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Technological Work at Home (TWH): revised expectations and some reflections on the Brazilian case

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ABSTRACT

This study brings together two contemporary topics: unemployment and technology. Specifically it discusses Technological Work at Home (TWH), seen both as a personal option when faced with unemployment and as an organizational strategy. Three views are considered: 1) the domestic infrastructure required, 2) the personal and family relations of the cyberworker, and 3) aspects related to virtual management. Each view is analyzed from two opposite standpoints: advantages versus disadvantages, risks versus the benefits they present. A recent practice, TWH, in Brazil, does not yet possess structured records. Therefore the referential framework is complemented with information taken from business journals. Productivity, motivation, leadership and quality of life among others, are appreciated as topics. In the conclusions, questions, in fact contradictions, are shown, which have not yet been duly studied and evaluated; for this reason, it is considered premature to identify TWH as a relentless, universal trend, especially in Brazil.

Technological Work at Home (TWH): revised expectations and some reflections on the Brazilian case[1]

Introduction

The work world has been undergoing profound changes, the most serious and severe of which, a permanent topic on the world agenda, is probably the lack of jobs for many millions of workers, anonymous heroes and byproducts of the new globalized productivity. The "guilty" of the current situation are also mostly unidentified, all of them part of the family called "rationalization , productivity and competitiveness programs", whose members go by the names of downsizing, networks, rightsizing, total quality management, reengineering , lean production , and others.

However, mediating jobs and joblessness, there are alternatives, and they are the subject of this article. Specifically, it is intended to discuss one of the alternatives which have been pointed out as a solution, not only to joblessness, but also to other problems of contemporary society (traffic jams in large urban centers, pollution , rising costs of a square meter of real estate, etc.) – Work at Home. Particularly the one that makes intensive use of the microelectronic base devices connected to the communications system: fax, modems, microcomputers (desktops, laptops, palmtops) pagers, cards and intelligent answering machines, cellular phones, portable, high resolution printers, internet, and others - activities which henceforth will be called Technological Work at Home (TWH).

Initially greeted as a promising alternative, especially considering its advantages *vis-à-vis* activities performed in the company, slowly, as result of practice and more mature reflections, the expectations regarding TWH are being reconsidered. The onset of originally unidentified problems requires new analyses, and solutions have to be provided before TWH can become a strategy of work organization.

Structured in four sections, this paper begins with a synopsis on the work agenda at the end of this century: unemployment , changes in work relations , emerging sectors, declining ones, etc. Next it focuses on technology, the source of many, maybe most changes now occurring in every area. In the third segment, in promoting the reunion of technological devices with the new possibilities of work related to them , the paper goes back to the central theme. In the fourth section , Technological Work at Home (TWH) is analyzed from three standpoints : 1) the individual one, i.e., the person who does it (the teleworker) , their relations with the family and the group closest to them; 2) the physical infrastructure required for TWH, and, finally, 3) from the standpoint of the organization – each approach being appreciated in the light of advantages, disadvantages, limitations and outreaches allowed. The conclusions are presented in the form of prospects, considering the small, almost inexistent amount of research material, especially in Brazil, considering the recent, innovative character of this new architecture of work.

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1 The world of work: the contemporary agenda

According to the Economic Forum held in Davos (Switzerland), approximately 800 million persons are (were) unemployed or underemployed at the time of the event (Gonçalves and Barelli, 1996). In Brazil, although wrapped in a myriad of diverging indexes[2], the questions is seen as a "national phantom" (Simonetti and Grinbaum, 1998). Delinquent payments, protests, bankruptcies and closing firms, constitute the economic expression of unemployment, also pointed out as the reason for misfits and family disintegration, a primary cause of behavioral disorders (alcoholism, drug consumption , violence, etc.), and even of an rising number of suicides, especially in the most heavily affected sectors, such as banking, in Brazil. Celso Furtado(1997), among others, identifies the question of unemployment as the greatest (vital) challenge to industrial civilization at the turn of this century. Therefore, the study of alternatives to jobs, as well as feasibility mechanisms, should be a priority item in the agenda of annual debates among academicians, government, business people and organized society.

The subject is controversial, and does not meet with unanimous consensus. Rifkin (1995), for instance, advocates the thesis that the reduction in level of employment is inevitable, at least in the form this social construction was (and still is) understood by society[3]. Bridges recalls that the passage from the rural-artesanal economy to the urban-industrial one did not take place without encountering resistance - the destruction of the newly invented machines by the Luddites, at the beginning of the Nineteenth Century is a historical reference. Accustomed to an environment in which personal matters were mixed with professional activities (flexible work times, work division according to skills and physical conditions, production quotas according to the requirements for survival, etc.) and work relations which involved mainly family members, the wave of people rendered jobless unemployed by the industrial revolution resisted as long as possible before entering the world of employment. According to the author, the moment characterized the "transition from doing a job to having a job" (p.44). Working under the orders of strangers, with people from many different places, under standards which limited creative freedom, submitted to the rigidity an often extenuating number of working hours, and pressured by rising production quotas, constituted a radical change from all standpoints. It took the intervention of the State to make the industrial-urbanizing movement advance – fence-building in England and legislation establishing the rights and duties of workers are included among the initiatives. Bridges concludes that as a result of the first industrial revolution society resisted employment; whereas the answer to the "third wave" (Toffler, s.d.) is resistance to unemployment. Resistance is natural (due to losses, conflicts with well founded values, etc.), but according to Bridges and Rifkin, legal relations between capital and labor are unable to stop the movement which is said to be changing the very concept of employment. The alternative, also

[2] Edward Amadeo, Professor of the Department of Economics of PUC-RJ and Brazilian Minister's Work, for instance in a column in *Exame* magazine (July 30, 1997), p.142, on the contrary, maintains that "unemployment has not becomes worse".

[3] A work contract which , by means of rights and duties guaranteed by law, links a firm to an individual, in order for the latter to perform a pre-defined activity, in a set place, during a fixed time period, with lasting expectations, among other characteristics.

according to those authors, is to redirect the focus of debates: the central question is not employment but work , and this is expanding in new and even unusual ways. One of the aspects of this view is also the displacement of focus from the organization to the worker – the agent of work. Thus, proposals of the type "Run 'You & Co' Like a Business" (Bridges, 1995, p.111), a proposition which is also espoused, among others, by Tom Peters (1997). Therefore, the solution to the impasse when facing unemployment would not come from debates about forms of keeping jobs, but about the new ways of working. Along the same lines is the also controversial proposition of J. Heckman (1996) – a teacher at the University of Chicago, who advocates that it is useless to train the unemployed of the "second wave" (Toffler , n.d.), it would be more effective to invest in the young – workers of the "third wave" (Toffler, n.d.).

However, there are voices that diverge from the thesis of inexorability of the end of employment, among them that of the French author, Viviane Forrester (1997). In her opinion, as for other, unemployment is the result of a choice (mistaken and inhuman) of economic policy (neoliberal), as well as of a deliberate form of insertion in the globalized market.

The roots of (un)employment , as well as their directions, based on a perspective which considers macroeconomic, political and philosophical aspects, are exalting but inexhaustible themes, going beyond the scope of this work, the reason why this topic only recorded the two great directions which now debate the subject.

Certainly, Brazil is still far from the world predicted by Rifkin and Bridges, if we consider, for instance, that one of the solutions (for unemployment) suggested by them, the Third Sector, is not yet discussed much as an alternative. Furthermore, although rising , the joblessness rate covers an important movement: that of the interiorization of work (and development)[4]; thus, while there is a lack of jobs in the capitals and adjacent metropolitan areas, there is lack of labor in the (interior) regions; as well as in the emerging sectors (tourism, leisure, communications ,etc.) and in the technical diffusors, such as for instance in computer science, in the service of work process automation. Whereas salaries are rising in these markets, in others, such as the metallurgical-mechanical sector located in the ABC[5] region of São Paulo, alternatives are sought to the traditional work day. There are debates and experimentation: reducing the work day, reducing and/or eliminating overtime, constituting an hour bank, flextime, changes in the costs of hiring/firing, and the temporary work contract, among other options[6]. Common to them is the fact that all alternatives are consistent with the principle of flexibility – an

[4] See, among others (*Exame*, jun.-19, 1996, p. 24-6; *Veja*, feb.-19, 1997, p. 80-5), the article "Não é bem o que parece" (It is not quite what it seems), signed by André Lahóz and published in *Exame* , ed. 663, year 31, n.12, p. 14-5, jun.-3, 1998.

[5] An acronym constituted by the initials of the cities of Santo **A**ndré, São **B**ernardo and São **C**aetano do Sul.

[6] The importance of the national automotive system (approx. 25% of the GDP), heavily concentrated in the São Paulo ABC region; the state of São Paulo, as shown by the indicator analyzed, accounts for 70 to 85% of business involving the automotive system, together with the fact that this segment has been attempting to experiment with structural changes throughout the world , makes the region a focus of permanent attention (and concern), as well as a laboratory for new managerial practices of all kinds, in particular those of capital-labor relations.

organizational paradigm required to face the speed of change and the uncertainties which predominate at the turn of the century.

It can be seen that the question of (un)employment is nothing new; however, more recently, the topic has become more acute in Brazil due to the simultaneity of the two conditions:

- the circumstance that, throughout the historical-economic formation, no structure has been created to support workers in times of crisis and great change, and,
- because of the situation parallel to other changes, summed up in the term "globalization".

A broad and multidimensional process, globalization expresses, among other aspects, the intensification of flows (trade flow, information flow, financial resource flow, flow of knowledge, etc.) between nations, the redefinition of the role of national governments with the subsequent privatization and/or (de)regulation of the functioning of some markets, etc. It should be pointed out that, to integrate the globalized market implies the condition of the possibility of having access to productive resources, among them labor, wherever they are most advantageous for the competitive strategy of the organization. Pressures for continued reduction of costs have one of their main strategies in focusing activities and the subsequent externalization of those which do not constitute the central competence of the company. The programs of selective redundancy, in order to reduce the structure of fixed costs and expenses of the organization[7] at the end of which there remains in the organization of a minimum number of people, are the immediate result. The companies respond to the possible sudden demand, or to growing although unconsolidated trends, using external resources: subcontracting, outsourcing, temporary labor, contract of specialized activities, leasing of dedicated assets, etc. – practices which also confer high flexibility on management.

In this context, one of the options which provide the greatest flexibility for organizations, is Technological Work at Home (TWH); this is in large measure the result of technological innovations applied to the work process.

2 Technology, innovation and labor

Although it has been popularized, technology is a concept which covers multiple meanings: to Foster (1988), for instance, technology means,

> "(...) understanding several things. In some cases it is a specific process (...). Broadly, technology may mean a productive process(...). We can imagine technology even more broadly, as the way in which a company does business or implements a task..." (p.32).

[7] Salaries and fixed charges for people who perform support activities (administrative or operational), rents, monthly expenses of the facility – light, water, rates and taxes, cleaning, etc.

Virmiani and Rao (1997) also call attention to the fact that the word "technology" has different meanings, for different people, covering a broad spectrum, from the more general, as attributed to it by Chopra: form of "relationship between man and nature" (*apud* Virmani and Rao, 1997, p.18) to the more pragmatic, represented by the view of Stewart: "(...) the new and better ways of achieving economic results which contribute to development and growth" (*op.cit., loc.cit*).

Foster's point of view has dominated contemporary literature (Fleury, 1987; Sankar, 1991) expressing the idea of selection and development of a "form of doing" – Fleury states that "(...) technology [is] knowledge used in the production of goods and services (...)". This is thus, the understanding which will be attributed to technology.

A second aspect to be stressed as regards technology is the fact that it is pointed out as the center from which all other changes come. This observation is particularly valid for technologies based on microelectronics, whose impact on the other fields of knowledge, often in fact lead to them being pointed out as though they were the genus of all species. Utterback and Suarez (1993) for instance, referring to the automotive sector, state: "(...) for us, organizational change is driven by technological change in the industry". Technology is, thus, a source of change and innovation.

One of the most widely used concepts to define innovation is that adopted by Schumpeter (1988). Also broad, in the present context it is the second of the five meanings attributed to it by the author that should be emphasized:

> "(...) 2 – Introduction of a new method of production ,i.e., a method which has not yet been tested by experience in the specific branch of the transformation industry , which in no way must be based on a scientifically new discovery, and can also consist of a new way of managing merchandise commercially; (...)" (p.48-9).

Furthermore, to be acknowledged as an innovation, a practice must pass the test of the market, i.e., throughout its diffusion trajectory, it must accumulate inertia – a critical mass of demand which allows it to be self-sustainable (and its development) on the market. Otherwise it will be a novelty, possibly something exotic, without any socioeconomic significance. Therefore, the new ways of doing old things also constitute innovations, the case of the work-job binomial which is now undergoing profound changes. However, the changes appear to obey the Third Law of Newton: to every action corresponds a reaction of the same intensity but in the opposite direction. But, if necessary, technology does not exhaust nor delimit the possibilities of change. The later must be contemplated in a broadened perspective, involving an intricate set of relations, interests, values, attitudes and (individual and collective) behaviors, circumscribed by cultural patterns which are sometimes conflicting and mutually exclusive. N.Rosenberg[8] (*apud* Badaracco, 1991, p. 40) stresses that "(...) technological change is an extremely complicated social process, inherently very difficult to model". J. Collins (1997) , along the same lines, points out that ,

[8] *Perspectives on Technology* . Cambridge : Cambridge University Press, 1976.

> "The most important innovations will be the social innovations – and not those in the field of technologies or products. The social innovations tend to be deeper than any other single technological innovation , discovered with relation to the market or a new product. It is the social innovations which allow the rise of all other innovations" (p. 64).

Thus, in order for technology to constitute an effective leverage for changes, a source of innovations and development, it is necessary to have it accompanied by other changes, of a behavioral and societal type. This is the case of the new ways of working, in particular the activities developed at home and assisted by microelectronics matrix devices – Technological Work at Home (TWH), as we will attempted to show further on.

Finally, a few things should be said about the fact that technology causes or not unemployment. Considered by several authors, in many studies, the question still presents inconclusive results. However change can be observed in discourses. While the first studies acknowledged the aspect of technologies related to loss of jobs, they also pointed out that new sectors and work opportunities were created by technology, but more recent studies already acknowledged an irregularity in this process, represented by a growing deficit in the number of jobs. The argument prevailed that unemployment generated by increased productivity as a result of technological updating applied to industry, would be compensated by new jobs, especially those created in the service sector. The rapid automation also in the services sector (banking, communications, mails, trade, transport and others), unbalanced the equation. Between the extremes come the TWH activities whose nuances, considering their innovative character, are not perceived by the indicators usually used to measure the level of (un)employment. It should be observed that, strictly speaking, TWH can be analyzed both from the standpoint of generating jobs, and as a source of unemployment – in fact the important thing that remains is the net balance for the economic system.

3 Technological Work at Home (TWH)

The report of the United Nations Information Center indicates that, in 1996, there were, in the United States alone, 7 million people working at a distance (Rossi, 1996) – cyberworkers (Fukuyama , 1997). More than the figure, which can only be relativized, what has impressed the analysts is their rate of evolution: growing, and at a fast rate – configuring a new trend which cannot be overlooked.

From the United States comes news that corporations such as Dow Chemical, Hewlett-Packard, IBM, DuPont, AT&T, Microsoft, among others, increasingly carry out activities developed by employees who are plugged in via internet and access the respective intranets (Vassalo, 1996; Bernardi, 1997). Beneficial Insurance, located in the United States, process all damages in Ireland (crashes, theft, etc.) on the insured vehicles, using satellite communications, and the trend is to increase the volume of this sort of work because of its low cost. In the United States and in more developed countries, the office and virtual workspace – without a permanent physical address, becomes increasingly real, day by day.

In Brazil there are no statistics regarding this movement, but the growing purchase of microcomputers, fax machines, fax modem boards and internet connections by

individuals for their homes, signal the dynamic growth of this sector. The crowded telephone lines and the proliferation of access server companies – the Bulletin Board System (BBS) indicate the same trend[9]. Beyond games and entertainment and educational applications, it is assumed that these devices, combined with others[10], have been used to configure effective residential offices, work places.

Organizational initiatives are still restricted, limited to the activities and companies which, by their nature, impose greater velocity to the incorporation of new forms of work organization , following the example of IBT- Itaú Bankers Trust, or to the branch offices of multinational companies and joint ventures which follow the guidelines and experiments which have already been successful in the respective head offices. In an article titled "Virtual work attracts companies and professionals", the newspaper Gazeta Mercantil (May 18, 1998) stresses that Hewlett-Packard, Kodak, Adaptec and Laboratórios Biosintética have been developing pioneer experiments in Brazil. It also presents the result of a survey which heard 314 professionals from different sectors and firms distributed throughout the country regarding the subject (home office):

- for 57.3% of the people surveyed, the home office is a challenge,
- for 31.8%, a stimulating proposition,
- an effective work system for 19.7%, but
- 2.5% consider it unnecessary, and 1.9% inefficient .

Research also indicates, in the order of importance mentioned, the following advantages provided by the home office:

For the company	For the employee
• Cost reduction	
• Increased productivity	• Saving time
• Reduced travel time	• Improved distribution of daily routines
• Saving space	• Greater privacy
• Greater flexibility of processes	

Among the group of users accountable for the explosive increase in the consumption of electronic devices applied to communication, it is possible that there are many former employees who from jobless became self-employed (You & Co., I & Co. Ltd., etc.); as well as many entrepreneurs who, having identified new creative arrangements (facilitated by the new softwares) gave rise to new products and services,

[9] Companies have actually already characterized a new market segment: SOHO - **S**mall **O**ffice **H**ome **O**ffice

[10] Digital cameras, scanners, DVD-ROM PC Cards , multimedia devices, etc.

or, mostly, new ways of doing old things – the graphics sector, for instance, is one of those which have been most threatened by the new technologies and new homeworkers; telesales constitute another example, as well as services with preprogrammed attention – making doctors'appointments, message services, etc. The reflections below refer to this large number of cyberworkers, indistinctly.

The next segment will deal with the advantages and disadvantages, limits and possibilities of this new way of working.

4 TWH: a multidimensional arrangement

If for some professionals TWH is one, when not the only alternative (considering unemployment), from the standpoint of the organization and the government it has been hailed as one of the most promising, since at the same time it contributes to solving equally important problems:

- in reducing the flow of people and vehicles it reduces traffic jams and hours lost in transit – ultimately, it means a saving of resources whose benefits extend beyond those directly involved. Also related to traffic, the level of pollution emission is diminished, and also the pressure for parking places, with a lower level of noise, less accidents and the stress typical of urban communities is attenuated;
- working at home also contributes to reducing pressures on the need for real estate to be used as offices, normally concentrated in the downtown areas and with prices inflated by the imbalance between offer and demand;
- in maintaining a smaller number of people in the office it also reduces conflicts in relationships and difficulties of internal coordination typical of large groups, and
- management teams at a distance also help to reduce indirect expenses with food, sanitary facilities, support services (safety, cleaning ,etc.).

Although there are benefits, there are also disadvantages. The investments and expenditures on communications grow, as well as difficulties (and costs) with coordination and external control. However, the capacity, speed and reliability of the current microelectronics-based devices, associated with the advantages mentioned (among others), may situate TWH, not as a possible activity, marginal to the organization, but as a strategy to leverage the results. All the same, before being raised to the position of strategic option, the subject requires broader and more profound reflection on some aspects of management.

A first group of questions requiring thought includes those more directly related to personal aspects of the professional: is he competent to manage and live with flextime? What happens with family relations? Is it possible to separate the professional from the family aspect? If the answers are no, what impacts can be expected on quality of work? Still in this group, the questions which contrast the points where TWH exposes the professional to consolidated values of society also merit reflection: "workers" have to obey working hours , and they have a signed work card; those who stay home do not have a signed work card (fixed income), they live of "odd jobbing"; the former have access

to credit, to the banking system (current accounts, credit cards ,etc.) and are able to appear if not in many in some registers; the latter face all sorts of difficulties.

A second set of questions deals with the infrastructure elements required for TWH, and the reflections must be directed to the effective material conditions existing in Brazil today. While organizations have resources (specialized staff, for instance) and technological solutions which allow them to overcome certain impasses (no-breaks, power generators, back up systems, communications through central radio systems, etc.), the TWH professionals have all sorts of limitations: financial, technical support for problem-solving, update of hardware, software, etc.

Finally, from the viewpoint of the organization, how can one conciliate TWH with the question of organizational culture, a critical factor for survival and long term success of the organizations (Collins and Porras, 1996)? And the "leadership effect", stressed by many, such as Bennis (1995)? And questions relating to motivation and synergy of team activities which are so greatly emphasized, among others by the authors of Total Quality Management, and by those who adopt the Japanese Management Model?

These questions will be considered below in greater detail, and it is intended to provoke thoughts about the pros, constraints, advantages and disadvantages of TWH, as well as to suggest possible solutions.

4.1 Individual elements of TWH

Free from the constraints of the time clock and the factory siren, and without rigid timetables, the professional working in TWH practices the freedom of distributing tasks throughout the day, the week and maybe even over the course of a month. The time previously taken up with travel can now be used to extend rest, perform other activities or to spend more time with family and friends. The flexibility achieved is seen as a return to a lost situation – with positive impacts on the worker's quality of life. As to the companies, besides the favorable aspects and positive externalities which have already been indicated, TWH is also identified as a "competitive advantage" by those who adopt it, because it denotes the concern and importance attributed to the family questions of its professionals:

> "The corporations that believe in the importance of harmony between these two sides of life [professional and family] and help their employees achieve it, will attract and keep talents on a larger scale" (A. Golbert – director of Human Resources at Hewlett-Packard do Brasil, *apud* Bernardi, 1997).

Garner (1995) also states: "the flexibility allows better meshing between work and family" (p. 90). Thus, under less pressure and with greater satisfaction, one expects a rise in workers' productivity – as a result of the new process and work environment. Is this, however, the reality? Accumulated experience suggests caution regarding expectations. Although evaluations are generally positive, some problems related to TWH recommend more proactive work by the administration, because only in this way will the obstacles be removed and unpleasant surprises eliminated.

One of the questions presented is: now closer to the family, the worker[11] is also exposed to all sorts of matters involved in daily life, for instance the children's school (taking and fetching, meetings, etc.), unexpected health problems, need for small repairs in the home, shopping, as well as, naturally, greater attention demanded by the spouse, and especially by the children. Consequently, to what extent will the worker manage to segregate and conciliate his/her dedication to both poles: the professional and the family? Presence in the home characterizes relative availability (at least greater than in absence) to those close to the professional – even a female neighbour (possibly aged), will not feel embarrassed at asking for help with some prosaic domestic activities, such as changing a light bulb, a small repair, etc. Family problems, previously "non-existent", which the professional kept away from (without feeling guilty), can now demand his/her direct involvement, as well as severe demands from the family, if the previous position is maintained. The distance and rigid timetables delimited the set of possibilities of solutions to domestic problems. Flexibility, on the other hand, could favor badly resolved solutions, displacing the conflict which was previously located within the organization into the home – "family disturbances" (Vassalo, 1996). Thus divided, the worker may perform worse, frustrating initial expectations.

Chronological displacement and postponement of activities, although solutions, also give rise to another sort of problem: never-ending work, permanent occupation – Pedro Mello, a partner in Plug & Use, a Brazilian company which adopts TWH, records that , on their own initiative, the employees increase their work hours (*apud* Bernardi, 1997). Thus, while peerless among his peers, the TWH professional also suffers pressures from friends and family - "normal workers" who reserve weekends for leisure activities, partying, and ... for the family. It should be observed that, despite the fact that cyberwork is part of the time available and flexible for the family (during the week), in the eyes of third parties the person appears like a weekend workaholic, insensitive to the family's needs!

Thus, strangely, the return to missed practices of the past which had been eradicated even with the use of violence could (if not well managed) go so far as to annul one of its main advantages per se: finding back to the lost link between family and work.

We wish to call attention to the fact that TWH, as an alternative, if it is to be successful as a form of work, requires (to become an innovation) behavioral changes which extend beyond the organization versus the worker. Thus, the organizations which identify TWH as a business option, should accompany, reflect and manage (without taking the form of intervention) the domestic aspects of this initiative.

4.2 The infrastructure of TWH

Other aspects that have not yet been well exploited in the texts are those concerning conditions of infrastructure and the physical environment of TWH. The

[11] This sequence of comments must be looked at in the light of local traditions. In the Brazilian case, historical formation determined that even today it is mostly males who are the external provider of the family's resources: this picture is, however, undergoing rapid change.

former, external to the organization and the worker, the latter directly related to the work environment proper – at the professional's home.

A country which until recently had all of its infrastructure, particularly in the area of communications, under direct control of the government, Brazil today is suffering the combination of this fact with another: the bankruptcy of the State as investor. The result is an installed plant which is technologically seriously out of date, besides being insufficient for a demand which responds rapidly to changes – all towards increasing the needs for communication. Difficulties in dialing access to phone lines and interruptions[12] of established communications are, if not routine problems, very frequent, and above the rate found in developed countries, from which the TWH practices tend to be reproduced. To the limitations of the communications system should be added those of power generation and distribution systems - also causing unforeseen interruptions, especially at certain times of the year (summer) and in regions of concentrated demand. Although some limitations also affect the companies indistinctly, as corporations they have more resources: a direct line to the servers, wireless communications, facilities using fiberoptics, power generators, etc. Therefore, we wish to call attention to the fact that the decision to encourage TWH must first undergo an analysis and evaluation of the risks (costs) involved *vis-à-vis* the possibilities of a (possibly lengthy) break in communications, since, if the activities (inside the organizations) depend on TWH, externalization should be previously and carefully assessed. Thus, although it is technically possible to work at home, it becomes imperative to think about the degree of criticalness of the externalized task, in the company's productive cycle. Therefore, to the aspects already mentioned it should be added that in order to allow TWH to consolidate as an innovation, it is also necessary to overcome the limitations of the limitations of infrastructure in the country.

From the standpoint of internal infrastructure, i.e., the environment in which work is performed, there are also questions to be formulated: are the furniture and facilities ergonomically appropriate to the tasks? Does the equipment require that temperature and humidity be maintained at a certain level, etc.? Does the activity require a silent environment and peace for concentration? Frequent consultation of technical publications and sources located in the company? Does it involve confidential aspects and strategic information[13]? These, among other topics, should also be the subject of attention . In other words: TWH cannot be adopted indistinctly for any task, and for its good (and safe) implementation, it requires a certain amount of care, because when the environment is inappropriate for that work it favors the onset of diseases, with repercussions on productivity. It should also be added that leaving the choice and update of softwares and applications (anti-virus, firewalls, etc.) to the professional, may render the firm vulnerable to the undesirable leakage of information.

[12] It often happens, for instance, that in the main urban centers, when there is heavy or long-lasting rainfall, communications are broken off.

[13] Domestic microcomputers are generally accessed and used collectively; a certain amount of promiscuity is even found in the exchange of softwares, mostly unauthorized copies. Inadvertent damage to the files is also significant.

Curiously, to the contrary of what its name suggests, Technological Work at Home, from certain standpoints actually brings the firm closer to the new work environment: the employee's home. Therefore TWH does not necessarily mean distance from and transfer of responsibilities. On the contrary, it brings back, from a new perspective, the continuous debate between the (dis)advantages of centralization versus decentralization.

4.3 The management of TWH

From a management perspective there are also great obstacles to be overcome in order to achieve large scale diffusion of TWH. Fukuyama (1997), in fact, views this trend with scepticism; he ponders that , although machines are intelligent and productive, they will never dispense with human contact, the foundation required to establish trust, without which no management is possible. Handy, a Professor at the London Business School, also calls attention to the difficulties circumscribing the extent of management of virtual corporations, also applied to TWH:

> "In its simplest form, the administrative dilemma can be summed up in one question : how to manage people you do not see? The simple answer is: by trusting them. But this apparent simplicity hides a revolution in organizational thinking. The rules of trust are obvious and well established , but do not sit easily on a managerial tradition according to which efficiency and control are closely linked, and that it is not possible to have one without the other"(1995, p. 63).

In a country in which Gerson's Law[14] has not yet been revoked, and most organizations can be classified as traditional and autocratic (Johann, 1996), there is doubtlessly a cultural hindrance to be overcome.

Furthermore, there is a second, equally important dimension of culture: the one which regards each organization , a topic which although one cannot say that it is a novelty[15], recently gained unusual importance in view of the contribution by Collins and Porras(1996). Culture, creed, mission, philosophy, values, ideology, principles and others, although not synonymous, are terms used indistinctly to denote the cement that glues people to the organizations, above all in times of adversity. And it is this cement that confers sustainability to organizations over the long term – it is in fact the basic pillar. The authors also emphasize that, more than a mere declaration of intentions, the principles and values of the organizations must be practiced in order to be effective as a managerial tool; they even report situations of true "brainwashing " – hymns and odes to the company. If it is so, to what extent will organizational unity and its long term success be compromised, as TWH activities expand? In this sense, Vassalo (1996) warns:

[14] Gerson's Law refers to a Brazilian soccer player, a former World Cup champion, who appeared in a cigarette ad saying that he always liked to obtain advantages, i.e, come out ahead. Since then the expression has become a byword in Brazil, usually in a negative sense.

[15] See, for instance: AIDAR *et al*., Marcelo Marinho. Cultura Organizacional Brasileira. In: WOOD Jr., Thomaz (Org.), *Mudança Organizacional*. São Paulo : Atlas, 1995.

"virtuality taken to the extreme, however, creates a risk: that of the loss of corporate identity" (p. 84).

Handy calls attention to an equally important aspect of the management of human resources - motivation: "(...) it is not clear what motivates people in the virtual business organizations" (1995, p. 66), which can have serious implications for the result of work. It is also in the course of day-to-day relations in the organization that a significant proportion of knowledge is transferred from one member to another – the base of the learning organizations (Garvin ,1993).

Furthermore, literature also warns that a company is not only a space to carry out work; it is in the company that solid bonds of friendship and trust, necessary for both individual and social group balance are created – an aspect that transcends the bounds of organizational formality. Finally, in this case too, there is an ambiguous situation: if on the one hand, TWH brings closer and intensifies family relations, on the other it also makes people more distant, above all from a group that is very dear to the professional - the one which acknowledges him/her in their area of competence.

Conclusions

The main goal of this work was, based on two of the most controversial topics of the present time - unemployment and technology - to raise reflections on Technological Work at Home (TWH), seen at the same time both as one of the causes and one of the solutions to the greater problem: unemployment. Analyzed from three angles – individual-familial, infrastructure, and (social) organization , the question is inconclusive, since there are aspects which are surprising in their contradiction and convergence, for instance:

- the onset and/or worsening of family problems, when the opposite had been expected;
- that, on the contrary of what is suggested a first sight, TWH from certain standpoints can lead to greater company interference in the family environment;
- that if on the one hand the TWH brings a group of people closer - the family, on the other hand it distances others – the fellow workers.

Such gaps and contradictions certainly instigate further studies and research , whose spectrum, as shown, is quite broad. In this sense, the essay by Porter (1993) reveals a number of dimensions of analysis and areas for further studies. It is likely that the paradoxes result from the analysis of an innovative solution which is, however, based on assumptions and deductions of a dated paradigm. Considering the situation presented, it is suggested that care be taken in accepting any deterministic statement that indicates that TWH is a universal trend, indistinctly applicable to cultures, sectors and activities, etc.

Finally, in the Brazilian case, in order to allow TWH to constitute an innovation which will generate jobs that could possibly leverage the productivity of some organizations, it is first necessary to solve and implement solutions to problems concerning infrastructure, whose response time requires at least a medium term horizon: 3 to 5 years.

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