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Chapter 3
Telework and Communication in Data Processing Centres in Brazil*

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Abstract:

Computers have been extensively introduced in our daily lives. They have become the greatest exponent of modernization. A popular image is that computers linked by telecommunication networks enable people, mainly women, to work from home, choosing freely when they want to work. This paper investigates an actual telework experience in a Brazilian Data Processing Centre and

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discusses how decentralization mediated by telework affects informal communication in a data-entry sector. It also explores the similarities and differences in telework use in developed and developing countries.

Keywords:

data-entry workers, data-processing centres, informal communication, social isolation, Taylorism, telework, women's work, work organization

Introduction

The use of computers has become routine in many developed and developing countries. Amazingly, however, and in spite of all its technical evolution, the computer has revived the "cult of machines"[1] which existed in the sixteenth and seventeenth centuries: computers, as machines, are overvalued, and the human work they demand is kept hidden. The cult is expressed in such comments as: "The computer can do no wrong"; "In the future, computers will allow us to work at home". *Toffler* (1980) argues that in the "Third Wave" industries, which are based on computers, human effort will concentrate on the mind and not on muscle. Instead of increasing physical strength, new technologies will increase the power of the mind, and offices will be transformed into "electronic cottages".

Information workers[2], on the other hand, remain hidden from public view. The "miraculous deeds" computers make possible require a great deal of work by analysts, programmers, computer operators, data-entry clerks, tape librarians, and others. Yet, information work has been considered the "profession of the future". It is often presented as a modern job, rational, pleasant, intellectually stimulating and profitable. *Greenbaum* (1976) states that this image was accurate only in the early days of the computer use, but it retains its popularity.

1 In the sixteenth and seventeenth centuries there was a great enthusiasm for machines, a "cult of machines" as Agostino Ramelli, engineer for the King of France, for example, shows in his book "Le Diverse et Artificiose Macchine" published in 1588 in France, where he describes and illustrates the "flower pipe organ, a machine that reproduces the chanting of a little bird coming out of a bunch of flowers." In reality, the little bird's song was produced by a slave in a room next to the machine. He blew into a small tube and the song was heard in the next room. In this way, the slave in fact produces the sound without, however, being seen by the people who admire the song of the bird. For more examples on this period, see *Rossi* (1989).

2 The term information workers is used in this paper to denote all human work which is necessary for the operation of computers: analysts, programmers, data-entry clerks, tape librarians, data-preparation clerks, computer operators, etc.

Computers have become the greatest facilitators of modernization. Whenever a task or a decision is to be carried out with rationality and modernity, it will surely be entrusted to a computer. *Roszack* (1986) claimed that people are prepared to believe that we live in an Information Age, which makes of every computer around us what the relics of the True Cross were in the Age of Faith: emblems of salvation.

Another popular image is that computers linked by telecommunication networks enable people, mainly women, to work from home choosing freely when they want to work. Working life and private life, in this way, will be integrated, resulting in increased productivity, energy savings and reduced stress. Mothers will be able to care for their children and also stay in the labor market. Thus new technologies appear to solve every problem of contemporary life. However, is this promise actually being kept?

Until recently, most telework experiences have occurred in developed countries, where their positive and/or negative aspects have been analyzed. But one wonders whether the implications of telework in *developed* countries are the same as in *developing* countries. The Brazilian case, analyzed in this paper, is useful for the investigation of this question because Brazil is one of the largest developing countries where computers have been introduced extensively in the last decade.

This paper seeks to pierce beneath the "cult of machines" that surrounds computers and the new technologies in order to investigate an actual telework experience in Brazil. Drawing on secondary literature, it also explores the similarities and differences in telework use in developed and developing countries. Using qualitative methods, the study analyses informal communication in large Brazilian Data Processing Centres (DPCs) and how decentralization mediated by telework affects this form of communication. Finally, it describes the ways in which Brazilian workers and managers in DPCs are facing these issues.

The Data Processing Centres in Brazil

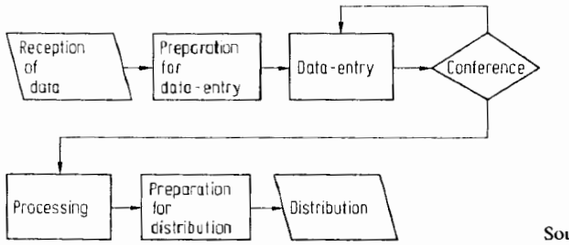
The emergence of DPCs in Brazil took place during the authoritarian period after 1964, when Brazilian capitalism reached its monopolistic phase. Since then a great interest in technology has existed. Technology is seen as a non-political variable, neutral and essential to the country's development. In the post-1964 era, technology has become a symbol of progress, efficiency and modernization, and any possibility that it could involve exploitation and domination is willfully ignored.

Covre (1983) pointed out that monopolistic capitalism entered Brazil through two basic processes: "de-nationalization" and technological modernization. The latter involved the widespread use of both machine-specific

and organizational technology. DPCs are closely related to the modernization process described by *Covre* (1983). The information workers, who appeared during the period of military rule, have since then been repressed and excluded from participation. This is one aspect of the analysis presented here.

Another aspect that must be considered is the many chronic social and economic problems which exist in Brazil. People live far from their workplaces and sometimes commute more than two hours every day. Two in every three Brazilians earn less than twice the minimum wage[3]. The work accident statistics are frightful: 500,000 fingers are lost yearly due to work accidents. In 1989, there were an estimated 1 million work accidents. Finally, we have to bear in mind that Brazilian culture has an authoritarian quality. *Chauí* (1985, 1986) stated that in Brazil social differences are constructed as hierarchies and social relations are mediated by "the favor policy" or "the Brazilian way", which makes the establishment of egalitarian relationships between people difficult. The most elementary democratic rights are often not respected.

Although information workers are considered to hold "white-collar" jobs which are deemed safer and cleaner than factory jobs, Data Processing Centres might be compared with a factory in which the raw materials are the data-entry documents that pass through the assembly line (see Figure 1). The final product is the reports and documents which have to be sent to the customers.



Source: Maciel (1985)

Figure 1: Assembly line "batch" in a DPC

3 The minimum wage in Brazil is established by the Federal Government and, unfortunately, does not provide the minimum amount per month that the worker needs to live. It is an official rate which was, in January 1990, US$32.00. The minimum wage per month estimated by a Brazilian trade union-organization, which is widely recognized as the most accurate, was, at that time, US$221.58.

The work organization in Brazilian DPCs is based on Taylorism (*Taylor,* 1919) which will be considered here not as a set of ideas surpassed by other schools of organizational psychology, but as a set of principles underlying work organization. Thus, a Taylorist work organization may be analyzed in terms of the three general categories proposed by *Littler* (1978): (1) the division of labour; (2) the implicit employment relationship; and (3) the structure of control over the task performance.

Information work is fragmented, and this fragmentation has been under way since its emergence in the mid 50s, as pointed out by *Greenbaum* (1979) and *Kraft* (1977). It gave rise to a polarization of skills[4] processes as noted by *Palloix* (1976), where we have unskilled tasks for most of the information workers, who in Brazil amount to 83.5 per cent of the information labor force (data-preparation clerks, data-entry clerks, computer operators, programmers, and tape librarians) as shown in Table 1. This fragmentation takes place in the context of a rigid hierarchy which was created, according to *Greenbaum* (1976), to reinforce the standardization effects and to pay the worker the lowest possible wage.

Working on a DPC is well described by the minimum interaction model, "under which there is a minimal connection between the individual and the organization in terms of skill, training, involvement, and complexity of his contribution, in return for maximum flexibility and independence on the part of the organization in using manpower" (*Davies & Taylor,* 1972; p. 302). Training programmes in DPCs are rare and most of the workers complain about this lack. "Most companies have preferred, when they could, to organize jobs as narrowly as possible in order to minimize training (a key tenet of Taylorism). And when they couldn't, they have relied on the informal organization of workers on the shop floor to provide an environment where people can learn from one another" (*Howard,* 1985; p. 42).

4 There is a long and intense debate about the de-skilling process related to the introduction of new technologies in the workplace. Some investigators (*Noble,* 1984; *Greenbaum,* 1979; *Shaiken,* 1984; *Braverman,* 1974) argue that the introduction of new technologies led to reduced skill levels. Other investigators support the idea that new technologies may lead to an upgrading of skill levels (*Zuboff,* 1988; *Hirschhorn,* 1988). Another position in the debate is held by *Spenner* (1983, 1985) who points out the importance of the "social and bureaucratic factors" in the de-skilling process. He notes that the same technological innovation in two different firms can change the skill requirements in different ways. (See *Milkman & Pullman,* 1988, for extensive literature review.) Computer skills will be used here as "learned behaviours needed for achieving desirable performance levels when doing job-related tasks using a computer; achieving satisfactory performance hinges first upon attentional resource capabilities (i.e., information processing) and motor behaviour by the individual and, second, upon the mix of declarative and procedural knowledge needed to perform the skill" (*Gattiker,* 1990).

Table 1: Distribution of Information Workers per Job (Estimated)

Jobs	Year	1987	1988	1989	1990
Analysts (16.5%)		59.015	67.867	78.047	89.754
Programmers (15.0%)		53.845	61.922	71.210	81.891
Computer Operators (11.6%)		41.489	47.712	54.868	63.098
Data-Entry Clerks (36.2%)		129.690	149.143	171.514	197.241
Data-Preparation Clerks (19.9%)		71.521	82.249	94.586	108.773
Tape Librarian (0.8%)		2.970	3.415	3.927	4.516
Total		358.581	412.308	474.152	545.273

Source: Special Secretary of Informatics, Brazilian Federal Government (SEI)

The strategy of leaving training to be done by informal groups – "learning on the job" – is common in DPCs as may be seen from this comment by a computer operator:

> "Until now, we did not have any training courses and the system is going to change soon. We are going to have to learn by ourselves" (*Soares*, in press).

Finally, control over task performance is extensive. In the data-entry sector the control is double: by supervisor and by computer. The work is electronically monitored and even time spent in the bathroom is monitored. In this way, there is the emergence in the DPCs of what *Foucault* (1977) called "integrally useful time". The electronic surveillance of data-entry is a clear example of how all time is, in fact, transformed into working time. Computer monitoring exerts a continuous and constant control on workers, imposing on them a severe discipline and setting the workers' pace in a standardized way, which not only eliminates the working individualities but also restrains horizontal communication. The worker cannot stop working for a few minutes in order to think, to drink a cup of coffee, or to talk to a fellow worker.

In large DPCs Taylorist work organization produces divisions among workers, even when they share the same working conditions, pace and discipline. It increases loneliness at the workplace and decreases horizontal communication (*Dejours,* 1987). Restrictions on communication during working time, according to *Dejours* (1987), disorganize workers' emotions and prevent the emergence of informal groups, which are both production

groups and struggle groups in the face of common problems related to work. It is well known that workers constitute informal groups to resist, to defend themselves, to struggle (*Castoriadis,* 1985). Thus, workers might not experience frustration and anxiety alone, but when they are isolated these feelings are much more intensified (*Dejours,* 1987).

Another aspect that hinders horizontal communications in DPCs is the spatial distribution of workers in the workplace. The discipline is first seen in the spatial distribution of the persons (*Foucault,* 1977). One of the most used techniques in DPCs is the distribution of workers in individual workstations separated by tall partitions. "Each person in his/her own place; and in each place only one person. The disciplinary space tends to divide itself into so many fragments as so many bodies or elements must be divided" (*Foucault,* 1977; p. 131, my translation).

This technique of fragmentation and isolation of the spatial environment is often present in the DPCs. "The workstations were separated by tall partitions, which created a cubicle effect around the work space of each clerk. Installing those partitions was the final step that completed the clerk's relegation to the realm of the machine. Exiled from the interpersonal world of office routines, each clerk became isolated and solitary" (*Zuboff,* 1988; p. 125). This rigid fragmentation of spatial environment not only creates isolation in the workplace, but intensifies the workers' pace so that informal relationships and horizontal communication are further prevented. The workers are increasingly isolated in cubicles, where there is constant surveillance of their behavior (cf. *Gattiker, Gutek & Berger,* 1988).

The restrictions on workers' communication are generalized in the DPCs, as may be seen by this comment by a system analyst:

> "You want to have a chat with a fellow-worker. You want to relax, but if you go there and talk to another person, someone will go by and start to watch you, go away, come back again and watch you because he knows that you are chatting. You feel that someone is watching you. Someone is watching what you are doing and you cannot do this ... So, you start to control yourself, because there is always someone watching you" (*Soares,* in press).

However, the lack of communication is more severe in the data-entry sector, where 36.2 per cent of the manpower is concentrated. Data-entry clerks are forbidden to talk during working time. Data-entry work is extremely uneventful, repetitive, without any demands on creativity and has a very narrow and one-sided job content. Most of the time the data-entry clerks are paid according to results: "the more you work, the more you are paid," which increases workers' pace and decreases work communication. Thus, the emergence of informal groups among data-entry clerks is only possible during rest breaks, lunch/dinner breaks, before or after work,

or during the journey to or from the office[5]. It is only in these short periods of time that data-entry clerks may talk to each other about the problems related to the tasks which they perform. The data-entry clerks are *Taylor*'s "second-class" workers who should be isolated from each other in order to prevent "systematic soldiering".

One fundamental aspect that must be considered is that there is sex segregation in the data-entry sectors. The majority of workers are women. *Braverman* (1974) pointed out that data-entry work was considered a female job due to the low skill requirements. This is an important aspect because the extent of control over time and space as well as the tasks performed differ according to sex (*Humphrey,* 1987). Indeed, one of the reasons management was so concerned about restricting communication among data-entry clerks is that they were women, and were presumed to be interested only in gossiping.

Finally, due to the low wages and poor working conditions in Brazil, trade unions are concentrated in the data-entry sector. The number of strikes has increased. In 1987 there were over 2,281 hours of worked missed due to strikes. In the same year employers decided to use a new form of work organization, telework, to decentralize the data-entry sector.

Literature Review on Telework

Before reviewing the literature, let us define the term "telework". According to *Huws* (1988), all existing definitions are imprecise and illogical. She suggests that telework should be defined not as a unitary phenomenon but as a product of convergence of several trends, which are affecting the organization of work[6]. In this paper the term telework denotes a form of work organization mediated by computers and telecommunications in which work is carried on outside a firm's central office (*Olson,* 1983; *Elling,* 1985; *Lie,* 1985; *Kraut,* 1987; *Empirica,* 1986).

There are several different kinds of telework which may be classified, according to *Monod* (1985), as collective and individual experiences. In the former, there are the neighborhood work centers, branch offices linked to a mother organization, and in the latter, there are all the instances where people using terminals located anywhere in the world can work. For

5 Large organizations in Brazil provide bus service as a social benefit to their workers due to problems with public transportation.

6 The different trends presented by *Huws* (1988) are: (1) the geographical relocation of employment; (2) the externalization of labor; (3) changes in contractual relationships between employers and workers; (4) increases in home-based working; and (5) changes in the design of jobs.

example, we have telehomework, tele-sales representation and telemanagement. Most of the literature on all this is on individual telehomework. Much less is on collective forms. This case study is about the latter.

The telework phenomenon first appeared in developed countries in the mid-70s, due to the energy crisis, and has been improved with the ongoing development of computers and of high-speed telecommunication networks (*Connolly,* 1988). Several questions related to telework have emerged in recent literature.

Reasons for Telework Use

Information about the experiences of telework is limited, but some of the main reasons for its diffusion have been pointed out. Among the economic reasons for the spread of telework is the savings in overhead costs it makes possible, including lower building costs in suburban areas (*Olson,* 1987; *Huws,* 1985). Some organizations even move their back offices or data-entry departments to other countries where there is a lower paid labor force available for deskilled tasks. Another incentive for the proliferation of telework is to eliminate the long, tiring commuting time during the rush hours, resulting in reduced stress and energy savings (*Craipeau & Marot,* 1983; *Hedberg & Mehlmann,* 1984; *Lie,* 1985; *Empirica,* 1986).

Telework may also enhance profitability through the reduction of social costs (*Elling,* 1985; *Olson,* 1987). Several pilot studies have reported increased productivity with telework use (*Kraut,* 1987). In Sweden, telework has been used to solve some regional political problems, reallocating jobs to areas where there is a scarcity of employment opportunities (*Elling,* 1985).

Telework has also been used as a recruitment policy in several ways. It facilitates the allocation and retention of desirable high-skilled manpower; e. g., computer personnel (*Elling,* 1985; *Kraut,* 1987; *Olson,* 1987). It also seems to be easier to recruit workers on a part-time (*Hedberg & Mehlmann,* 1984) or temporary basis during peak periods, what has been labelled as a "buffer strategy" (*Elling,* 1985). Telework makes it possible to tap such otherwise inaccessible labor sources as the disabled and women at home with children (*Olson,* 1987).

Finally, telework has been seen as the basis for the integration of housework and childcare with traditional office work (*Hedberg & Mehlmann,* 1984; *Elling,* 1985). Telework hours can be flexible, providing more time for family and happier relationships between men and women. Mothers would be able to raise their children without leaving their professional activities, as advocates of telework point out first (*Huws,* 1984 a).

Problems Related to Telework

Most of the claims about telework's advantages presented above have been criticized and sometimes rejected. *Renfro* (1985) points out that the supposed energy savings is misleading because although people save money on the fuel it takes to commute to work, they spend much more on energy to heat or cool their homes. Another problem related to telehomework is the lack of any clear division between "work" and "non-work" activities which may intensify "workaholism" (*Nilles,* 1985), as people might work compulsively to solve a problem – the "just one more time" syndrome. *Huws* (1984 a) states that another disadvantage of telehomework is the encroachment of work on family and social life.

Telework has also been seen as a source of deterioration in work relations, as it may limit career opportunities, stimulate regressive forms of payment (e. g., piece work) and decrease wages (*Huws,* 1984 a; *Elling,* 1985). *Olson* (1987), on the other hand, states that telehomeworkers should accept lower wages because they have lower costs of commuting, child care, clothes and other items associated with work outside the home.

Another factor limiting telework's spread in developed countries is the high cost of telecommunication networks (*Empirica,* 1986; *Huws,* 1984 b). Also, the claims of increased productivity have been questioned by *Kraut* (1987), who criticizes the research methodologies and selective samples such claims are based on. Finally, another objection to telework involves problems of remote supervision. Many supervisors are concerned about how they would control their remote workers (*Empirica,* 1986). *Olson* (1987) reports that even when managers know that an employee's performance is satisfactory, they still express concern about this question.

Social Isolation

Literature about telework is unanimous in pointing out social isolation as its most problematic aspect (*Elling,* 1985; *Huws,* 1984 a; *Lie,* 1985; *Olson,* 1987; *Kraut,* 1987; *Renfro,* 1985; *Empirica,* 1986). The disadvantage most frequently cited by workers is social isolation, and the second most frequent suggestions are related to problems of poor communication, which workers stated led to lower quality of work (*Blomberg,* 1987; *Huws,* 1984 a).

Lie (1985) pointed out that on-the-job learning is not possible when working at home and also suggests that what workers miss is not simply contact with other people, but co-workers with whom to discuss their work. Similarly, *Kraut* (1987) highlights the importance of social interaction as a source of satisfaction and support, especially the face-to-face relationships with co-workers and/or customers.

Telework literature is full of examples of workers who complain about social isolation. *Huws* (1984 c) cites a case of a homeworker who drove fourteen miles to see a colleague, who was also a telehomeworker, when she got really desperate because of the social isolation. *Renfro* (1985) offered another example of a journalist who went back to his office when his typewriter at home broke and felt rejuvenated by the interaction with co-workers at the office; clearly, he perceived the normally lacking sense of companionship and togetherness.

One solution prescribed for the problem of isolation has been neighborhood centers. *Hedberg* and *Mehlmann* (1984) argue that they offer a way to combine the benefits of telework with social interaction. However, other studies suggest that neighborhood centers may not provide an adequate solution for the lack of social contact. For example, *Olson* (1983), based on her exploratory study, argues that contact with professional peers is critical to professional development and is not necessarily provided through neighborhood centers.

Decentralization and Skills

Telework raises an old issue related to the decentralized/externalized labor process and its effects (*Monod,* 1985). One must be careful in analyzing how the labor process is mediated by telework, because true decentralization involves not only a geographical transfer of part of the organization but, above all, delegation of authority. In other words, there must be a transfer of power from the center to the periphery. Moreover, it must be taken into account that technology is not the determinant factor in the decentralization process (*Arronsson,* 1989; *Huws,* 1988).

The experience of the developed countries suggests that two main sets of tasks are mediated by telework: (1) The highly skilled tasks of analysts, programmers, senior executives, researchers and software specialists; and (2) the less skilled tasks of data-entry clerks and word-processing operators. Thus, as *Elling* (1985) points out, there is a polarization of skills. In one set we have the well-educated, highly skilled, male workers. And in the other set, we typically have female workers performing routine tasks that require low level skills and little education. This polarization of skills was also perceived by *Kraut* (1987) when he analyzed the differential effects of telework on workers with different skills (cf. *Gattiker,* 1991).

The tasks which have the greatest potential to be decentralized through telework are programming, data-entry and word-processing (*Empirica,* 1986). This decentralization potential is evident when we observe the frequency with which various types of jobs were involved in telework, as presented in Table 2 (*Bair,* 1987).

Table 2: Type of Telework

TASKS	Percentage
Word Processing	50
Programming and System Analysis	23
Decision Support	6
Photocomposition	6
Accounting	5
Computer Aided Design	5
Information Broker	3
Software Advisor	2
TOTAL	100

Source: *Moran* and *Tansey*, 1986

The Trade-Union Position

Many trade unions state that telehomework would make remote union activity more difficult (*Hedberg & Mehlmann*, 1984). They are also concerned about the deterioration of working conditions, the spread of piecework payment systems, the lack of job content and ergonomic concerns associated with telework (*Elling*, 1985; *Empirica*, 1986; *TUC*, 1985). Another point of concern mentioned by the British Trade Union Congress (*TUC*, 1985) is the potential for "off-shore" data-processing which became easier with teleprocessing. *Olson* (1987) observed another important aspect related to trade unions: that the majority of jobs considered for homework are not unionized, at least in the USA. Trade unions are also worried about the loss of employment rights and protection, reduced promotion and training prospects and the elimination of "fringe benefits" such as subsidized meals and social activities (*TUC*, 1985). Another aspect of great importance in the telework debate is gender.

Gender and Telework

Women are the social group most affected by telework (*Lie*, 1985; *TUC*, 1985; *Elling*, 1985; *Empirica*, 1986; *Vedel & Gunnarsson*, 1985) and family commitments are one of the main reasons for women to be telehomeworkers. For example, the lack of suitable and/or reasonably priced child care centers is one of the major reasons women accept telehomework conditions (*TUC*, 1985; *Huws*, 1984a). Moreover, the cultural imposition of child socialization on women also contributes to telework being a largely female domain even though most women would rather work at the office.

Indeed, one of the main arguments used for the introduction and spread of telework was that it helps women to solve the problem of the working woman's "double day"[7]. However, this argument was rejected by *Vedel* and *Gunnarsson* (1985) who stated that peak periods of work often coincide with the times when women should be at their children's disposal.

Summary

The literature about telework in developed countries suggests the following conclusions: (1) The main reasons for the use and spread of telework involve the "cult of machines"; (2) one main limitation of the spread of telework is the high cost of this new form of work organization associated with the uncertainty of the rate of return; (3) women are the social group most affected by telework; (4) there is an increased rate of productivity of work mediated by telework, at least initially, and (5) one of the most problematic aspects of telework is the social isolation. These issues form the starting point of this research about telework in Brazil. They will help us to analyze the similarities and/or differences of telework in different social, economic, political and cultural contexts.

Method

This is a qualitative analysis of a telework experience in a developing country. A qualitative perspective was chosen for this work for several reasons. First of all, it was believed that "qualitative methodologies bring into central focus the points of view of those studied and their active participation in constructing worlds that are sometimes quite different from the worlds they are thought to live in by those in power" (*Statham, Miller & Mauksch*, 1988, p. 311). As well, knowledge of telework is in its initial phase and has been based only on the experiences of developed countries. Moreover, the knowledge of telework in developing countries has not been systematized yet and in order to achieve this stage of knowledge, without preconceived notions or categories, the best approach is a qualitative one.

7 It is known that working woman has a "double day". She works one shift at the office or factory and has a "second shift" at home. *Hochschild* (1989) shows that there is a leisure gap between women and men at work, just as there is a wage gap between them in the workplace. (For extensive discussion on this subject see: *Hochschild*, 1989; *Gannagé*, 1986).

We cannot study a developing country's experience using parameters, notions and categories created for developed countries, which have very different cultural, social, economic and political realities. Finally, a qualitative approach was chosen due to the fact that we were concerned with the more subjective aspects of this new form of work organization. The purpose is to understand the feelings and problems that workers and managers face with telework.

However, one must be conscious of the difficulties that the qualitative approach might engender. For example, a problematic aspect is the relationship between interviewer and interviewee, which is never neutral and may influence the results of the research. Another example is the number of interviews, because the samples in qualitative studies are typically small and unsystematic for several reasons, such as time constraints[8]. Nevertheless, we were also aware that "the kind of phenomenon we chose to investigate should be achieved through the possible techniques and not through the ones considered as ideal because we risked gaining in formality and losing our object, if we were attached to the most usual proceedings in social research" (*Rodrigues,* 1978, p. 31, my translation).

These methodological constraints are minimized, however, due to the fact that the interviews were conducted by a researcher who was intimately familiar with the DPC[9]. According to *Goffman* (1989), this familiarity helps one achieve a random sample and a range of unanticipated events, as well as giving one the justification and warranty for the fieldwork.

The Site Selection

The organization analyzed is the first experience of telework in a public DPC in São Paulo, Brazil. For the purpose of this research, this public DPC will be referred to as "ORG 1." Since 1987, ORG 1 has decentralized the data-entry sector through telework. ORG 1 is the third largest DPC in Brazil, with approximately three thousand workers. ORG 1 is fundamental to the modernization and rationalization process of public administration in São Paulo because it is the company in charge of the computing resources of the State of São Paulo.

A great number of administrative problems were pointed out by ten work groups that were created by the management to evaluate ORG 1 and provide support for the modernization of the public administration in the State of São Paulo. The main problems were: lack of material resources, an organizational structure overly centralized, lack of human resources, and severe bureaucracy. The communication problems and work organization issues were not considered by any of the ten work groups.

Experiences with telework in Brazil are very recent. At the time of the case study there were only two DPCs using this new form of work organization, which now seems to be emerging as a general trend in this sector. The researcher visited the other DPC to gather information about its experience, but the request for access to data-entry clerks was refused, and only managers could be interviewed[10]. In this analysis, we decided not to use these data because it would be very difficult to make comparisons between the two organizations. This other DPC is a private organization and smaller than ORG 1. This is one of the reasons for our small sample.

Interview Procedures

The researcher conducted personal semi-structured interviews (see Appendices 1 and 2 for interview schedules), with three managers and twelve data-entry clerks, three from each of four shifts, who worked in the branch office[11]. The workers selected all had worked in the mother organization before working in the branch office. This restriction was made because it is likely that only the workers who had experienced the changing process would be able to evaluate this new form of work organization. The interviews were conducted and recorded in a private room at the workplace during working time. Each person was informed of the nature of the research project, that the interview would remain confidential and anonymous. Each was asked if s/he would rather not have the interview recorded and only after s/he agreed was the tape-recorder turned on and the interview begun. The duration of the interviews was, on average, forty minutes for each worker. The managers' interviews lasted, on average, one hour. During the interviews pressure was never put on the workers and/or managers to answer our questions because of the belief that "the task is never neutral to the worker's emotional life, s/he can talk about her/his job or s/he must be silent about it. Sometimes it is necessary to hide the content of the job from others" (*Dejours,* 1987, p. 51, my translation).

8 In this case we also had financial constraints as this project was not supported by any research funding and tape transcription is an expensive service in Brazil.

9 ORG 1 was one of the DPCs I studied in preparing my Master's Thesis and I had been researching it for 2 years when I conducted the interviews for this project.

10 The managers in this private DPC told the researcher that in April 1988, for a production level of 100, there were 25 data-entry clerks and that after the decentralization process mediated by telework, in August 1989, the production level increased to 180 and there were only 5 data-entry clerks.

11 In the branch office, there are 133 data-entry clerks who work mediated by telework.

Table 3: Deconcentration of Data-Entry Clerks in ORG1

Localization Year	Mother Organization	Branch 1[1]	Branch 2[2]	Branch 3[2]	Total
1986	419	–	–	–	419
1987	393	–	–	–	393
1988	195	144	94	18	454
1989	124	133	77	19	353

Source: ORG1
[1] Branch 1 is mediated by telework.
[2] These branches are not mediated by telework because the equipment is not compatible.

Results

Data-entry clerks have been distributed among the clients of ORG 1 since 1988 (see Table 3). The branch office is actually located inside the offices of the main customer of ORG 1, which is in the heart of the metropolitan area of São Paulo. ORG 1 is located in a suburban area of the city of São Paulo.

Women are the first and foremost group affected by this experience of telework due to the job segregation of the data-entry sectors. In ORG 1, 87% of data-entry clerks were women and in the branch office 56% were women. We must remember that geographical movement is usually problematic for women workers due to family constraints.

Union activity became more difficult after the introduction of telework. The CRE (Commission of the Employees' Representatives)[12] was criticized by data-entry clerks because it could not manage the dissemination of information about CRE activities in the branch office after one year of telework experience. The organization of the CRE at the branch office has been difficult and problematic.

The Workers' View

The main problem raised by workers at the branch office was the social isolation and lack of informal communication. When they were asked about the difficulties they were facing, social isolation appeared in almost every answer as may be observed in these comments:

12 The CRE – Commission of the Employees' Representatives – is a commission of employees officially recognized by the company, which represents the workers' interests.

> "I believe that there is a lack of information. There is not enough communication; we are too isolated. It seems that we do not exist."

> "The only thing I feel is lack of information. Information arrives late and people become outdated. In the mother organization, sometimes there is a party and we do not know about it. The events which are a way to keep in touch with each other, do not exist here."

> "At the mother organization we were much more informed about contests, championships, coming events. Now, after we have come here we are outdated."

One could observe the emerging perception of two classes of workers: those who work at the mother organization and those who work at the branch office. There was a great feeling of rejection among the data-entry clerks in the branch office as can be noted in the following comment:

> "The mother organization is wonderful. There is nothing like the mother organization. It seems that we are different. When we were there and went to the Medical Department, it is different from what we have here. It is something that makes you feel uncomfortable. Maybe it is a personal impression, but there are differences. You cannot say that branch office and mother organization are the same. They are really different."

This feeling of rejection was also expressed in almost every interview. Workers felt that they were no longer working in ORG 1 due to their spatial localization. Furthermore, they were not perceived as workers from ORG 1 at the mother organization, also as a result of their remote workplace. The main complaints and objections about the social isolation due to telework are summarized in Table 4.

Table 4: Workers' Objection to Telework in Brazil: The Social Isolation Problems

1. Isolation from CRE[1]
2. Lack of Information about Social Activities
3. Lack of the Worker's Club[2]
4. Lack of Information About Other Co-Workers
5. Lack of Snack Bar and Restaurant[3]

[1] CRE is a Commission of Employees, officially recognized by the company, which represents the workers' interests.
[2] Large organizations usually have a club where the worker goes during his/her break time, or during lunch time to play games (e.g., chess) or read magazines. Clubs often organize sales promotions for workers.
[3] Large DPCs usually provide restaurants and/or snack bars for workers as a social benefit.

Workers expressed a strong preference for work at the branch office, however, due to its central location. There was a decrease in commuting time and great transportation facilities: proximity to both bus stops and an underground station.

After the "decentralization" process, no strikes occurred in ORG 1 (see Table 5). Many factors may have contributed to the absence of strikes, but the researcher believes that the introduction of telework is one of the most important.

Table 5: Strikes in ORG 1

Strikes	Year	1987	1988	1989	1990
Number of Days on Strikes		3	9	0	0
Number of Hours on Strike		72	216	0	0
Number of Workers on Strike		720	*	0	0

Source: DIEESE – Inter-Trade Union Department of Economic and Social Information.

* This information was not available from the trade union nor in the newspapers.

The Managers' View

The main problem mentioned by the managers involved the new controls necessary for a decentralized organization; the management of struggles related to wages, overtime and strikes; and the poor working conditions in the building where the branch office was set up. Another problem mentioned was the more intense pressure exerted by the customer due to the geographical proximity of the branch office. Actually, the branch office was set up in the customer's building, so the contact was much more intense and not mediated as revealed in this comment by a manager in the branch office:

> "I was never so pressured at the mother organization. The pressure is more intense here at the customer location. Before, when the customer complained to the mother organization, we felt some pressure, but it used to be much less."

The bureaucratic structure at the mother organization used to act as a shock absorber to the client's demands. Working in a decentralized way, inside the customer's building, the pressure is concentrated and more intense at the branch office. Thus, the relationship between customer and DPC, which is never an easy one as pointed out by *Musio* (1987), becomes more problematic. Naturally, this additional pressure due to the spatial localization of the branch office was also felt by data-entry clerks.

A curious and contradictory aspect, taking into account our developing condition, is that no complaints were made about the high costs of the project nor investment return rates which are the main reasons for not using telework intensively in developed countries. Another aspect which reinforces this contradiction is the fact that many of the administrative problems pointed out by the ten work groups were related to the lack of economic resources: lack of material resources and human resources.

Managers perceived a productivity rate increase in the branch office when compared with the mother organization. Unfortunately, no data were available to evaluate this claim. Another problem mentioned by the managers was that due to the increased rate of productivity, there was an increasing number of data-entry clerks with Repetition Strain Injuries[13], despite all the ergonomic care which was taken during the construction of the office setting.

Communication problems were not mentioned or perceived by the managers at any point in the interviews. One manager explained that he was "obliged" to take out the public telephones which were installed at the data-entry sector because the workers formed queues to telephone instead of working. The communication problems were not mentioned in any proposals made by the ten work groups either.

Finally, another point worth mentioning is that trade union questions were never mentioned by managers. Trade unions in Brazil[14] are not aware

13 Repetition Strain Injuries (RSIs) are known as a category of injuries which involve damage to muscles, tendons and nerves caused by overuse or misuse. (*Massachusetts Dept. of Industrial Accidents,* 1990). The RSI Task Force of the Australian Public Service gives the following definition: "RSI is taken to be a collective term for those conditions with recurrent or persistent pain, disability or loss of function in any part of the body, mainly in the limbs and particularly in the upper limbs and neck. These conditions are usually associated with repetitive movement and/or fixed posture, and related to, or aggravated by, an occupational setting. Some types of RSI have been identified and technically named (tenosynovitis, carpal tunnel syndrome, epicondylitis, etc.) while others appear to be more generalised and non-specific with or without observable conditions (e. g., pain in the forearm muscles with reduced function). All of the conditions are characterised by pain, with or without physical manifestations" (*Task Force Report,* 1985, p. 11–12; see *Bammer,* 1989, 1990, and *Stevenson,* 1987, for extensive debate on this subject). It is estimated that 30 per cent of Brazilian data-entry clerks have a form of RSI.

14 Trade unions are not powerful in Brazil. It is estimated that union members are only 10 per cent of the Brazilian workers. It is argued that the weakness of unions is an institutional problem because they were created by the authoritarian State and are subject to extensive regulation (*Andrade,* 1984). When the labor movement violates

of telework issues and so far this new form of work organization has not been discussed, although its utilization is becoming more widespread.

Discussion

The images which surround the computer in our society are based on myths which, according to *Barthes* (1985), are discourses by which we try to establish a kind of compensatory and reparatory operation for the evils of society. In this way, the myths of "the profession of the future" as well as "the electronic cottage" bring us confused and misleading concepts of what information work and telework are. When we analyze how information work is organized in large DPCs in Brazil we can see that the reality is completely different from the myth. Information workers face a myriad of common problems every day. Work organization in DPCs is constructed according to Taylorist concepts which brings to the surface one contradiction: one of the most modern machines is being managed according to an old-fashioned organizational system. A great number of problems may arise from this contradiction: health problems, high absenteeism, low productivity, social isolation of workers, lack of communication in the organization and job dissatisfaction (*Arronsson,* 1988; *Garson,* 1977; *Forester,* 1985).

On the other hand, telework has been presented as the most competent, rational and modern management solution for the problems of ORG 1. Telework has been seen as the perfect solution for the organization's problems because it links two important aspects: informating[15], which is seen as a modernization process, and decentralization; which is, according to *Liebling* (1981), the way that top managers often respond to an internal crisis and changing economic and environmental conditions in a centralized organization. As the data-entry sector is the most problematic sector in a DPC (high absenteeism, numerous strikes, health problems – e. g., Repetition Strain Injuries), it was the first sector chosen for the decentralization mediated by telework.

Telework, in a historical context, represents the current stage of the history of information work degradation. Telework imposes the spatial fragmentation on information work and sets a new discipline based clearly on a "divide-and-conquer" policy[16]. Although some investigators may argue that reallocation of work may "modestly" upgrade the work of data-entry clerks (*Attewell,* 1987), this case study is an example of the degradation of the already degraded data-entry work. Telework must be seen not as a technology that came out of thin air, but one shaped by economic, political, social and organizational constraints. In the Brazilian experience, where none of these aspects was adequately considered, telework reinforces the organizational problems which already existed, mainly those related to social isolation and informal communication.

In the Brazilian experience, telework increased the lack of informal communication which already existed in DPCs. The workers' anxiety and suffering were reinforced and the emergence of informal groups was almost impossible with this new form of work organization. The group problem-solving, observed by *Suchman* and *Wynn* (1984), which took place during breaks in the snack bar, club or restaurant among data-entry clerks, became very difficult in the branch office. The feelings of social isolation, lack of comunication and dissatisfaction were increased by telework. Moreover, in many ways communication is the essence of the organization and provides task coordination as well as socio-emotional support for the individuals (*Katz & Kahn,* 1967). In this sense, telework is removing the organizational essence from the branch office of ORG 1 and is also disrupting the organizational culture. According to *Kraut* (1987), organizational creativity is aided by the informal communication which fosters collaboration among individuals.

The creation of informal groups is also hindered by telework in ORG 1, especially in the branch office. According to *Davis* (1967), informal groups are one of the main sources of satisfaction and stability for workers, giving them a sense of "belonging" and security. It is precisely the lack of informal groups in the branch office that enables us to understand the "outsider" feeling of the data-entry clerks who state that "It makes you feel uncomfortable (. . .) You cannot say that branch office and mother organization are the same". They perceive and feel that they do not belong to any informal group at the mother organization and that is one of the main problems they pointed out.

the rules it is seen as dangerous and illegal. Due to the link to the State, trade unions are bureaucratized and often do not pay enough attention to workers' problems. Although this is not true of every trade union in Brazil, it is the case for the information workers (SINDPD – Trade Union of the Data Processing Workers). The collective agreements are based only on wage benefits clauses, which are important due to our economic situation, but do not take into account any problems related to the new technologies.

15 We are using the term informating in the sense developed by *Zuboff* (1985). According to him the information technology has a dual nature: Automate/Informate. The former is defined as a means to replace human effort and skills in order to achieve tasks performed at less cost with more control and continuity. The latter is defined as a process that goes beyond automation which is used by organizations to accomplish the work process through the creation of information.

16 The general manager of the production department in the other Brazilian DPC using telework to decentralize the data-entry sector stated clearly that one of the reasons for using telework is that "it is safer not to have all the eggs in the same basket".

According to *Karasek* and *Theorell* (1990), the elimination of group work undercuts social support at the workplace, the potential for learning on-the-job skills, and flexibility to restructure work organization in tandem with changing market and technological requirements. Using *Zuboff*'s (1985) terminology, although managers are trying to informate ORG 1, they are only "automating" ORG 1. In short, the organizational structure of ORG 1 became more rigid and static after the introduction of telework, although the opposite outcome was desired.

The utilization of telework in Brazil also suggests some interesting similarities and differences compared with other international experiences. Among the similarities, it was found that women are the first and foremost group affected by telework due to the sex segregation which exists in this sector. Also observed was an increased rate of productivity with the introduction of telework. Trade union activity became more difficult and social isolation was perceived as the main problem for workers.

A curious and contradictory aspect, taking into account that Brazil is a developing country, is that no complaints were made about the high cost of the telework project, which is one of the main reasons for not using telework intensively in developed countries. Until now, telework has been used only in DPCs in order to decentralize the data-entry sector. It was not intended to be a form of recruitment policy, energy savings, or a policy to solve regional problems related to unemployment. Another interesting and contradictory aspect is that telework has been used to transfer part of the data-entry sector from a suburban area to the metropolitan area of São Paulo city. Clearly, lower building costs were not considered either.

The case of ORG 1 suggests that the introduction of telework aggravates communication problems and creates a more rigid and static organizational structure. According to *Howard* (1985), this happens because managers, armed with Taylorist principles and concepts, concentrate their efforts on the formal procedures and structures of the organization and try to eliminate or just ignore the informal aspects of the organization through the use of new technologies.

That is exactly the way that Brazilian managers are facing the problems in DPCs and the communication problems related to telework. Telework has become one of the myths that surrounds computers in Brazil. It is one more "emblem of salvation" with a double role of decentralizing and informating the workplace. Treated in such a "neutral" way, without trade union resistance and introduced in a sector where communication problems already exist, telework intensifies these problems and is a source of suffering and anxiety for workers.

Issues for the 21st Century

Research into benefits and problems related to telework should be carried out. It is a new form of work organization and we do not know very much about it. Although there are many studies of telehomeworking, there are not many about telework in a collective form, to use *Monod*'s (1985) classification. We have to know more about telework as a new form of work organization which may link branch offices to a mother organization. The health problems which may arise from this work organization remain largely unknown. It would be valuable to compare similar jobs carried out in the mother organization and in the branch office to investigate any possible differences related to the workers' health. The stress reactions due to the social isolation provided by telework should be considered, too.

One important point which should be analyzed in further research on homeworkers is how new technologies affect family relationships. Children should be interviewed to investigate what they think of their parents working at home. Are there any restrictions on their play or TV watching during their parents' working time? Another aspect which should be analyzed is stress at home due to telework. The home is often said to be a low stress work setting. However, we believe that telehomework is not stressless, but due to its newness we do not yet know the sources of stress in this form of work organization. It is also too early to draw conclusions about the stress effects of telehomework due to the selective samples used in existing studies and the newness of these experiences. An additional issue concerning homeworkers is how women manage both housework tasks and telework. An interesting investigation, we believe, would compare telehomeworkers and women who work in a central office in the same job and with similar housework tasks. Such a project could explore stress complaints, the gender-related division of labor at home, family relationships and also children's opinions (cf. *Gattiker & Nelligan,* 1988).

Another important question that deserves further research is the productivity level achieved with telework. Several pilot projects, as well as our experience here, pointed to increasing rates of productivity. However, we agree with *Kraut* (1987) that, given the methodological problems and the selective samples used in research on telework, no firm conclusions can be drawn. Moreover, we have to bear in mind that after a change in working conditions and/or organization of work, workers may enhance, for some time, the productivity level due to several factors: the ergonomic setting, the newness, fear of job loss, and also the Hawthorne effect. However, the productivity level may return to its former level after some time. Future research should compare historical time series data on productivity levels of teleworkers.

The role of informal communication for social life in the branch offices and how new technologies affect these particular forms of worker communication should also be analyzed further, especially in regard to the stress issue. But the most important aspect to explore here is how workers resist the lack of informal communication. *Zuboff* (1988) relates an interesting case where two clerks overcame the lack of communication and the social isolation by making a small hole in the tall partition between their workstations in order to see and communicate with each other without having to stand up and peer over or around the wall.

Technology should be taken into account by managers as a political, social and cultural variable which has a dialectical relationship with the organization. In order to achieve the desired flexibility with new technologies, managers should consider the organizational culture, as well as informal procedures, groups and communication. Otherwise, as in ORG 1, the result may be a rigid and static organizational structure with no flexibility.

Finally, informal communication should be considered by managers not as a problem of gossiping or "soldiering" at work, but as a way to solve management problems. Instead of acting against workers, through fear, using new technologies as a way to break up the trade union movement or in a "divide-and-conquer" policy, management should try to improve the quality and the productivity of their service. A good way to achieve these goals is to change work organization patterns. Instead of using expensive "solutions" such as telework, it is much better to discard Taylorist principles and search for an individual, local solution which takes into account the organizational culture and encourages greater worker involvement and participation at the workplace.

Appendix 1
Workers' Questions

1) How long have you been working as a data-entry clerk?
2) What do you do as a data-entry clerk?
3) How do you feel about your work?
4) How do you feel about the change of workplace?
5) Are there any differences in your working life after the change?
6) What are the main problems that you are facing after the change?
7) What would you do to improve your work?
8) Was your working life improved or worsened with the change?
9) What are the aspects that you do not like in the data-entry work?
10) What are the aspects that you do not like in your new workplace?
11) How do you feel about the CRE participation during the change process?
12) Are there any other questions or aspects that you think are important that we have not talked about?

Appendix 2
Managers' Questions

1) How could you evaluate the changing process from mother organization to here?
2) Why did the data-entry sector become decentralized?
3) How is your relationship with the mother organization?
4) How is supervision by the mother organization organized?
5) How is the relationship with the customer now?
6) Is there any kind of pressure now that did not exist before?
7) What is the structure of the production here?
8) What are the main problems you are facing here?
9) Are there any other questions or aspects that you think are important and that we have not talked about?

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