Ehiobuche, and Kwaku Ampadu-Nyarkoh

Berkeley College, USA

This paper presents telecommuting as a strategic option for the raising problems of office space and traffic jams in developing countries. US and many developed countries have leveraged technology and cultivated a culture of telecommuting which has become one of the corner stones of competitive advantage and employee's job satisfaction. While some scholars and practitioners are skeptical implementing this as a global business practice for obvious reasons such as poor infrastructure, culture of corruption among others, this research empirically sustains the positives of telecommuting and postulate a model for its successful implementation in developing countries as a global business sustainability strategy.

Keywords: Telecommuting, Intensity, Voluntariness, Mediation, Moderation.

Introduction

What lessons are learnt from the experience of businesses in developed countries with work from home organizational culture? Are these experiences transferable to developing countries? By investigating the extent to which telecommuting intensity influences or predicts employee perceived outcomes in the developing countries. This research shades some lights to applicability and pot holes of virtual organizational principles and practices in less developed countries. To developed a theoretical model for the adoption of virtual organization principles and practices as a managerially strategic option for businesses in developing countries based on the experiences of businesses in developed nations

Background

Telecommuting provides significant benefits to individuals, organizations and society. However, there are also potential problems. Unfortunately, our knowledge of the determinants of success and failure are less than perfect, with the result that organizations wishing to implement telecommuting programs particular in developing countries run some risk of failure (Pinsonneault and Boisvert, 2001). This research sheds some light on the critical success factors for telecommuting from the point of view of intensity (hours per week employees work from home) It also presents some guideline on implementation of work from home organizational culture for developing countries.

The developed world is in the midst of the most revolutionary transformation in the nature of work and family since the industrial revolution, with a dramatic shift from industrial-based national economies to information-based global economies (Hill et al., 2003). This

transformation has changed the once universally accepted mode of office work from commuting to a central office, to a new paradigm in which a significant proportion of the population works remotely including from home. The current business paradigm shift recognizes that space and time no longer contractually define the mode and nature of work. Workers do not have to go to where the work is - instead, work is now sent to where the workers are - in homes, satellite offices, and neighborhood work centers. This new, “telecommuting”, mode of work provides both opportunities and challenges. How to mitigate these challenges is a strategic organizational priority and critical success factor for many organizations.

In knowledge-based economies, organizations view telecommuting as an opportunity that could enhance their core competencies through the knowledge and creativity of their telecommuting workforce (Drucker, 1994; Nonaka and Takeuchi, 1995).

Telecommuting is a flexible work arrangement in which employees work outside the conventional workplace (e.g., home) part-time or full-time and interact with their managers and co-workers by way of computer-based and other telecommunication technologies (Nilles, 1976, 1994; Bagley and Mokhtarian, 1997).

Working from home (telecommuting) instead of working from the central office location (commuting) is however, not a new phenomenon. Belanger (1999) identified two major characteristics that differentiate today’s home-based workers from those of the ‘cottage industry’ of prior centuries. These are communication links to central offices and the knowledge necessary to participate in knowledge-based work environment. Pinsonneault and Boisvert (1996) identified three principal components of telecommuting: utilization of information technology, link with the organization, and the delocalization of work. Belanger and Collins (1998) essentially characterize distributed work as “simply arrangements that allow employees and their tasks to be shared across settings away from their central business location or physical organizational locale”.

As the above indicates, different researchers have adopted slightly different definitions of telecommuting, making it hard to understand and compare both the trade literature and research studies. In our study, telecommuting is simply defined as working from home part-time or full-time for an employer and communicating with the corporate office through telecommunication and other information technologies.

Why Telecommuting in Developing Countries

Based on previous research and a survey of the research literature by Pinsonneault and Boisvert (2001), the possible positive and negative impacts of telecommuting for organizations are summarized in Table 1.

Table 1. Potential Impacts of Telecommuting on Organizations.

Positive Impacts	Negative Impacts
Lower absenteeism	Increased absence of best employees from the central office
Increased feelings of belonging with the organization	Loss of synergy in the organization
Increase in loyalty	Difficulty managing remote workers leading to manager’s dissatisfaction
Increased ability to retain employees and attract new ones	Increased data security concerns
Increased productivity	Difficulty in objective evaluation of financial benefits of telecommuting
Decrease in real-estate costs and overcrowding	
Quicker responsiveness to customer needs and unexpected man-made and natural disasters	
Increased organizational flexibility	
Improved employee morale	

Source: Adapted from Pinsonneault and Boisvert (2001)

Similarly, Table 2 summarizes the positive and negative impacts of telecommuting on individual telecommuters.

Table 2. Potential Impacts of Telecommuting on Individuals.

Positive Impacts	Negative Impacts
Increased job satisfaction	Feeling of isolation
Elimination/ reduction of commute time	Reduction in chances for promotion
Reduction in work-related expenses	Tendency to overwork
Flexibility in the organization of work hours and leisure activities	Potential decrease in frequency of intra-organizational communication
Greater sense of autonomy and self -empowerment	
Better balance of competing work/family demands	
Increase in productivity	
Ability to get more/quality work done	

Source: Pinsonneault and Boisvert, (2001)

From Dr. Nyaanga’s previous research, a similar table can be developed for the positive and negative impacts of telecommuting on society at large.

Table 3. Potential Impacts of Telecommuting on Society.

Positive Impacts	Negative Impacts
Conservation of energy	May contribute to urban sprawl.
Preservation of the environment through reduced carbon dioxide emissions	
Reduction in traffic congestion and traffic-related hazards (accidents)	
Reduction in overall work-related travel	
More people can work irrespective of their physical handicaps	
Less discrimination in hiring, compensation, and promotions	

In summary, telecommuting can provide significant benefits to individuals, organizations and society. However, there are also potential problems. Unfortunately, our knowledge of the determinants of success and failure are less than perfect, with the result that organizations wishing to implement telecommuting programs particular in developing countries run some risk of failure (Pinsonneault and Boisvert, 2001). This research sheds some light on the critical success factors for telecommuting from the point of view of intensity (hours per week employees work from home) It also presents some guideline on implementation of work from home organizational culture for developing countries.

Relevant Literature

Society and the Nature of Work: The concept of remote work – “telework” as it is termed in Europe - was coined by Norbert Wiener in his landmark book “*The Human Use of Human Beings: Cybernetics and Society* (Wiener, 1950). The principal idea was to demonstrate a hypothetical example of someone living in Europe and supervising the construction of a building in the United States. However, interest in this mode of work was not embraced until the 1970s when technology potential and social needs helped to serve as the stimulus for innovation, adoption and implementation of all kinds of remote work. The prevailing view of telework was simply to ameliorate the need for energy conservation by substituting electronic communication for physical transportation or travel to the central office, and cut back on pollution following the 1990 Clean Air Act (Gainey et al; 1999). At the same time, telecommuting has been suggested as one of the approaches to reducing office space and other costly business overheads, increase worker productivity, improve worker morale, and increase job satisfaction among others (Meyers and Hearn, 2000). Jack Nilles (1973) coined the term “telecommuting” as the U.S. equivalent of the European “telework.” Alvin Toffler was excited by the imminent substitution of telecommunications for physical travel to the central office which led him to incorporate the idea of telework or telecommuting in his book entitled *The Third Wave* (Toffler, 1980). His prediction was that the new information-based production economic system would move millions of workplaces from factories and offices back to where the workers had originally come from: the home “electronic cottage.” His premise on telecommuting (remote work) as a viable work option in modern information-based economy was potentially capable of providing benefits to employees, organizations, and society. Hill et al. (2003) and Useem and Harrington (2000) recognized the possible impact of the ubiquity of telecommunication and computer technologies on economies shifting from industrial-based to information-based global societies in which space and time no longer define work. They asserted that work-related flexibilities should be viewed as essential components of organizational competitive strategies as they provide “dual benefits” such as meeting business objectives and balancing the demand of work and family simultaneously.

Telecommuting and Business Organizations; Galinsky and Bond (1998) found that as many as 55% of U.S. companies allowed their employees to work at home occasionally and 33% allowed their employees to work at home or off-site on a regular basis.

We live in a dynamic, turbulent and chaotic world in which the ubiquity and universal affordability of technology define an organization’s competitiveness, innovativeness, and ultimate survival. It was once believed that the core of an organization’s existence and competitiveness depended largely on its ability to set up huge real estate office complexes in central business districts and staff them with workers. But with the advent of telecommuting, this is no longer necessary. Technology and people are more interdependent today than any other

time in history, and surprisingly, organizations are caught between the two modes of work with respect to their business designs and competitive strategies (Porter, 2005).

The basic premise of organizational change is that it will achieve improved performance, increased organizational commitment from workers and improved job satisfaction, growth and higher quality products and services. John Scully (1987) former CEO of Apple Computer Company, argued that to create an extraordinary corporation in the contemporary business environment, technology must be a central driving factor/enabler. Work is now mobilized more than ever before changing the traditional concept of work, location and time as all being centralized as opposed to today's virtually distributed work. As stated earlier, many organizations of all kinds (private, public, large, medium, and small) view telecommuting as a necessary and strategic business continuity tool to respond to both man-made and natural disasters and rapidly changing global business conditions that require real-time strategic adaptation and (Guimaraes and Dallow, 1999). However, given the global competitive nature of the marketplace, telecommuting is seen as an opportunity for both employees and employers to operate more cost effectively than before.

Varieties of Remote Work; Advances in the area of telecommunications technology have profoundly impacted the options employees have with respect to where, how, and when to perform their work. This has impacted the number of employees and prospective employees in terms of work-location and work frequency choices. Employees are increasingly performing their work in some location other than their regular central office (Kim, 1999; Leonard, 1997; Lomerson and Anderson, 1999). The latter identified three discrete telework approaches: *telecommuting* is when an employee performs work-related activities from a fixed remote location (e.g., an employee working from home). The second is *remote access computing*, in which an employee performs work activities from multiple fixed remote work locations (a consultant working at various client sites.) The third is *nomadic computing* in which an employee performs work activities from variable remote work locations (e.g., a salesperson recording sales transactions in the field.)

Mirchandani (1999) defined telecommuting as "a work arrangement whereby an employee works from her or his home rather than from the central office." Yap (1996) expanded the above definition by noting that one's home is not the only remote location from which an employee may telecommute. He therefore defined telecommuting as "a mode of work whereby an individual or individuals in their home or satellite work centers work with the use of a computer and telecommunication technologies instead of commuting daily to the central office district. Gray, Hudson, and Gordon (1993) defined telecommuting as "a flexible way of working which covers a wide range of work activities, all of which entail working remotely from an employer's site or from a traditional place of work, for a significant proportion of work time." Various modes or arrangements of remote work are listed as follows; Telework centers, Satellite offices, Neighborhood work centers, Telecommuting (full-time, home-based work vs. part-time, office and home based), Client offices or (off-site work), Hoteling, Home work. Each of these alternative work arrangements increases employee flexibility which can be advantageous for both employers and employees.

Hunton (2005) conducted a longitudinal study using experience sampling in which he examined the impact of alternative telework arrangements such as working at home only (H), home plus downtown (H+D), home plus satellite office (H+S) and home plus satellite plus downtown (H+S+D). The research design imposed each of the four different conditions on medical records workers in different hospitals. A fifth condition, of working only downtown (D) was imposed on another group of workers for control purposes. The results of multiple

measurements over a six-month period showed that workers in the choice conditions (H+S, H+D, H+S+D) adaptively adjusted the proportion of time that they spent at home or in alternative locations over time. The author's thesis was that these workers attempted to achieve an optimal work-life – home-life balance that minimized task interruptions from the home and work place and achieved greater cognitive efficiency. The research also showed that workers in the choice conditions had greater job satisfaction and higher productivity than those in the non-choice (H only and D only) conditions.

Hill et al. (2003) found that among the three types work arrangement studied in their research, namely: virtual office, home-based office and traditional office, home-based office work (telecommuting) had better job performance, job motivation, and workload success ratings than the others. They attributed the higher than average work-related outcomes to a sense of autonomy and relatedness/belonging when working away from the traditional office.

In essence, telecommuting is a home-based work arrangement whereas remote work is simply working away from the central office. Technically speaking, telecommuting is a sub-set of remote work. Mokhtarian, and Solomon (1998) concluded that to assess effectively the macroeconomic impact of telecommuting, identification and classification (scope) of modes of telecommuting are important. In summary, it can be concluded that the impact of remote work and telecommuting in particular, depends on the specific work arrangement involved.

Empirical Assessment of Telecommuting Impacts on Organizations and Telecommuters

An empirical study of 100 firms by Davenport and Pearlson (1998) found that when management is open to the concept of remote work (telecommuting) as a business competitive strategy and involves employees from its development (pilot studies) to full blown implementation, the resulting outcomes can include increased overall performance, productivity, loyalty and improved morale (Kugelmass 1995). Nilles (1994); and Gray et al; (1993) described conceptually and anecdotally the various benefits identified in other studies as well as the potential disadvantages. They concluded that the benefits by and large outweigh the costs of telecommuting if telecommuting is properly and effectively implemented as a strategic business tool.

Neufeld and Fang (2004) developed an exploratory research framework to investigate and identify the determinants of telecommuter productivity. Their model encompassed seventeen hypotheses regarding telecommuter productivity and the factors that may influence productivity such as individual (family, status, gender), social (client, colleagues, manager, family interaction), situational (resource availability, distraction-free environment) and how these factors directly impact telecommuter beliefs, attitudes and productivity. The objective was to demonstrate how telecommuter productivity can be positively influenced directly and indirectly by these factors. The Neufeld and Fang study showed that low and high telecommuter productivity can be associated with varying degrees of beliefs and attitudes, interaction effectiveness, resource availability, and distraction-free environment.

A comparative experimental study by Dubrin (1991) on the job satisfaction and Productivity of 34 telecommuters versus 34 in-house employees found that telecommuting tends to increase job satisfaction in specific work arrangements, and that telecommuters are more likely to be more productive than commuters (in-house employees) on repetitive and structured job tasks. In this study, the telecommuters were sub-contractors as opposed to regular employees working from home. This distinction is critical because it could help to explain the extent of their respective organizational loyalty and commitment to their organization. The at-home group

employees had lower job satisfaction than the in-house employees with respect to the volume of work availability thus limiting their earning potential. The Dubrin study showed that work-at-home employees had productivity increases of about 30%. This finding is consistent with other research telecommuting findings. Venkatesh and Vitalari (1992) also concluded that telecommuters were more productive and had improved job satisfaction.

On the other hand, Hartman (1991) and Bailey and Kurland,(2002) found limited evidence to support earlier findings on the causal relationship between telecommuting and productivity and job satisfaction.

Baker, et al. (2007) developed a multi-factor approach to investigate the influence of Organizational variables, job characteristics, individual work style, and household characteristics on work from home (WFH) outcomes. Specifically, they wanted to find out if the variables had any impact on satisfaction and perceived productivity when professionals work from home. They defined WFH as an arrangement in which employees worked for their organizations on a full-time basis and that full-time specifically referred to employees who worked at least 20 hours per week. The findings show significant correlations between job satisfaction and productivity with respect to organizational constructs and job characteristic variables while none of the work style constructs or household characteristics were substantially correlated with job satisfaction or perceived productivity. Limitations of their study were that it comprised a small sample size and only focused on professional “full-time” (>20 hours per week) telecommuters.

While major telecommuting initiatives have been undertaken, telecommuting continues to fall short of the expected adoption rates (Tomaskovic and Risman, 1993). This gives rise to the notion of a “telecommuting Paradox,” which states that despite enormous improvements in IT, the adoption of telecommuting was lower than expected across the board (Pliskin, 1997, p.164).

Behavioral Issues in Telecommuting; The attitudes of managers and employees towards telecommuting can impact its adoption and the benefits that can be gained from its use. This section summarizes research on the application of some of the major behavioral theories to explain telecommuting outcomes. Past literature on telecommuting identified self-efficacy, remote work experience, IT capabilities, computer anxiety, communication skills, flexibility, specialized skills, self-motivation, personal control, and self-discipline as key factors that can influence telecommuting success (Staples et al, 1999; Casio, 2000; Pearlson et al, 2001; Olson, 1983; Meyers et al, 2002).

Self-efficacy Theory; Bandura (1978) defined self-efficacy as the judgment an individual makes about his or her ability to execute a particular work-related behavior. McAllister (1995) suggested that three conditions are necessary for people to feel a sense of self-efficacy:

- They believe that they have the ability to perform a task
- They believe that they are capable of putting forth the necessary effort
- They believe that there are no outside obstacles that will prevent them from accomplishing the task

The suggestion is that employees who have a high level of remote work self-efficacy are likely to believe that they are more effective at performing their remote work-related tasks. Bandura (1982) reviewed past studies on different perspectives of self-efficacy and concluded that self -efficacy theory had considerable explanatory power, more especially with respect to perceived self-efficacy which accounts for a wide variety of individual behaviors in the workplace. Staples et al. (2001) study supported earlier research including Bandura’s (1982) that

self-efficacy offers significant promise as an explanatory variable for positive remote work and management outcomes.

Other studies have found that self-efficacy is closely linked to actual task performance (Locke, 1991; Gist and Mitchell, 1992).

Trust. Staples (2001) argued that trust in a remote work environment (home-based telecommuting) where employees work away from their managers is fundamental to improving perception of self-performance. A Study of cognitive and affect-based trust by McAllister (1995) established significant correlations between both types of trust, which supports Bandura's finding that organizations can increase their employees' overall productivity and work-related performance benchmarks if they can create a viable environment that empowers them. Bandura (1989) argued that empowered people not only feel competent, they also feel confident that they can perform adequately, feel a sense of personal mastery of the tasks, are more self-assured, and believe that they can learn and grow to meet new challenges. Increased productivity and employee job satisfaction as well as organizational commitment in such work arrangements depends on the degree of trust management is willing to bestow upon remote workers and in this case, telecommuters (Staples et al. 1998).

The idea that telecommuters should exhibit self-efficacy and trust for effective telecommuting is not surprising given that remote workers may spend most if not all of their working time away from their managers. However, these traits are also important for managers. Early research by Olson (1992) and Zuboff (1982) highlighted the intensity of managerial resistance in the implementation of organizational telecommuting. It is important to note that this degree of resistance has the potential to compromise the prospects of widespread adoption and instead create a more stringent management-by-results paradigm. Managers may fear that reduced control over their subordinates who telecommute would compromise their ability to apply a "command and control" management style. The rationale for this type of management approach is that workers are more productive under some degree of supervision. This in part, explains why telecommuting lacks universal management support for widespread adoption. Management may become fixated with a command and control type of organizational structure, which would not be conducive to effective telecommuting. In short, the prospective introduction of telecommuting meets with skepticism and opposition in some organizations.

Anxiety. Employees fear isolation that would potentially diminish their chances of corporate promotion-related exposure (Kurland and Cooper (2002); McCloskey and Igbaria (2003). Bandura (1998) found that emotional reactions such as anxiety had the potential to lead to negative judgments on one's ability to perform the tasks as assigned. Research shows that, more often than not, telecommuters work with few or no co-workers unless required to be present one day or so a week for office social events. This scenario may work well for some and not for others depending on the nature of the job task (high vs. low) interdependence.

Monitoring and Reward Structures

As organizations adopt telecommuting, the overall work model potentially shifts from team-based to individual oriented, and management's model of performance evaluation shifts from evaluation by presence to evaluation by results (Vora and Mahmassani, 2002). Adopting telecommuting means entrusting telecommuters with the responsibility for their work. Porter and Lawler (1968) advocated structuring of the work environment so that effective performance would lead to both intrinsic and extrinsic rewards, which they asserted would in turn lead to increased employee job satisfaction. Their rationale was that if structuring the work environment

was objectively done, not only would it induce a positive worker autonomy perception but also make work in general more interesting, rewarding, and satisfying. Gagni and Deci (2005) applied Self-Determination Theory to help understand worker overall job satisfaction and motivational factors. They found that there was a distinction between autonomous motivation and controlled motivation. They concluded that workers tended to respond positively to autonomy in their work tasks because it provides them with the highest sense of choice as opposed to an extrinsically motivated work environment in which they felt controlled to perform. These conclusions show that remote work and, in particular telecommuting requires intrinsically motivated worker behavior that is autonomous in nature.

“Agency Theory” (Fama and Jensen, (1983); Jensen and Meckling, (1976) studies the relationship between a principal and an agent whose economic incentives, goals and beliefs may differ. Because telecommuting is characterized by explicit and implicit contractual agreements between two parties – employer and employee - as principal and agent, respectively, it can be modeled using Agency Theory (Gordon and Kelley, (1986). In her review of Agency theory, Eisenhardt (1989) developed six general propositions concerning the efficacy of two basic reward mechanisms under different degrees of uncertainty, information cost and risk aversion. Westfall (1997) demonstrated how each one of these propositions fits into organizational telecommuting and telecommuter constructs. In short, telecommuting contracts can be either outcome based – the agent is rewarded based on the volume of work achieved- or behavior based – the agent is rewarded based on observations of how work is performed. Behavior-based control is characteristic of traditional work in which the manager and employee are in close proximity in a traditional office. In telework, behavior-based control involves electronic monitoring and periodic performance evaluations to avoid “shirking” as described in the agency theory literature (Mitnick, 1992). Such mechanisms are likely to be reassuring to managers but come at a cost. As outcome uncertainty increases, behavior-based control is more likely to increase and outcome based control to decrease. Risk-averse telecommuting employees who perceive their task success outcomes to have low probability would be more likely to prefer onsite task assignments to a telecommuting work arrangement. To the extent that outcomes are easily measured in terms of (say) units produced, shipped, sales dollars and telemarketing calls outcome-based contracts become more desirable. However, either outcome- or behavior-based control can be applied if the telecommuter has a high level of trustworthiness and will work in the best interest of the principal (employer).

Productivity. Cohen (1993, p. 5) argues that in the interest of organizational competitiveness, efficiency, and effectiveness, it is incumbent upon management to establish an acceptable and standardized measure of an employee’s efficiency and effectiveness in terms of real-time output. Westfall (2004) emphasized the need for organizations to develop a more objective measurement or assessment approach to telecommuting outcomes. He identified four different variables relevant to telecommuting productivity in an effort to objectively gauge any improvements from telecommuting as follows:

Amount of work: Actual hours of work per day, week, month, or year

Intensity of work: How hard the person is working (amount of concentration or focus)

Efficiency of work: Ratio of outputs to labor inputs (affected by amount of supporting technology, experience, and training, and organization of work)

Adjustments: Telecommuters generally require additional inputs from the organization.

The implied relationships are summarized in the following equation:

Output = Hours x Intensity x Efficiency x Adjustments

Neufeld and Fang (2004) defined productivity as the ratio of inputs to outputs which is consistent with the original definition by labor economists. Sink and Smith (1994) characterized productivity specifically as the relationship between outcomes of a system and what is consumed to produce or create the outputs.

According to Ruch (1994), perceived productivity at the individual level is associated with the effectiveness with which a worker applies his or her talents and skills to perform their work using available resources.

Neufeld and Fang (2004) examined factors associated with low and high perceived productivity and positive and negative attitudes and beliefs and concluded that high productivity and low productivity differed in terms of belief and attitudes toward telecommuting, interaction effectiveness with managers and family members, resource availability, and distraction-free environment. Studies by Davenport and Pearlson (1998) and Mokhtarian and Salomon (1997) on individual telecommuter productivity reported increased productivity for telecommuters due to reduced work interruptions and /or the flexibility to work at optimally efficient hours. Bandura (1998); Staples et al (2001); and Hartman et al (1992) have reported similar results.

Duxbury and Higgins (1995) found that both productivity and employee job satisfaction are primarily determined by the amount of work-related flexibility that organizations provide their employees. This flexibility generates a positive sense of belongingness and viability thus guaranteeing a balance between work and family that is viewed as critical to maintaining a productive, satisfying, and identity workplace atmosphere.

Belanger (1999) noted that many researchers reported greater increases than average increases in productivity for telecommuters due to working peak hours, reduced interruptions, conducive working environment for optimum concentration, reduced incidents of absenteeism, and reduced time commuting. According to her comparative research study, telecommuters rated higher than non-telecommuters in terms of productivity and personal control of work-related tasks and thus, higher job satisfaction.

Job Satisfaction. To explore the complexity of the relationship between telecommuting and productivity and job satisfaction, Dubrin (1991) conducted a comparative study of the job satisfaction and productivity of telecommuters versus in-house full-time (central office locale) employees. His study compared 34 in-house employees and 34 telecommuters performing similar data entry and coding job tasks. His findings were consistent with those in telecommuting literature (Shamir and Salomon, 1985) in that home-based employees (telecommuters) expressed higher job satisfaction and improved productivity overall than the their counterparts. The home-based employees were part-timers who produced at a higher rate than those who worked full-time at the central office.

Khalifa and Etezadi (1997) conducted a study in which they assessed the perceptions of telework among 300 white-collar workers in various business areas (e.g., human resources, sales, and information systems) in a number of organizations. They found that telecommuting can potentially improve an employee's quality of life, contribute positively to the environment as well as society, improve both company and individual productivity, and enhance the company's overall appeal in the eyes of its current employees as well as prospective employees.

McCloskey and Igarria (1998); Olson (1989) found that irrespective of the extent to which individual employees telecommute, they were more likely to be satisfied with their work than those who participated in other work arrangements such as traditional and virtual work offices.

Belanger et al. (1998) developed a telecommuting research framework that fundamentally emphasized the concept of "fit" as a central construct in terms of telecommuting success outcomes. They argued that a good understanding of the characteristics of the telecommuting

arrangement (i.e. individual, work, organizational, and technology) was necessary for success in terms of telecommuting outcomes. Their results suggest a curvilinear relationship between the extent of telecommuting and job satisfaction with job satisfaction appearing to plateau at more extensive levels of telecommuting. In addition, it was found that telecommuters whose jobs entailed low levels of task interdependence and/or high levels of job discretion tended to experience comparatively greater levels of job satisfaction across all levels of telecommuting.

Organizational Commitment Several definitions of organizational commitment are identified in the literature. Bateman and Strasser (1984) operationally defined organizational commitment as multidimensional in nature in that it involves employees’ loyalty to the organization, willingness to exert extra effort on behalf of the organization, degree of goal and value congruency with the organization, and the overall objective desire to maintain membership with the organization for mutual benefit. A review of the organizational commitment research by Meyers and Allen (1991) identified three types of organizational commitment: *affective, continuance, and normative*.

Affective organizational commitment is defined as the emotional attachment, identification, and involvement that an employee has with his or her organization and goals (Mowday et al, 1997; Meyers and Allen, 1993). The general consensus is that employees value work-related options that improve their overall effectiveness, commitment, efficiency and thus choice of organizational membership.

Continuance commitment is defined as the willingness to remain in an organization due to the personal investment made by the employee in the form of non-transferable investments that include such things as relationship with other employees, years of employment or benefits that an employee receives or stand to receive. In essence, employees who develop a special bond with their employer find it difficult with time to sever the relationship in terms of leaving the organization.

Normative organizational commitment is defined as the commitment that a person believes he or she has to the organization or their feelings of obligation to their workplace (Belanger,1999). Weiner (1982) discussed normative commitment as being a “generalized value of loyalty and duty” essentially, a commitment demonstrating “a moral feeling of obligation” to the organization.

Meyer et al (1993) observed that the three types of organizational commitment represent psychological states that characterize an employee’s relationship with the organization and influences whether the employee leaves or stays with the organization. They concluded that those employees with a strong affective commitment will remain with the organization because they want to, those with a strong continuance will remain with the organization because they have to, and those with a normative commitment will remain because they feel they have to.

Table 4. Summary of Empirical Research on Telecommuting.

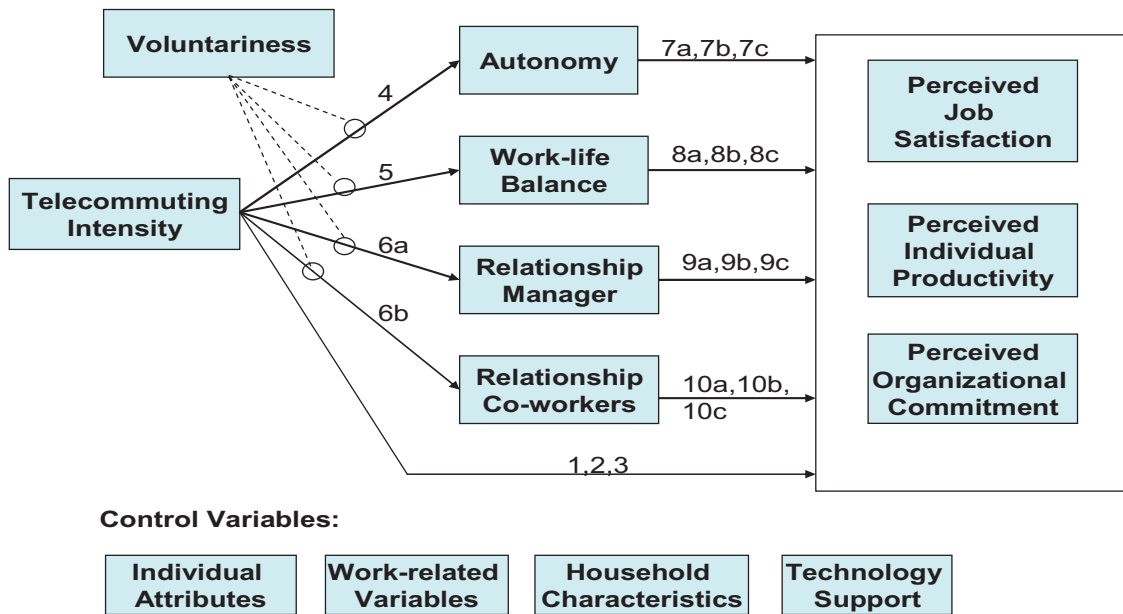
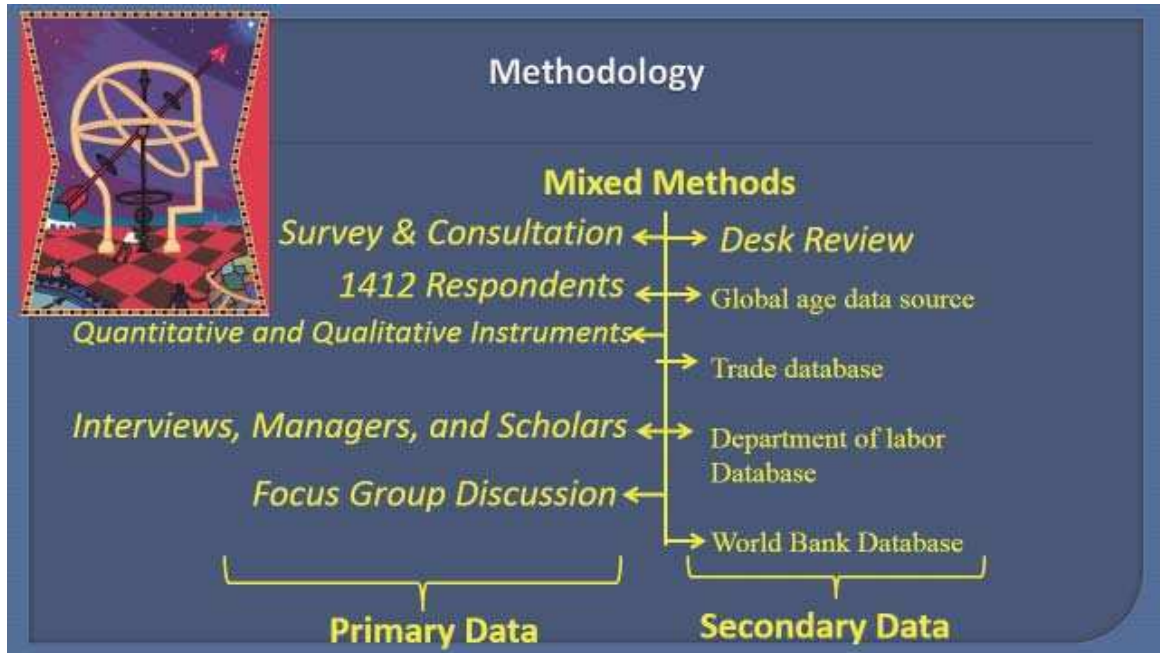
Study	Independent Variables	Dependent Variables	Control Variable(s)	Conclusions
Belanger (1999)	Telecommuting	Choice or Option, Work characteristic, Organizational and Individual characteristics, productivity, job satisfaction, and personal control	Age, Skills, identification with organization, and job category	Telecommuting option correlated with worker expected outcomes

Baker (2007)	Work From Home (WFH) Telecommuting	Job characteristics, individual, organizational, satisfaction, and productivity	Influences: Organizational, Individual, job, and interface	Organizational and job characteristics were significantly correlated with study outcome measures (satisfaction and perceived productivity)
Hunton (2005)	Telework/ Telecommuting strategies or policy	Autonomy, location, Performance, retention motivation, and productivity	Treatment variables; Downtown, Home, Downtown +Home, Downtown + Satellite D + S + H	An autonomy-supportive work environment mediated the effective balancing of organizational work demands and employee personal needs
Golden & Veiga (2005)	Telecommuting (Extent)	Job satisfaction, task interdependence, job discretion, and work scheduling	Gender, age, functional specialization, and telecommuting tenure	Extensive levels of telecommuting and job satisfaction are negatively correlated
Neufeld & Fang (2004)	Telecommuter Productivity	Individual, social, situational factors and beliefs and attitudes	Information and technology resources and interaction opportunities	Telecommuting productivity was positively associated with beliefs and attitudes, social factors, and situational factors, and unassociated with individual factors.
DuBrin (1991)	Telecommuting versus In-House Employees	Job satisfaction and productivity	Financial incentives, benefits, modified work schedule and work options	There is a positive correlation between telecommuting and job satisfaction with specific work arrangements and productivity on structured repetitive tasks
Gajendran and Harrison (2007)	Telecommuting	Job satisfaction, performance turnover, role stress productivity, and organizational commitment and career prospects	Need for autonomy, need for work-life balance, relationship quality, task interdependence, age, and skills	Telecommuting has overall positive impacts or relationships with employee proximal and distal outcomes.

Methodology

This research investigates the extent to which telecommuting intensity influences or predicts employee perceived outcomes in the developing countries. The research question is basically whether or not telecommuter perceived outcomes are a function of one's telecommuting intensity which was defined as hours per week worked from home. In other words, does the number of full work days per week worked from home have any bearing to hypothesized outcomes or some other work motivation other than intensity? The most often studied dependent variables in the literature appear to be job satisfaction, productivity performance, and organizational commitment. It can be argued that these measures capture the range of outcomes that are important to both the worker and the organization. Accordingly, we adopted these outcomes

variables in our study to test predictability of telecommuting intensity applicability on the hypothesized perceived outcomes in developing economies.



Findings and Discussions

Analysis and Procedures Variables in all of the 2138 cases were coded and their respective raw data values were entered into the SPSS database to create a data file for statistical analysis. Data

was checked for missing values and those missing were double-checked manually from the survey data output. Missing values were confirmed and attributed to non-response by the respondents. A number of cases were omitted for this reason. No data values were entered for the missing values. However, over 600 cases were omitted from the original data file because they did not meet the minimum telecommuting requirement (8 hours or 1 day) leaving 1,412 cases for statistical analysis. (One day was the cutoff for separating casual telecommuters from those who were committed to spend a significant proportion of the time working from home.)

Table 5. Summary Results for (H1) with and without Covariates for Telecommuting Intensity Predicting Productivity.

Hypothesis	Hypothesis Statement	R ²	Adjusted R ²	Variable of Interest <i>p</i>	Hypothesis Support/Non-Support
1 – no covariates	The intensity of telecommuting is positively related to higher levels of productivity	.020	.019	.001	Supported
1 – with covariates		.085	.076	.001	Supported

Table 6. Summary Results for (H2) with and without Covariates for Telecommuting Intensity Predicting Job Satisfaction.

Hypothesis	Hypothesis Statement	R ²	Adjusted R ²	Variable of Interest <i>p</i>	Hypothesis Support/Non-Support
2 – no covariates	The intensity of telecommuting is positively related to higher levels of job satisfaction	.012	.011	.001	Supported
2 – with covariates		.090	.081	.016	Supported

Table 7. Summary Results for (H3) with and without Covariates for Telecommuting Intensity Predicting Organizational Commitment.

Hypothesis	Hypothesis Statement	R ²	Adjusted R ²	Variable of Interest <i>p</i>	Hypothesis Support/Non-Support
3 – no covariates	The intensity of telecommuting is positively related to higher levels of organizational commitment	.010	.009	.001	Supported
3 – with covariates		.119	.110	.010	Supported

Table 8. Summary Results for (H4) with and without Covariates for Telecommuting Intensity Predicting Autonomy.

Hypothesis	Hypothesis Statement	R ²	Adjusted R ²	Variable of Interest <i>p</i>	Hypothesis Support/Non-Support
4 – no covariates	The intensity of Telecommuting is positively related to higher sense of autonomy	.010	.009	.001	Supported
4 – with covariates		.056	.047	.017	Supported

Table 9. Results for Regression Curve Fitting (H5) Telecommuting Intensity Predicting Work Life Balance.

Hypothesis	Hypothesis Statement	R ²	Adjusted R ²	Variable of Interest <i>p</i>	Hypothesis Support/Non-Support
5 – no covariates	The intensity of telecommuting has a curvilinear (inverted U-shaped) relationship with perceived work-life balance	.006	.005	.685	Not supported
5 – with covariates*		-	-	-	-

Note. Because a Regression Curve Fitting analysis was run, covariates were not entered.

Table 10. Summary Results for (H6) with and without Covariates for Telecommuting Intensity Predicting Relationships: Manager to Employee and Relationships: Coworker to Employee.

Hypothesis	Hypothesis Statement	R ²	Adjusted R ²	Variable of Interest <i>p</i>	Hypothesis Support/Non-Support
6a – no covariates	The intensity of telecommuting has a negative relationship with the quality of the telecommuter’s relationships with superiors	.008	.008	.002	Supported
6a – with covariates	The intensity of telecommuting has a negative relationship with the quality of the telecommuter’s relationships with superiors	.046	.036	.062	Not supported
6b – no covariates	The intensity of telecommuting has a negative relationship with the quality of the telecommuter’s relationships with co-workers	.007	.007	.003	Supported
6b – with covariates	The intensity of telecommuting has a negative relationship with the quality of the telecommuter’s relationships with co-workers	.058	.048	.001	Supported

Table 11. Summary Results for (H7) with and Covariates for Autonomy Predicting Job Satisfaction, Productivity, and Organizational Commitment.

Hypothesis	Hypothesis Statement	R ²	Adjusted R ²	Variable of Interest <i>p</i>	Hypothesis Support/Non-Support
7a – no covariates	Perceived Autonomy is positively related to higher levels of job satisfaction	.314	.313	.001	Supported
7a – with covariates	Perceived Autonomy is positively related to higher levels of job satisfaction	.345	.339	.001	Supported
7b – no covariates	Perceived Autonomy is positively related to higher levels of productivity	.001	.000	.284	Not supported
7b – with covariates	Perceived Autonomy is positively related to higher levels of productivity	.054	.045	.204	Not supported
7c – no covariates	Perceived Autonomy is positively related to higher levels of organizational commitment	.249	.249	.001	Supported
7c – with covariates	Perceived Autonomy is positively related to higher levels of organizational commitment	.333	.327	.001	Supported

Table 12. Summary Results for (H8) with and without Covariates for Work Life Balance Predicting Job Satisfaction, Productivity, and Organizational Commitment.

Hypothesis	Hypothesis Statement	R ²	Adjusted R ²	Variable of Interest <i>p</i>	Hypothesis Support/Non-Support
8a – no covariates	Improved work-life balance is positively related to higher levels of job satisfaction	.043	.042	.001	Not supported*
8a – with covariates	Improved work-life balance is positively related to higher levels of job satisfaction	.118	.110	.001	Not supported*
8b – no covariates	Improved work-life balance is positively related to higher levels of productivity	.014	.013	.001	Supported
8b – with covariates	Improved work-life balance is positively related to higher levels of productivity	.065	.056	.001	Supported
8c – no covariates	Improved work-life balance is positively related to higher levels of organizational commitment	.032	.031	.001	Not supported*
8c – with covariates	Improved work-life balance is positively related to higher levels of organizational commitment	.135	.127	.001	Not supported*

Note. These regressions yielded a significant negative relationship between the variables.

Table 13. Summary Results for (H9 - LMX) with and without Covariates for Relationships Quality: Manager to Employee Predicting Job Satisfaction, Productivity, and Organizational Commitment.

Hypothesis	Hypothesis Statement	R ²	Adjusted R ²	Variable of Interest <i>p</i>	Hypothesis Support/Non-Support
9a – no covariates	Manager to Employee	.382	.382	.001	Supported
9a – with covariates	Manager to Employee	.441	.436	.001	Supported
9b – no covariates	Manager to Employee	.005	.004	.010	Supported
9b – with covariates	Manager to Employee	.057	.048	.112	Not supported
9c – no covariates	Manager to Employee	.236	.236	.001	Supported
9c – with covariates	Manager to Employee	.317	.311	.001	Supported

Table 14. Summary Results for (H10 - TMX) with and without Covariates for Relationships Quality: Coworker to Employee Predicting Job Satisfaction, Productivity, and Organizational Commitment.

Hypothesis	Hypothesis Statement	R ²	Adjusted R ²	Variable of Interest <i>p</i>	Hypothesis Support/Non-Support
10a – no covariates	Coworker to Employee	.125	.125	.001	Supported
10a – with covariates	Coworker to Employee	.196	.188	.001	Supported
10b – no covariates	Coworker to Employee	.002	.001	.146	Not supported
10b – with covariates	Coworker to Employee	.056	.047	.505	Not supported
10c – no covariates	Coworker to Employee	.112	.112	.001	Supported
10c – with covariates	Coworker to Employee	.199	.191	.001	Supported

Hypothesis (H1): The intensity of telecommuting is positively related to higher levels of productivity

To assess hypothesis 1, a hierarchical and a linear regression were conducted to assess if telecommuting intensity predicted productivity. The results of the linear regression without covariates (see Table 1 in Appendix B) supported the hypothesis that telecommuting intensity significantly predicted productivity, $B = 0.15$, $p = .001$. As telecommuting intensity increased, productivity also tended to increase. The results of the hierarchical regression with the covariates (see Table 11 in Appendix B) did also support the hypothesis, $B = 0.16$, $p = .001$. As telecommuting intensity increased, productivity also tended to increase while controlling for the covariates. The full regression results are shown in Table 1 in Appendix B.

Hypothesis (H2): The intensity of telecommuting is positively related to higher levels of job satisfaction

To assess hypothesis 2, a hierarchical and a linear regression were conducted to assess if telecommuting intensity predicted job satisfaction. The results of the linear regression without covariates (see Table 2 in Appendix B) supported the hypothesis, $B = 0.10$, $p = .001$; as telecommuting intensity increased, job satisfaction also increased. The results of the hierarchical regression with the covariates (see Table 12 in Appendix B) also supported the hypothesis, $B = 0.08$, $p = .016$; as telecommuting intensity increased, job satisfaction also increased after controlling for the covariates. The full regression results are shown in Table 2 in Appendix B.

Hypothesis (H3): The intensity of telecommuting is positively related to higher levels of organizational commitment

To assess hypothesis 3, a hierarchical and a linear regression were conducted to assess if telecommuting intensity predicted organizational commitment. The results of the linear regression without covariates (see Table 3 in Appendix B) supported the hypothesis, $B = 0.12$, $p = .001$; as telecommuting intensity increased, organizational commitment also tended to increase. The results of the hierarchical regression with the covariates (see Table 13 in Appendix B) also supported the hypothesis, $B = 0.11$, $p = .010$; as telecommuting intensity increased, organizational commitment also tended to increase after controlling for the covariates. The full regression results are shown in Table 3 in Appendix B.

Hypothesis (H4): The intensity of Telecommuting is positively related to higher sense of autonomy

To assess hypothesis 4, a hierarchical and a linear regression were conducted to assess if telecommuting intensity predicted autonomy. The results of the linear regression without covariates (see Table 4 in Appendix B) supported the hypothesis, $B = 0.09$, $p = .001$; as telecommuting intensity increased, autonomy also tended to increase. The results of the hierarchical regression with the covariates (see Table 14 in Appendix B) also supported the hypothesis, $B = 0.08$, $p = .017$; as telecommuting intensity increased, autonomy also tended to increase after controlling for the covariates. The full regression results are shown in Table 4 in Appendix B.

Hypothesis 5: The intensity of telecommuting has a curvilinear (inverted U-shaped) relationship with perceived work-life balance

To assess hypothesis 5, a regression curve fitting was conducted to assess if telecommuting intensity predicted work life balance. The results of the regression curve fitting (see Table 5 in Appendix B) did not support the hypothesis; the square of telecommuting intensity did not significantly predict work life balance, $B = -0.01$, $p = .685$. The full regression results are shown in Table 5 in Appendix B.

Hypothesis 6

(H6a): The intensity of telecommuting has a negative relationship with the quality of the telecommuter's relationships with superiors

(H6b): The intensity of telecommuting has a negative relationship with the quality of the telecommuter's relationships with co-workers

To assess hypothesis 6, two hierarchical and two linear regressions were conducted to assess if telecommuting intensity predicted relationships: manager to employee and relationships: coworker to employee. The results of the linear regression without covariates (see Table 6a and 6b in Appendix B) supported the hypothesis; as telecommuting intensity increased, relationships: manager to employee ($B = 0.10$, $p = .002$) also tended to increase and relationships: coworker to employee ($B = 0.11$, $p = .003$) tended to also increase. The results of the hierarchical regression with the covariates (see Table 16a and 16b in Appendix B) only supported hypothesis 6b; as telecommuting intensity increased, relationships: coworker to employee ($B = 0.17$, $p = .003$) also tended to increase. The full regression results are shown in Tables 6a and 6b in Appendix B.

Hypothesis 7

(H7a): Perceived Autonomy is positively related to higher levels of job satisfaction

(H7b): Perceived Autonomy is positively related to higher levels of productivity

(H7c): Perceived Autonomy is positively related to higher levels of organizational commitment

To assess hypothesis 7a-7c, three hierarchical and three linear regressions were conducted to assess if autonomy predicted job satisfaction, productivity, and organizational commitment. The

results of the linear regressions without covariates (see Table 7a-7c in Appendix B) showed that autonomy significantly predicted job satisfaction and organizational commitment; as autonomy increased, job satisfaction ($B = 0.55, p = .001$) and organizational commitment ($B = 0.64, p = .001$) also tended to increase. Hypotheses 7a and 7c can be supported by the regressions without covariates. The results of the hierarchical regressions with the covariates (see Table 17a-17c in Appendix B) showed that autonomy significantly predicted job satisfaction and organizational commitment; as autonomy increased, job satisfaction ($B = 0.51, p = .001$) and organizational commitment ($B = 0.64, p = .001$) also tended to increase. Hypotheses 7a and 7c can be supported by the regressions with covariates. The full regression results are shown in Tables 7a, 7b, and 7c in Appendix B.

Hypothesis 8

H8a: Improved work-life balance is positively related to higher levels of job satisfaction

H8b: Improved work-life balance is positively related to higher levels of productivity

H8c: Improved work-life balance is positively related to higher levels of organizational commitment

To assess hypothesis 8a-8c, three hierarchical and three linear regressions were conducted to assess if work-life balance predicted job satisfaction, productivity, and organizational commitment. The results of the linear regressions without covariates (see Table 8a-8c in Appendix B) showed that work-life balance significantly predicted job satisfaction, productivity, and organizational commitment; as work-life balance increased, job satisfaction ($B = -0.16, p = .001$) decreased, productivity ($B = 0.11, p = .001$) increased, and organizational commitment ($B = -0.18, p = .001$) decreased. Only hypothesis 8b can be supported as hypotheses 8a and 8c asked for positive relationships. The results of the hierarchical regressions with the covariates (see Table 18a-18c in Appendix B) showed that work-life balance significantly predicted job satisfaction, productivity, and organizational commitment; as work-life balance increased, job satisfaction ($B = -0.13, p = .001$) decreased, productivity ($B = 0.12, p = .001$) increased, and organizational commitment ($B = -0.14, p = .001$) decreased. Only hypothesis 8b can be supported as hypotheses 8a and 8c asked for positive relationships. The full regression results are shown in Tables 8a, 8b, and 8c in Appendix B.

Hypothesis 9

H9a: Quality of relationship: manager to employee is positively related to higher levels of job satisfaction

H9b: Quality of relationship: manager to employee is positively related to higher levels of productivity

H9c: Quality of relationships: manager to employee is positively related to higher levels of organizational commitment

To assess hypothesis 9a-9c, three hierarchical and three linear regressions were conducted to assess if relationship: manager to employee predicted job satisfaction, productivity, and organizational commitment. The results of the linear regressions without covariates (see Table 9a, 9b, and 9c in Appendix B) showed that relationship: manager to employee significantly

predicted job satisfaction, productivity, and organizational commitment; as relationship: manager to employee increased, job satisfaction ($B = 0.51, p = .001$), productivity ($B = 0.07, p = .010$), and organizational commitment ($B = 0.53, p = .001$) also tended to increase. Hypotheses 9a, 9b, and 9c can be supported by the regressions without covariates.

The results of the hierarchical regressions with the covariates (see Tables 19a, 19b, and 19c in Appendix) showed that relationship: manager to employee significantly predicted job satisfaction and organizational commitment; as relationship: manager to employee increased, job satisfaction ($B = 0.48, p = .001$) and organizational commitment ($B = 0.50, p = .001$) also tended to increase. Hypotheses 9a and 9c can be supported by the regressions with covariates. The full regression results are shown in Tables 9a, 9b, and 9c in Appendix B.

Hypothesis 10

H10a: Quality of relationship: coworker to employee is positively related to higher levels of job satisfaction

H10b: Quality of relationship: coworker to employee is positively related to higher levels of productivity

H10c: Quality of relationships: coworker to employee is positively related to higher levels of organizational commitment

To assess hypothesis 10a-10c, three hierarchical and three linear regressions were conducted to assess if relationship: coworker to employee predicted job satisfaction, productivity, and organizational commitment. The results of the linear regressions without covariates (see Table 10a, 10b, and 10c in Appendix B) showed that relationship: coworker to employee significantly predicted job satisfaction and organizational commitment; as relationship: coworker to employee increased, job satisfaction ($B = 0.24, p = .001$) and organizational commitment ($B = 0.30, p = .001$) also tended to increase. Hypotheses 10a and 10c are supported by the regressions without covariates.

The results of the hierarchical regressions with the covariates (see Table 20a, 20b, and 20c in Appendix B) showed that the relationship: coworker to employee significantly predicted job satisfaction and organizational commitment; as relationship: coworker to employee increased, job satisfaction ($B = 0.22, p = .001$) and organizational commitment ($B = 0.27, p = .001$) also tended to increase. Hypotheses 10a and 10c can be supported by the regressions with covariates. The full regression results are shown in Tables 10a, 10b, and 10c in Appendix B.

Table 15. Summary of Results – All Hypotheses.

Summary of Hypotheses – Multiple Regressions				
Hypotheses	p	Linear	p	Hierarchical
H1: The intensity of telecommuting is positively related to higher levels of productivity	.001	Supported	.001	Supported
H2: The intensity of telecommuting is positively related to higher levels of job satisfaction	.001	Supported	.016	Supported
H3: The intensity of telecommuting is positively related to higher levels of organizational commitment	.001	Supported	.010	Supported
H4: The intensity of Telecommuting is positively related to higher sense of autonomy	.001	Supported	.017	Supported
H5: The intensity of telecommuting has a curvilinear (inverted U-shaped) relationship with perceived work-life balance	.685	Not Supported	N/A	N/A

H6a: The intensity of telecommuting has a negative relationship with the quality of the telecommuter's relationships with superiors	.002	Supported	.062	Not Supported
H6b: The intensity of telecommuting has a negative relationship with the quality of the telecommuter's relationships with co-workers	.003	Supported	.001	Supported
H7a: Perceived Autonomy is positively related to higher levels of job satisfaction	.001	Supported	.001	Supported
H7b: Perceived Autonomy is positively related to higher levels of productivity	.284	Not Supported	.204	Not Supported
H7c: Perceived Autonomy is positively related to higher levels of organizational commitment	.001	Supported	.001	Supported
H8a: Improved work-life balance is positively related to higher levels of job satisfaction	.001	Not Supported (-)	.001	Not Supported (-)
H8b: Improved work-life balance is positively related to higher levels of productivity	.001	Supported	.001	Supported
H8c: Improved work-life balance is positively related to higher levels of organizational commitment	.001	Not Supported (-)	.001	Not Supported (-)
H9a: Quality of relationship: manager to employee is positively related to higher levels of job satisfaction	.001	Supported	.001	Supported
H9b: Quality of relationship: manager to employee is positively related to higher levels of productivity	.010	Supported	.112	Not Supported
H9c: Quality of relationships: manager to employee is positively related to higher levels of organizational commitment	.001	Supported	.001	Supported
H10a: Quality of relationship: coworker to employee is positively related to higher levels of job satisfaction	.010	Supported	.001	Supported
H10b: Quality of relationship: coworker to employee is positively related to higher levels of productivity	.146	Not Supported	.505	Not Supported
H10c: Quality of relationships: coworker to employee is positively related to higher levels of organizational commitment	.001	Supported	.001	Supported

In Table 15, the p-values that do **not** support the hypothesized relationships are shown in bold. The results in the table provide moderately strong support for the research model in Figure 3.1. Altogether, 12 of the 19 hypothesized relationships are supported (with significance $p=.05$ or better) and 2 relationships, H6a and H9b, are partially supported in the sense that the simple linear regression was significant while the associated hierarchical regression with covariates was not supported at the .05 level of significance. On the other hand, 5 relationships (associated with hypotheses H5, H7b, H8a, H8c, and H10b) are not supported. Three of the unsupported relationships (H5, H8a and H8c) involve the construct of work-life balance indicating that a closer examination of this concept is warranted. It is also noteworthy that, contrary to hypotheses H7B and H10B, neither Perceived Autonomy nor Co-worker-Employee relationship had a significant positive relationship with Productivity. On the other hand, improved Work-life balance was found to have a significant positive relationship with Productivity. In summary, it can be concluded from these results that telecommuting is a complex phenomenon that requires further research before it can be fully understood.

Tests of Moderation and Mediation - Results

The statistical analyses, results, and Interpretations of the tests are all based on the work of Baron and Kenny (1986).

Moderation - Voluntariness

Tests for the Moderation Effect of Voluntariness for Telecommuting Intensity Predicting Autonomy, Work-Life Balance, and Relationships: Manager to Employee, and Relationships: Coworker to Employee.

To test for moderation, four linear and four hierarchical regressions were conducted to assess if voluntariness moderated the relationship between telecommuting intensity and autonomy, work-life balance, relationship: manager to employee and relationship: coworker to employee. To assess moderation, a regression was conducted containing the independent variable, the moderator, and the interaction of the independent variable and the moderator (after the independent variable is entered with a mean of 0. If the interaction is significant, moderation can be supported.

The results of the linear regressions without covariates (see Tests 1a-1d in Tables 21a-21d in Appendix C) showed that voluntariness did not significantly moderate the relationship between telecommuting intensity and autonomy, work-life balance, relationship: manager to employee and relationship: coworker to employee. The interaction terms in each of the regressions were not significant. The results of the hierarchical regressions with covariates (see Tests 1a-1d in Tables 22a -22d in Appendix C) also showed that voluntariness did not significantly moderate the relationship between telecommuting intensity and autonomy, work-life balance, relationship: manager to employee and relationship: coworker to employee. The full summary of results for moderation test 1a-1d with and without covariates sees Table 16.

Table 16. Summary of Results for Moderation (Voluntariness) Test.

Moderation Test #	Independent variable	Dependent variable	Moderator Variable	Without Controls (Linear)	With Controls Hierarchical
1a	Telecommuting Intensity (Days)	Autonomy	Voluntariness	Moderation: No	Moderation: No
1b	Telecommuting Intensity (Days)	Work-Life Balance	Voluntariness	Moderation: No	Moderation: No
1c	Telecommuting Intensity (Days)	Relationships: Mgr-Employee	Voluntariness	Moderation: No	Moderation: No
1d	Telecommuting Intensity (Days)	Relationships: Coworker-Employee	Voluntariness	Moderation: No	Moderation: No

The above results are not surprising because only 44 (3.10%) of the respondents were required to telecommute, the test of Voluntariness as a moderator variable was therefore unlikely to yield positive results for statistical reasons. Further research with a more even balance of volunteers and telecommuters who are required to telecommute will be necessary to determine the impact of voluntariness.

Test for Mediation - Autonomy

Test for Mediation with and without Covariates for Telecommuting Intensity Predicting Job Satisfaction, Productivity, and Organizational Commitment Mediated by Autonomy

A four-regression technique was used to assess for mediation. The first regression assesses if the independent variable predicts the dependent variable. The second regression assesses if the independent variable predicts the mediator variable. The third regression assesses if the mediator variable predicts the dependent variable. If all three regressions show significant predictors, then

the fourth regression can be conducted. In the fourth regression, if the independent variable is no longer significant, full mediation can be supported. If the independent variable decreases in strength (the regression weight becomes closer to 0 from the first regression to the fourth regression, then partial mediation can be supported.

To test for the hypothesized mediating influence of Autonomy, Work-life Balance and Employee-Worker and Co-Worker-Employee on the relationship between Commuting Intensity and the three outcome variables, twelve linear and twelve hierarchical regressions were conducted.

The results of the linear regressions without covariates (see Tables 23-26 in Appendix C) showed significant relationships between the telecommuting intensity, autonomy, and job satisfaction. In the fourth regression, the regression weight decreased from 0.10 (in the first regression) to 0.05 thus supporting mediation. The results of the linear regressions without covariates (see Tables 27-30 in Appendix C) showed that autonomy did not predict productivity and mediation cannot be supported. The results of the linear regressions without covariates (see Tables 31-34 in Appendix C) showed significant relationships between telecommuting intensity, autonomy, and organizational commitment. In the fourth regression, the regression weight for telecommuting intensity decreased from 0.12 (in the first regression) to 0.07, thus supporting mediation. Tests 2a and 2c can be supported for mediation by the linear regressions without covariates.

The results of the hierarchical regressions with covariates (see Tables 35-38 in Appendix C) showed significant relationships between telecommuting intensity, autonomy, and job satisfaction. In the fourth regression, telecommuting intensity was no longer a significant predictor, supporting full mediation. The results of the hierarchical regressions with covariates (see Tables 39-42 in Appendix C) showed that autonomy was not related to productivity thus mediation cannot be supported. The results of hierarchical regressions with covariates (see Tables 43-46 in Appendix C) showed significant relationships between telecommuting intensity, autonomy, and organizational commitment. In the fourth regression, telecommuting intensity was no longer a significant predictor and thus full mediation can be supported. Tests 2a and 2c can be fully supported for mediation by the linear regressions with covariates. The full regression results for mediation tests 2a-2c with and without covariates see Table 5.20

Mediation – Work-Life Balance

Test for Mediation with and without Covariates for Telecommuting Intensity Predicting Job Satisfaction, Productivity, and Organizational Commitment Mediated by Work Life Balance

As explained above for the test of the mediation impact of Work-Life balance, 12 twelve linear and twelve hierarchical regressions were conducted to test if Work-life balance is a mediating variable (see tests 3a – 3c in Appendix C). The results of the linear regressions without covariates (see Tables 47-50 in Appendix C) showed significant relationships between the telecommuting intensity, work-life balance, and job satisfaction. In the fourth regression, the regression weight decreased from 0.10 (in the first regression) to 0.08, supporting mediation. The results of the linear regressions without covariates (see Tables 51-54 in appendix C) showed significant relationships between the telecommuting intensity, work-life balance, productivity. In the fourth regression, the regression weight *increased* from 0.15 (in the first regression) to 0.17, not supporting mediation. The results of the linear regressions without covariates (see Tables 55-58 in appendix C) showed significant relationships between the telecommuting intensity, work-life balance, and organizational commitment. In the fourth regression, the regression

weight decreased from 0.12 (in the first regression) to 0.11, thus supporting mediation. Tests 3a and 3c can be supported by the linear regressions without covariates.

The results of the hierarchical regressions with covariates (see Tables 59-62 in Appendix C) showed significant relationships between the telecommuting intensity, work-life balance, and job satisfaction. In the fourth regression, telecommuting intensity was no longer a significant predictor and full mediation can be supported. The results of the hierarchical regressions with covariates (see Tables 63-66 in Appendix C) showed significant relationships between the telecommuting intensity, work-life balance, and productivity. In the fourth regression, telecommuting intensity was no longer a significant predictor thus full mediation can be supported. The results of hierarchical regressions with covariates (see Tables 67-70 in Appendix C) showed that telecommuting intensity was not related to work-life balance thus mediation cannot be supported. Test for mediation 3a and 3b can be fully supported by the linear regressions with covariates.

The full regression results for mediation tests 3a-3c with and without covariates see Table 16.

Mediation - Relationships

Test for Mediation with and without Covariates for Telecommuting Intensity Predicting Job Satisfaction, Productivity, and Organizational Commitment Mediated by Relationships: Manager to Employee

To assess tests for mediation (4a-4c), 24 hierarchical and 24 linear regressions were conducted to assess if relationships: manager to employee and relationships: coworker to employee mediated the relationship between telecommuting intensity and job satisfaction, productivity, and organizational commitment. Again, a four-regression technique was used to assess mediation. The results of the linear regressions without covariates (see Tables 71-74 in Appendix C) showed significant relationships between the telecommuting intensity, relationships: manager to employee, and job satisfaction.

In the fourth regression, the regression weight for telecommuting intensity decreased from 0.10 (in the first regression) to 0.05, thus supporting partial mediation. The results of the linear regressions without covariates (see Tables 75-78 in Appendix C) showed significant relationships between the telecommuting intensity, relationships: coworker to employee, and job satisfaction. In the fourth regression, the regression weight for telecommuting intensity decreased from 0.10 (in the first regression) to 0.07, thus supporting partial mediation. .

The results of the linear regressions without covariates (see Tables 79-82 in Appendix C) showed significant relationships between the telecommuting intensity, relationships: manager to employee, and job satisfaction. In the fourth regression, the regression weight for telecommuting intensity did not decrease from 0.15 (in the first regression), thus not supporting mediation. The results of the linear regressions without covariates (see Tables 83-86 in appendix C) showed that relationships: coworker to employee was not related to productivity thus mediation cannot be supported.

The results of the linear regressions without covariates (see Tables 87-90 in Appendix C) showed significant relationships between the telecommuting intensity, relationships: manager to employee, and organizational commitment. In the fourth regression, the regression weight for telecommuting intensity decreased from 0.12 (in the first regression) to 0.07, thus supporting partial mediation. The results of the linear regressions without covariates (see Tables 91-94 in appendix C) showed significant relationships between the telecommuting intensity, relationships: coworker to employee, and job satisfaction. In the fourth regression, the regression weight for

telecommuting intensity decreased from 0.12 (in the first regression) to 0.09, thus supporting partial mediation. Test 4a and 4b can be partially supported by the linear regressions without covariates.

The results of the hierarchical regressions with covariates (see Tables 95-98 in Appendix C) showed that telecommuting intensity did not predict relationships: manager to employee, thus mediation cannot be supported. The results of the hierarchical regressions with covariates (see Tables 99-102 in Appendix C) showed significant relationships between the telecommuting intensity, relationships: coworker to employee, and job satisfaction. In the fourth regression, telecommuting intensity was no longer a significant predictor and thus full mediation can be supported.

The results of the hierarchical regressions with covariates (see Tables 103-106 in Appendix C) showed that telecommuting intensity did not predict relationships: manager to employee, thus mediation cannot be supported. The results of the hierarchical regressions with covariates (see Tables 107-110 in Appendix C) showed that relationships: manager to employee did not predict productivity, thus mediation cannot be supported.

The results of hierarchical regressions with covariates (see Tables 111-114 in Appendix C) showed that telecommuting intensity did not predict relationships: manager to employee, thus mediation cannot be supported. The results of hierarchical regressions with covariates (see Tables 115-118 in Appendix C) showed significant relationships between the telecommuting intensity, relationships: coworker to employee, and organizational commitment. In the fourth regression, telecommuting intensity was no longer a significant predictor and thus full mediation can be supported. Tests 4a and 4c can only be supported for mediation by the linear regressions with covariates. The full regression results for mediation tests 4a-4c with and without covariates see Table 5.20.

Table 17. Summary of Results for Mediation Tests.

Mediation Test #	Independent variable	Dependent variable	Mediator Variable	Without Controls (Linear)	With Controls: (Hierarchical)
2a	Telecommuting Intensity (Days)	Job Satisfaction	Autonomy	Mediation - Yes	Mediation- Yes
2b	Telecommuting Intensity (Days)	Productivity	Autonomy	Mediation - No	Mediation- No
2c	Telecommuting Intensity (Days)	Organizational Commitment	Autonomy	Mediation- Yes	Mediation- Yes
3a	Telecommuting Intensity (Days)	Job Satisfaction	Work-Life Balance	Mediation- Yes	Mediation- Yes
3b	Telecommuting Intensity (Days)	Productivity	Work-Life Balance	Mediation- No	Mediation- Yes
3c	Telecommuting Intensity (Days)	Organizational Commitment	Work-Life Balance	Mediation- Yes	Mediation- No
4a	Telecommuting Intensity (Days)	Job Satisfaction	Relationships	Mediation- Yes	Mediation- Yes
4b	Telecommuting Intensity (Days)	Productivity	Relationships	Mediation- No	Mediation- No
4c	Telecommuting Intensity (Days)	Organizational Commitment	Relationships	Mediation- Yes	Mediation- Yes

Conclusions

This is one of very few studies of telecommuting to specifically focus on the impact of telecommuting intensity (as measured by number of full work days per week telecommuters

spent working from home instead of at the central office location) and perceived worker outcomes. The results are encouraging in relation to the study's hypothesized outcomes. Some of the surprising findings were a complete departure from the literature. For example, I found no significant relationships between autonomy and productivity and quality of relationship between coworker and productivity. These relationships are, in fact, important motivators behind the demand for telecommuting as an alternative work arrangement regardless of the level of host country's economy.

These findings are especially surprising for autonomy since it is viewed as a motivating variable that unleashes individuals' creativity, sense of purpose, independence, and decision-making capabilities. Future research may be needed to fully understand the non-significant relationships between these two variables. With respect to the non-significant relationships quality between employee and coworker, it may be due to the fact that the tasks individuals perform while telecommuting are not suited to this mode of work and the virtual relationships do not help the productivity prospect. Another rationale for this finding may be due to the fact that non-telecommuters see telecommuters as enjoying better working conditions and are able to do more with their time to balance their work and family demands.

The findings on work-life balance and its lack of predictive power on job satisfaction (H8a) and organizational commitment (H8c) are also surprising given the theory that as individuals' work-life balance improves; it may lead to higher levels of job satisfaction and the general feeling of belonging and loyalty to the organization or employer. This is one of the most relevant findings in this research given the degree of importance attached to family in most developing countries. These findings need further research to better understand the rationale and theory behind them. The results do not reflect or support the hypothesized relationships.

The failure of voluntariness to moderate the intensity of telecommuting and mediating variables (Autonomy, Work-Life Balance, and Relationships Quality) may be due to the fact that most of the respondents (95.0%) who telecommuted did so voluntarily. Since the moderation tests on the mediating variables did not produce significant results, this may require future comprehensive research that incorporates a large cross-section of telecommuting population with and without the option to telecommute voluntarily.

We recommend that future research replicate this work over well-diversified samples from the population including both private companies and public agencies to get a well-represented view point in specific countries for generalizability purposes. This sample should also include a variety of job categories and titles. Management should support telecommuting studies since they can provide information on the determinants of telecommuting adoptions, recruitment, training, compensation, and employee development. To capture important and relevant telecommuter attitudes and perceptions of telecommuting, a series of longitudinal studies should be undertaken with sole purpose of representing telecommuting individuals in a wide range of industries, professions, and occupations.

Importantly, while this research has concentrated on a quantitative model of telecommuting, a lot of important information was collected during the study that has not been analyzed. This includes much of the descriptive data presented in literature on elements of culture as it applies to specific developing economy and the very large amount of subjective unstructured data collected through the three open-ended questions. In future work, we intend to explore this rich reservoir of information.

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