The Challenges of the Knowledge Society of the Information Age

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Abstract

The present article analysis some critical aspects of the information society (Tofler, 1980; Kearmally, 1999), reflecting upon the challenges faced by cities and regions in the new competitive environment (Charles, et al, 1999). ‘Core cities’ and ‘global cities’ are some of the concepts reviewed. Besides this geographical approach to the information society, some of the new forms of work are also referred, such as telework (Cornford, et al, 1997).

Though the technology evolution is speedy and vast, the human perspective and attitudes in relation to this evolution is often hesitative, ambivalent and full of controversy. Though the human factor is referred as critical in the societal process of evolution, this area is not developed in this article – it is present just as an all evolving scenario.

Key-words: information society, knowledge management, change management, telework, innovation, quality of life, social exclusion, competitiveness and new factors of competitiveness.

1. Introduction - a first approach

We live today in a world of radical changes. These changes are economical, cultural, political, sociologic and societal.

However, we are seldom aware of the dimension, the complexity, and also, the consequences, of such changes. Though we are deeply embedded in them, as change surrounds us everywhere, the perception we actually have is like that of the point of one iceberg – even being a large iceberg, its invisible part is far larger. Though living our every day life side by side with radical and revolutionary changes, our capacity to understand, to deal and to take profit of such changes is terribly limited.

One Spanish painter, in an exhibition, had this written, in very large letters, on the top of the wall of one room: «The reason we have round heads is for ideas to go around.» Apparently, and according to our performance in dealing with change, our heads are seldom round. To face the
challenges and to meet the opportunities created by the dynamism of our present society, ideas, inside our heads, must get around.

How may we characterise this evolution? How do these changes materialise? Where do they come from? What brings them about? How well do our theories on economics, inter-culturallity, politics, sociology and on society and civilisational evolution fit the reality we actually face? How does this complexity reflects itself in our everyday lives and what is our role – both professionally and personally – in this process?

Qualified professionals are different from non-qualified professionals in the sense that they are supposed to be able to conceptualise answers to their respective areas’ problems. To conceptualise means, in the first place, to be able to perceive and to understand the reality, or the professional’s area reality. Only then may this professional begin the reflection, searching, sharing and confronting process that leads to an answer, or to the approximation of an answer, to the perceived problem. The drama is that each step of this process is mined. Not only the creation process is not linear and clear cut, it also is timeless, continuos and, sometimes, all seams to be happening at the same time.

The purpose of this article is to reflect upon key factors of the change in society we all witness, intentionally or not, consciously or not, and willingly or not.

Qualified professionals of the areas that are related to information and communication technology, to telecommunications and to multimedia are particularly critical in this process. The arena in which we are called to intervene, both as professionals and as researchers of any field of knowledge, is deeply marked, influenced and determined by those areas. So this articles uses a wide brush method to overview some of the changes, the challenges, the practises and the threats and opportunities related to the new information society.

2. Knowledge as the new paradigm of today’s society

The developed world has gone through three distinct eras – the agriculture era, the industrial era, and now, the information era (Tofler, 1980).

The information era is characterised by the globalisation of markets, by the vertiginous technological evolution, in particular in the areas of information and communication technology, and by the importance of knowledge as a source of competitive advantage. Knowledge is a production factor in today’s new market scenery (Kearmaly, 1999). This statement seams irrelevant, a common place, though it hides the heart of the radical changes that are taking place.
Alvin Tofler (1980), in his paradigmatic book called «The Third Wave», refers:

«While land, labour and natural resources were the main factors of production of the Second Economic Era of the past, knowledge – broadly defined as information, data, symbols, culture, ideology and values – is now the central resource of the Third Era economy.»

Kearmally (1999), in his book «The new economics of the knowledge society of the information age», besides knowledge, refers as new economic resources and factors of production, the ‘core competences’ of each business and also their ‘clients’.

Both approaches define a very precise posture and mindset. This new attitude, that is intrinsic to these frameworks, represents a radical change in relation to the past and it is exactly this change that is necessary to unveil.

A new reality implies a new attitude in relation to our ways of life – the way we see, think, act and interact.

Large investment have been dedicated into research on these processes, covering wide scientific areas. Nevertheless, while in technologic terms progression has been overwhelming, in human terms, in relation to our capacity to create, share and manage knowledge, our evolution has been very frail.

3. Urban planning and development and knowledge management

An interesting unit of research to analyse this evolutionary process is that of the a town. A town goes through this process within a specific dimension of time and space, which helps us to set limits and borders to our research and to give us hints so that we are able to focus on the essential factors.

A concept that explores the ideas we were just referring on societies’ change is the concept of ‘core cities’.

In a research project called ‘Core Cities: Key Ventures for Regeneration Synthesis’ (Charles et al, 1999), this complex approach to urban development is presented – these cities are characterised as representing the most important and dynamic centres within their regions, being the engines of growth in their regional economies and underpinning the success of the national economy as a whole. Though their potential is enormous, their practical success may be limited by longstanding barriers and problems. Urban policy in recent years has tended to treat these problems as highly localised, as in inner areas, giving rise to specific refurbishing interventions,
or else as narrow vertical concerns, such as education, leading to specific investments in this area alone.

This article’s argument is that unless policy is developed at city-region level, then each ‘core city’ cannot be expected to play the role they should play as regional economic motors, and each country which hosts this limited, fragmented, localised, vertical and ad-hoc policy would suffer from economic under-performance and social polarisation. The interaction between cities and their regions, the roles core cities play and how the strengths and weaknesses of these cities affect processes of regional competitiveness and social cohesion, are critical areas of research, and are the problems to be addressed if we want to change a situation where many regions are failing to achieve their full potential.

4. The regional versus national importance of core cities

In this article, seven British cities are identified and studied: Bristol, Birmingham, Liverpool, Manchester, Sheffield, Leeds na Newcastle.

The most readily form of linkage between core cities and their city-regions is commuting. In the seven English cities identified in this study, it is the strength of net in-commuting to the cities which allows them to be the location for approaching a third of the of the city-regions’ jobs while housing less than a quarter of the city-regions’ working residents. Furthermore, there is a tendency for knowledge-based industries and other sectors employing many well-paid workers to be the most likely to locate in cities, whilst manufacturing is just likely to be found in the surrounding towns. High skill jobs are relatively scarce in the core cities’ regions, which are mostly rooted in the traditional industrial regions of the country, but those high-skill jobs which are located in these regions are particularly likely to be found in the core cities themselves.

Competition and competitiveness are growing in importance as policy concerns among European cities. Cities compete in the sense they engage in rivalry in creating or attracting activities that generate wealth for their citizens. These authors define territorial competitiveness as the ability of places to add value to the activity of business through the interaction of a set of framework conditions, with a set of inter-business and local institutional relations. This framework conditions are diverse, such as wage costs, the quality of labour, infrastructure endowment, as well as the housing, cultural, leisure/sports, educational and health policy. In addiction to this interaction between framework conditions and the organisational environment, in order to be reproducible in the long term, the benefits of wealth generation must be redistributed within the city-region to enhance social equity and quality of life without compromising sustainability.
5. The five challenges to be met by the core cities

This study focuses on five key challenges to be met by the cities and their national policy – if the problems of the cities and the regions are to be effectively addressed.

At the heart of this model of competitiveness is the question of business performance, where the emphasis should be on the competitiveness of the sector or cluster rather than the performance of the individual firm. The performance of business will be enhanced by the knowledge infrastructure and the institutions and conventions that support localised business interaction and collective learning. A policy to promote urban competitiveness must focus on rebuilding the learning dynamic in the cities, including research and innovation, institutional development and inter-firm net-working. Individual learning and training is necessary, but not sufficient, and much more needs to be done to stimulate the demand for learning at all levels and in all aspects of urban society. This is the first challenge this article presents – achieving competitiveness in a knowledge-based economy.

In understanding the special contribution of a city to its region, one important aspect is its cosmopolitan nature. Cities are in essence places where different groups of people meet and mingle – people of different classes, different occupations, different cultures, and different races. Such co-mingling contributes to the cosmopolitan nature of the city but also provides the spark of innovation. Cosmopolitan cities are also centres of cultural consumption, and the mix of cultures leads to opportunities for great diversity, although the parallel preservation of local culture is also important. Yet in Britain cities tend to have a negative image, even if they are more cosmopolitan than their surroundings, and this contributes to the exodus of middle class families which in turn damages the cities’ competitiveness in attracting certain kinds of investment. This then is the second challenge – of cosmopolitan image.

Competitiveness also depends on the question of redistribution. The business of a city can generate wealth underpinned by a favourable environment, but unless that wealth is distributed in a way that is broadly equitable the social tensions of the city threaten to erode the qualities that make it attractive. Success breeds polarisation, and has probably always done so. The way in which the negative consequences of success are managed within a city, such that the whole communities are not trapped and stigmatised is a condition for long term success. This is the third challenge – social polarisation.

Despite a variety of measures undertaken in major urban areas to tackle the environmental problems of noise, air pollution, water pollution, traffic congestion and water consumption, there is little evidence yet that of sufficient progress to ensure longer term sustainable urban
development. The negative effects of these environmental problems extend from their impacts on the quality of life and human health to the economic viability of cities. Polluted cities are unattractive to mobile people and investors, and the costs of coping with the problems can take a heavy toll on municipal financial resources. This is the fourth challenge – environmental sustainability.

Finally there is the problem of the governance of the city and its region. The English city-regions – which are the object of the referred study – are fragmented between local authorities, with the core city having to carry significant costs of its regional role without an adequate tax base. Co-ordination between elements has often been limited or non-existent, and new governance structures such as regional development agencies overlay city-regions. In at least two cases of this study separate parts of the hinterlands from their core cities. Central government relations with urban areas tend not to differentiate between the roles and responsibilities of core cities, and the regional dimension is absent from urban policy. Governance is therefore the fifth challenge of this study.

Each of these challenges need to be addressed at the level of the city-region – policy on each will have city-region wide consequences, and without a holistic view and integrated approach the potential for success will be limited.

6. The new factors of competitiveness

In the move to a knowledge or information-based economy, successful cities benefit from pools of knowledge, technological spillovers and what has been termed place-specific tacit knowledge. Cities are places where knowledge as a ‘strategic resource’ is created, and indeed throughout history cities have tended to be the focus for knowledge activities. Knowledge in this sense may be considered with regard to all industries including financial and business services, retailing, tourism, cultural and media industries, as well as manufacturing. The continued success of a city depends on the strengthening of the knowledge base for all dynamic growth industries.

Current economic development theory on knowledge and territorial competitiveness stresses the interaction between access to global sources of knowledge, often represented as ‘best practice’, and localise knowledge arising from the concentration of sectorally or cluster specific tacit knowledge. Such local knowledge is developed and shared within a socialised process involving groups of knowledge workers learning-by-doing, moving between firms, and learning through firm-to firm interaction.
At the core of the concept of knowledge-based economy are those activities which are highly intensive employers of knowledge workers. The core cities tend to be the most important concentrations of such knowledge work within their regions, although for some the city-region hinterland is seeing faster growth than the core city. However, at a national scale the seven core British cities presented in this article, as well as their regions, lag behind the South East and suffer from a continuous concentration of knowledge activities in the South East area of England over the past fifty years.

The core cities studied in this article perform quite poorly on Research and Development (R&D), lacking significant public R&D, and with private sector R&D also being concentrated in South East England. This contrasts sharply with competitor cities in continental Europe which have benefited from greater decentralisation of public R&D. In Germany, for example, all major cities benefit from basic research and industry oriented research centres which are subsidised jointly by central and regional government.

The share of university staff and students in the core cities is more equitable, although the contract research income of the universities is still slightly below the share of population. What is more concerning is that the four universities of Oxford, Cambridge, University of the City of London (UCL) and Imperial College each have greater research income than any individual core city group of universities.

For business services, there is a greater relationship between the scale and external orientation of the service sector and the position of the city within global trading networks. The centralisation of control has coincided with a spreading of telecommunication technologies that maximises interactivity and contact. Although such technologies are used intensively for control purposes within the firm, and for commodity transactions, the centralisation of command functions shows a separate dynamic arising from the continued importance of face-to-face contact.

The five main challenges facing urban policy and the core cities are not the only issues to be addressed, although most issues fit within this framework, the authors argue as a conclusion. In all cases, the role of the core cities within their city-regions is central to the development of the wider region. That most of these regions are under-performing is at least in part attributable to the fragmented approach to urban policy and strategy adopted in England. The core cities could play a much more dynamic role in stimulating the overall national competitiveness by revitalising their regions, but there are key tools as well as key powers they lack when compared with competitor cities elsewhere in Europe. So although a renaissance of urban life will depend on good planning and design, and an increased attention to sustainability, there needs to be
much greater effort to restore city economies by investing in the new infrastructures for the knowledge-based economy by investing heavily in education, by increasing jobs in the city whilst equipping inner city residents to do these new kinds of jobs, and by changing towards cities amongst the general public and decision makers.

The referred report, the authors comment in the end, do not offer simple solutions or remedies. In fact the cities have experienced decades of such experiments, most of which have been failures. Instead there is a need for a new partnership between central government, city-regions, and core cities, a partnership that sees the problems and opportunities of the cities as a national concern, and brokers actions which build the capacity at the city-region level to address the challenges in a collective and sustained manner.

7. Global cities and interconnectivity

In global cities - such as London, Paris, New York or Tokyo – the focus on the global becomes dominant and can lead to a partial disconnection from the national territory. Given that the very different economics of global cities in terms of land and factor costs, only those activities that need to be in the core are retained there. Decentralisation of routine activities provides opportunities for regional cities which can therefore grow as ‘command and control centres’ for domestic economies – becoming partially interlocked with global networks but with a main focus on servicing local clients and branches of multinational firms.

Some new niches are opening up for national and international operations where the presence in the global city is not necessary. In this sense, regional cities have been able to develop specialist services that link into global economy but can exist without the benefits of the cluster of international functions in global city.

The nature of change in information and communication technology as well as in transport technologies has transformed the basis of regional markets. Where once most firms in a region looked to the regional centre for specialised services, now the more fragmented structures of multi-site firms, map unevenly on the urban system, and smaller firms may be prepared to look to the neighbouring regions for services as accessibility increases. Fast journey times outside the cities coupled with congestion in the city itself evens out the benefits of proximity, whilst in many cases the customer now expects the service firm to do travelling. If the service firm offices are control centres and touchdown points for an essentially car-borne field force then some cities may win a greater share of the market than their own region can provide.
Manufacturing remains important in some of the city-regions of the core cities, where traditional clusters remain such as engineering in Birmingham and textiles and clothing in Leeds, but there is often little underpinning of these clusters with knowledge resources. Some cities are now seeking to build technology strategies around cluster advantages, although further partnership between authority districts and with central government is needed.

The concentration of knowledge activities in the South East of England, driven by the centralisation of both public and private sector command structures, has created a two-speed national economy with over-heating and knowledge based growth in the South East and sluggish or poor performance in the core cities’ regions. There is a role for central government to work with city-region partnerships to build knowledge capacities in the cities and over the long term, to stimulate a more decentralised pattern of development.

8. The new competitive market environment for cities – past dreams and future reality

So the main concept behind the contribution of the above referred article is the question of how to gain and maintain competitiveness in an knowledge-based economy.

According to another author developing the theme of urban sustainable development (Dentinho, 2000), it is the rise of the information economy that contributes to the globalisation of searching processes and knowledge diffusion, whilst it rapidly makes explicit and condemns the problems that affect each man in his own environment.

It is in this framework and facing the knowledge globalisation phenomena and the local dimension of each problem that the concept of ‘learning region’ makes sense. Learning regions are an adaptation to the regional context of the concept ‘learning organisation’, and they are defined as a region able to integrate and to apply global knowledge to local problems.

According to this author, cities are the elected place where knowledge, as a strategic resource, is created and recreated in a close and permanent interaction with all activities and economic sectors. The urban sustainable development depends on the strengthening of the knowledge base of those activities that are growth promoters.

In 1964, Marshal McLuhan prophesied that, in the future, and due to the development of information and communication technologies, cities would tend to disappear. The very own reason for the existence of cites, as places and locations where exchange and meeting activities took place, would tend to disappear. These exchange and meeting activities would become a virtual process through the development of electronic devices.
In fact, in today's world, we verify the opposite, although the argument is counterintuitive. New technologies overcome space and time barriers, working at a global level and on real time.

However, the information flows themselves, which volume, intensity and complexity tend to be crescent, create the need for the physical presence and simultaneous of a specific set of highly qualified and specialised professionals, whom are able to interpret and allow for the effective integration, conjugation and assimilation of that information. This is the argument of the «compulsion of proximity as refer Boden & Molotch (1994). Interpreted in this light, technology, decisively, promotes the reaglomeration, thus justifying and explaining the growth of specific cities.

This same model explains the role and the expansion of the cities known as ‘global’ (Boden et al, 1994), such as London, New York or Tokyo. In these cities, extensive electronic networks support financial and economic information flows, with rising volumes, speed, and volatility. These massive flows of information are managed by professionals that take decisions and that minimise the risk of decision-making through ‘face-to-face’ relations based in trust, compromise, commitment, reciprocity and reflexivity. The intense information flows, on one side, and the corresponding set of professionals, highly remunerated, who sustain, feed and use those information flows, on the other, are the two main factors which explain and are responsible for the power and the growth of these global cities. These towns, deeply linked among themselves, at a global level, bring value to one another.

Twenty years later, Alvin Tofler (1980), in the book already referred, launched the model of the highly qualified professional who works from his own home through electronic data transmissions.

9. New forms of work in the knowledge society – some theory and practise

In fact, the implications of information and communication technologies for patterns and modes of work are complex and various (Gillespie, Richardson and Corsford, 1995). However, the model that has most clearly captured the imagination of journalists, and, arguably of the general public, is that of the home based teleworker. In its best known guise this is the model, just referred above, popularised by Alvin Tofler (1980) as the ‘Electronic Cottage’.

In this scenario, the home based teleworker was envisaged as a highly skilled professional – either an employee or self-employed – providing services to her employee or to clients from a home office ‘over the wire’ via a computer link, telephone, fax machine or other appropriate technology (Cornford, Richardson and Gillespie, 1997). Further, by using the term ‘electronic
cottage’, a bucolic image of rural surroundings was invoked. Indeed, the electronic cottage can be situated as part of a wider (and quite utopian – see e.g., Robins, 1995; Stallabrass, 1995) discourse on technology that sees it as central to overcoming many of home and work and, of course, the congestion problems associated with agglomeration of population in big cities.

This model of professional home-based teleworking has gained a deal of policy interest in terms of regional development agencies. In the United States, this model of working has been most closely associated with policies to reduce work-related travel, hence the term telecommuter is more common in the US rather than teleworker (Nilles, 1976; Mokhatarian, 1991).

In Europe, the emphasis has tended to be more on the employment aspects of telework. The influential report of the European Commission’s High Level Group on the Information Society, Europe and the Global Information Society: Recommendations to the European Council (better known as the Bangemann Report) provides a good example of the enthusiastic adoption of the concept by public policy makers. In this report, teleworking is presented as the first priority for public action if Europe is to ‘seize the opportunities’ of the emergent information society. Under a heading which reads «More jobs, new jobs, for a mobile society» the report makes the stimulation of teleworking one of the ten priority areas for policy intervention.

Policy interest has been sparked at a more localised level too. For example, the Government of the Balearic Islands is making a major effort to attract such professional teleworkers, not necessarily on a permanent basis, to the Islands. In the UK, many local authorities and development agencies, mainly but not exclusively in rural areas, have sought to kick-start such development through support to various from of ‘tele-cottages’ – centres through which telematics services are made available to a region or locality’s business community (Gillespie et al, 1995). The rationale behind such centres is to provide hands-on experience, demonstrations of what is possible, and, perhaps most importantly, complimentary services such as advice and training to aid processes of awareness, adoption and use.

The ‘electronic cottage’ – and teleworking more generally – is often perceived, in Northern Europe, where it has been most successfully practised, to be associated with rural areas and with workers escaping from the rigours of urban life to work remotely in a rural idyll through the capabilities of modern telecommunications. The evidence from a number of studies suggests that this is not generally the case, and that electronic home-working is predominantly an urban and suburban phenomenon and is likely to remain so. Huws (1993), for example, shows that although teleworking employers in the UK were present in all regions, the highest concentrations were in London and the South East of England and East Anglia. Huws attributes
these variations to differing regional industrial structures, with London, the South East and East Anglia having a relative over-representation of service sector employment, especially in financial and business services, and, in London, government and media employment. Huws concludes:

«These results give no support to any argument that teleworking is most likely to be found in rural areas. On the contrary, it seems more likely to be found where population density and land values are high. These areas of relatively high telework prevalence also tend to be ones where traffic is congested and commuting times are long.»

According to Cornford (1997), one reservation that could be raised about the interpretation which Huws puts on these figures is that they relate to the location of employers rather than employees, and, in theory at least, teleworkers could indeed be located in rural areas at a distance from their urban-located employers. However, generally speaking, this is unlikely to be so, as most research evidence shows that teleworkers are likely to have been employed by the teleworking employer for a considerable time in a non-teleworking capacity and would therefore be located within daily commuting distance.

Further Cornford et al, refer that some estimates of telework numbers suggest that, under rather loose definitions, up to two thirds of teleworkers could be self-employed. Most research on telework, in the UK at least, suggests that the growth telework, particularly among self-employed professionals, is primarily related to the 'push factor' of corporate down-sizing and business process re-engineering. In this case, then, self employed teleworkers may not be choosing to telework for quality of life reasons but have rather forced into self-employment and teleworking.

On the nature of jobs which can be teleworked and their skill profiles (Cornford et al, 1997), we may have: data entry and processing staff, programmers, analysts, engineers, planners, product managers forecasters, computer system developers, marketing experts, market researchers, business planners, tax experts, personnel services, regular and free-lance journalists, translators, consultants, sales personnel and telephonists.

Stanworth & Stanworth (1991), categorise five types of job which can be teleworked, though the list is ‘by no means exhaustive’: (i) professionals and management specialists; (ii) professional support workers; (iii) ‘itinerant’ field workers; (iv) information technology specialists; and (v) clerical support workers.

   (i) professionals and management specialists: architects, accountants, management, marketing, public relations, human resources, finance, etc, financial analysts and brokers
(ii) professional support workers: bookkeepers, translators, proof-readers, indexers and researchers

(iii) ‘itinerant’ field workers: company representatives, surveyors, inspectors, property negotiators, auditors, journalists, insurance and brokers

(iv) information technology specialists: systems analysts, software programmers and engineers, etc

(v) clerical support workers: data entry staff, word processor operators, directory enquiry staff, telesales staff, etc.

These authors suggest (Stanworht et al, 1991) that what these jobs have in common is that they involve the ‘handling, processing and retrieval of information, rather than the production of a tangible product’.

Wejers et al (1992), devised a criteria which have to be met before a job, through the use of some form of information and communication technology, can be performed away from the employer and co-workers: part of the work (at least 20%) has to consist of the processing of information in a broad sense; part of the work results in measurable output, such as reports, accounts, etc, that can be planned and fitted into a whole range of activities; part of the work does not depend on face to face or physical contact. As new technologies are developed, for example, interactive and multi-media systems, the number of tasks capable of teleworking would be expected to rise.

Huws’ (1993) empirical study of the UK suggests that there is a surprisingly broad distribution of teleworkers by occupation. ‘Consultancy’ and secretarial/administration are most prominent, with each group accounting for 17 per cent of all teleworking occupations in the survey. These were followed in importance by data entry staff, computer professionals and training and education specialists, each of which accounted for 10 per cent.

Such evidence, then, suggests that there are a range of high-skilled, high-remunerated occupations that appear to be amenable to some form of communications supported home-based working.

As a final comment, it might be objected that workers who work ‘mainly from home’ (Cornford, 1997), cannot be taken as equivalent to the classic definitions of ‘teleworkers’ (Huws, 1996) in that they may not be utilising any form of communications technologies. It is, however, reasonable to assume that the vast majority, at least, will be using a telephone, many will have a fax machine, and that a minority, albeit a growing one, will be using some form of computing communication.
The focus on computer communications is, in any case, a good example of the fetishisation of technology in the study of work. The precise methodologies used – be they post, phone and fax or high speed multimedia links – should be unimportant if the ultimate goal is, as is often claimed for teleworking, the diversification of the economic base of rural areas through the development of home-based professional employment or the reduction of urban commuter traffic flows through home-working.

In many empirical studies, many self identified teleworkers do not have elaborate communication facilities. For example, Manuel Castells points out that a 1991 survey in the United States showed that ‘fewer than a half of telecommuters used a computer: the rest worked with a telephone, pen and paper.’ (1996). Nevertheless, Cornford (1997) concludes that non-manual workers, like manual workers, were more likely to work from home if they had higher skill levels and therefore, it can be inferred, more autonomy over the work process.

10. Conclusion

The idea behind the citation «think global, act local», is critical to the analysis of the impact of the telecommunications’ revolution at all levels of society, including that of social exclusion – as that is the most serious threat to stable, sustainable and peaceful future development.

Another related concept (Dentinho, 2000) cites: «think at eternity, act at the margin». This citation confronts the dialectic tensions involved in planning with a long term framework, especially when environmental issues are concerned, to the need to set action criteria based in the powerful tool of economics marginal analysis. It is at the margin that the optimal solutions are identified.

A further development, and over simplification, of these citations is just: «think and act». This may be a hidden objective, yet more profound, that should direct all our research and practises. We cited the information era and the knowledge society, but we all live, recognise and suffer from non-knowledge situations, where organisations, as a whole, and individuals, per se, refuse, first to think – which implies to confront, to question, to reflect, to evaluate and to decide – and then, to act – to act according to the reasoning and decision made, and not solely following a pre-defined pattern. As is referred by a popular saying: «There is no one more blind than someone who doesn’t want to see.»

As we pointed out at the beginning, the accelerating evolution of information technology was not followed by a similar evolution in terms of human knowledge and behaviour – and, closely related to the social exclusion phenomena, this is another aspect that threatens the future
technology evolution itself, as well as the balance between the two areas, technological and human. The human area is conditioned by complex factors, related to cultural aspects like the prevalent mentality, and to civilisational issues that have been present for centuries, if not millennia. When referring the «knowledge society» does not mean that knowledge is certain, or even easily accessible, but rather that there has been a change in paradigm, where knowledge, and knowledge management, are the critical attributes and competencies.

Knowledge is inside our heads. As we commented in the beginning, it is useful to begin to think of our heads as being round.

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