Information Networks in Mediterranean areas : an alternative to regional isolation. The Balearic Islands

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INFORMATION NETWORKS IN MEDITERRANEAN AREAS: AN ALTERNATIVE TO REGIONAL ISOLATION. THE BALEARIC ISLANDS

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0.- Introduction

The history of communications technology is the story of the expansion of the powers of human knowledge...(Carey (1981). In Gillespie, 1991)

The decade of the nineties has been characterised by the consolidation of a new "information society" in which management, the nature of competition, and speed of information have become the key competitive factors, both for industry and for services provided to end users.
The new information and communications technologies which have made possible the development of this society, are currently transforming many aspects of economic and social life in contemporary society. These include relationships in the workplace and methods of work, the organisation of firms, interpersonal communications, and leisure and recreational time.
(Crecimiento...1994).
Information technology, and information and communication services, in particular those related to the development of telecommunications, have been studied and analysed by a number of geographers interested in the geography of communications and telecommunications, in economic geography, and in urban and regional planning, etc.
Up until the seventies, studies of geography and telecommunications concentrated on the analysis of the structural role of these networks in the territory, as substitutes for transport systems. Since the eighties these objectives have shifted to an analysis of communications as a complement to the transport system, and its active role in trans-national companies (Bakis, 1993). Following this line, and without embarking on the description of differing methodologies, the following approaches and themes may be identified among recent contributions to the literature.

The analysis of telecommunications and networks of innovation as active agents in the processes which lead to the trans-nationalisation of activities, companies and processes (Bonavero, 1991; Wackermann, 1991; Bakis, Abler, Roche, 1993; Camagni, 1991; Roche, 1993).
The development of telecommunications itself, and of regional systems, that is to say, the role played by telecommunications in the processes of regional economic development, taking as a starting point access to new services available to productive units and services. Analysis of the role of innovation in the organisation and administrative structure of the territory, in terms of the geography of information, is another aspect of this approach. (Giannopoulos, Gillespie, 1993; Robins, 1992).
Finally mention should be made of studies which focus on recent innovations in transport and communications, and the extensive development of the telematic sector. (Giannopoulos, Gillespie, 1993).

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Unlike other subject areas in geography, in which there are difficulties in obtaining general information, there is, for the area we are concerned with, an abundance of varied information from a number of sources. These include newspapers, academic publications, and conferences which feature particular aspects of this new society within their remit.

Despite this the subject presents a major problem, because technical and statistical information is soon out of date, due to the breakneck speed of technological development. Consider two examples of advanced services, one available at present and another projected for the future. In 1991 there were approximately three and a half million mobile telephone subscribers in Europe, but this information was made obsolete by the 1994 figures, which reached eight million. Growth has been extraordinarily spectacular. At the end of the century it seems that a new world wide satellite network will be established for all types of communications, and that this may replace cable communications. In Spain, however, a cable network does not yet exist, since the law governing cable telecommunications did not appear until 1994.

1.- The globalisation of processes. The information society and its characteristic elements.

One of the characteristics which defines the decade of the nineties, affecting the growth dynamics of an ever increasing group of regions, has its source in the interaction between three major historical processes: the technological revolution, the creation of a global economy, and the emergence of information based production and management, as professors Castells and Hall (1994) have indicated.

The scale of the technological revolution based on New Information and Communication Technologies (NICT) seems to be having as profound an impact as the two previous industrial revolutions, which were based on the discovery of new sources of energy. The industrial sectors which produce New Technologies (NT) are those which have grown most over the last twenty-five years, and consequently those regions with the greatest potential to generate NT are the most competitive. NICT constitute the base material for the integration of new processes, and provide organisational flexibility. Teleinformation networks are the physical links along which information travels, making possible such integration and flexibility. (Abadal, Recoder, 1991).

Technological innovation, the production of technology and the spread of technology, cannot, according to Castells and Hall, be completely unrelated processes. There are not many regions of the world which are leaders in the development of all three, and there will always be a certain division of labour on the regional and national levels. But no country can prosper without a certain level of connection with the sources of innovation and production in high technology. Howells and Wood (1992) show how the spread of technology is becoming more decisive than the development of productive capacity in high technology.

Industry is adapting to these new processes and is reorganising so profoundly that the distinctions between electronics, computing, telecommunications and the audio-visual sector are becoming blurred. The boundary between the secondary and tertiary sectors, between industry and services, is also disappearing. (Crecimiento...,1994 p.25).

In the second place a global economy is evolving (Charles, Monk, Sciberras, 1989; Mitchelson, Wheeler, 1994) which functions as a unit, both in terms of capital, and of management, work, technology, information and markets (Hepworth, 1989).

Lastly, a new type of management and economic production is emerging, that of information, in which both production and ability to compete increasingly depend on the generation of new knowledge and on access to processing of appropriate information (Castells, 1995).

The information economy is the result of the three above mentioned processes, and may be considered as a global economy because the generative capacity of the new productive forces requires a constant expansion of the global market, dominated by a new hierarchy of economic power which depends critically on information and technology,

and is less and less conditioned by the cost of labour and raw materials (Castells, Hall, 94; Castells, 1989).

In the information economy horizontal relationships take the place of vertical bureaucracies as the most productive form of organisation and management, and this is achieved through information networks (Stekke, Valentin, 1994). Flexible specialisation replaces organised mass production, and the new system of production is based on the appropriate use of information technology to aquire new competitive levels. As Majó (1991) indicates, the use of technology may become a substitute for classical factors of production (energy, raw materials, labour). At the same time the information economy is characterised by its productive adaptation to the demand conditions of each society and culture.

The information economy does not only imply a revolution in the field of production, but also in that of commercial transactions. The fundamental element in society up to the present has been the exchange of products, but the information economy is based on the exchange of information in terms of access to a product, not its exclusive ownership. In this sense, a large proportion of the information in circulation is ubiquitous, given that it is available non-exclusively and simultaneously in a number of different places (Sánchez, 1988). The exchange of information may be enriching, and consumers may develop a role as active producers; so that the information is enriched before being passed on to a new consumer (Majó, 1991).

This new society, based on the information economy, has, among others, two relevant characteristics: dematerialisation and the elimination of resistance to distance.

Dematerialisation has been made possible by the innovative capacities of industrial firms, which have spread to other human activities (for example the introduction of optical fibres in place of copper in cables, with a consequent forty fold reduction in weight and much improved efficiency, Colombo, 1991, pp 18, 19). Dematerialisation implies the replacement of material goods with information, and products with services, and even the elimination of many movements of people and documents. The implementation of NICT leads to all new processes and products becoming part of non-material exchanges and relationships, transforming activities and individual and collective social values (Roque, 1991).

The rigid relationship between time and space, in which space created resistence to mobility which was measured in terms of consumption of time, has been eliminated (Sánchez, 1988). The activities supported in the use of NICT eliminate the resistence of space, and distance virtually dissappears. Time, as a measurement of this space, is instantaneous on the planetary scale, and the resistence of space is annulled. The emergence of Just-In-Time (JIT) systems has stimulated the rapid development of new information technology (Nijkamp, Vleugel, 1993).

As has been indicted, networks are the physical links along which the information society is structured, based on the new economy, and the vital importance of this development has been reflected in the most advanced economies on the planet.

Al Gore, vice-president of the United States, points out the need for a World-wide Information Infrastructure spanning the planet, a network of networks available to the whole world, constructed by the efforts of governments and peoples. According to him, this network will be the key to economic growth of national and international economies (Gore, 1995). Information networks will also be the most important axis in the development of the White Book of the European Union, and they are the factor which makes possible the rise of the information era, characterised by significant changes in production methods, the organisation of work and the stages of consumption, and by a need for mobility, and the development of new modes and possibilities for culture and leisure (Crecimiento... 1994, pp.14, 24).

2.- Convergence and connectivity in information networks.

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There are two words which characterise the functioning of networks in the nineties: **convergence** between telecommunications, computing and multimedia on the one hand, and **connectivity** on the other (Salgado, 95).

At present different topologies coexist in telecommunication networks offering diverse services and permitting many different applications. Current trends, however, are leading towards the convergence of networks and towards the provision of multiple services. Demand is divided into two segments which have till now been clearly differentiated, the home and business markets. Apart from radio and television transmissions, the only important presence in the home market is the telephone, but new technological requirements and possibilities are increasingly transforming the situation.

The emergence of micro-computers, modems, low cost data transmission networks, systems of data storage, and so on, and the recent development of multimedia systems, contribute to the demand for and expansion of these new services.

Multimedia communication constitutes one of the most important technological elements in the expansion and spread of this technology. It is the result of the integration, through computer programs, of text, sound and digital images in a single communication system (Stekke, Valentin, 1994). It is an interactive system, and access to the information does not necessarily require connection to the network.

The current trend in Europe, and in particular in Spain, is to offer users an ever greater range of products and services across a unified voice and digital services network, the Integrated Services Digital Network (ISDN). In Spain the installation of ISDN was initiated in the areas which were most involved in the Olympic Games of 1992, and by 1995 connection will have been made to 170 cities. The plans for the development of ISDN in Spain in the coming years (Golderos, 1995) point to the extension of the network in 1995 to cities with over 50,000 inhabitants; in 1996 it will be extensively available for those with 20,000 inhabitants; in 1998 it will be provided for towns of 4000, and in 1999 it will be expanded to towns of over 3000 inhabitants.

ISDN will be an essential component in the trans-European network and across Europe around ten million small and medium sized firms could be directly interested in it (Koenig, 1993). It constitutes the first step towards wide bandwidth networks. The cutting edge technology required to implement an international initiative of this type of integrated communications is ATM (Asynchronous Transfer Mode), universally accepted as the ideal technology for the future integration of services. This pilot pan-European network is at present to be found in more than 15 countries of the continent. In Spain, the pilot ATM network is running in 1995, while in 1996 fully commercial wide band width services will be established. It is hoped to implement a wide band width network in 1998-99.

The introduction of NT in wide bandwidth transmissions, such as optical fibre, along which it is possible to transmit large quantities of data at a low price (Capello, Cagmani, 1993), satellites or microwaves, has given rise to a new fusion of telecommunications with audio-visual technology and television transmission. This conjunction marks the start of the information era which will affect in the first place the business sector, and will gradually penetrate the home market. It is projected that the home sector of the electronics market will grow more explosively than the business or automobile sectors (Crecimiento...,1994).

The emergence of these new networks, perhaps integrated in only one system, will make possible a multitude of services, including professional, administrative, leisure, culture, personal and medical. Among the types of information to be transmitted will be texts (mail, newspapers, courses, catalogues, etc.), images (films, medical images, graphic images) sound (voice, music), all of which may be stored in multi-function data bases (Crecimiento...,1994 pp 14). In the business sector firms are already merging, in order to gain access to both telephone services and entertainment products (cable TV), as is the case in the firms Bell Atlantic and Telecommunications Incorporated (TCI). On the other hand, the major computer companies, such as Microsoft, Apple and IBM, also foresee the growth of this new audio-visual and telematic universe, and they are in contact with the above mentioned TCI with the aim of establishing alliances and using their network to distribute data (Blanco, 1993). As Dupuy (1993) has pointed out,

codification of images in computers is a true revolution in distance communications, although it is not yet clear if transmission will be dominated by optical fibre cable or satellite. This is the capacity which makes it possible for information technology to penetrate all fields of activity.

Commitments have already been made to the future of telematic satellite communications. The Teledesic project (in which Bill Gates, the creator of Microsoft is a participant) permits access to the information highway from mobile terminals at any point on the planet by means of satellites. These may become an alternative to optical fibre cables (El País Negocios, n° 461, 06-11-94). Verhoef (1993), and the prestige of the firms which have committed to the project is such that few doubt the success of satellite based personal communication systems.

3. Networks, services and telematic applications proposed for Europe in the nineties.

In 1994 a European Commission White Book was published with the title "Growth, Competition and Employment, Challenges and Trends for the Twenty-first Century." (Crecimiento...,1994). In it the concept of a common information space is developed as one of the options for helping to move European society towards the twenty-first century. The White Book indicates the need to construct trans-European electronic highways which can provide access to the information necessary for economic and social life, as this new society will obtain more resources from immaterial assets than from traditional goods.

This document, known as the Delors White Book, appeared very soon after the Administration of the USA announced its programme for promoting the development of the National Information Infrastructure (NII), with the aim of setting up the essential networks which will enable the distribution of information in all its forms in the country. Both programmes set out to maximise exploitation of advances in NICT. This concern emerged in 1994 because the advance in technology and media was increasingly dynamic, but the strategy for carrying Europe towards the information society has its roots in the eighties.

Community action in the area of information technology and telecommunications appears with the pilot programme ESPRIT in 1983, and in 1984 this established a programme of action along six lines.

1) Focus on trans-European networks, applied "a posteriori" to ISDN, mobile telephones and electronic mail. 2) Establishment of a European market in terminals. 3) Co-operation in R&D with businessmen operating in the sector, and network operators, in order to establish wide bandwidth integrated services networks. This objective led to the RACE programme (Research and Development in Advanced Technologies for Europe) which gave the Community powers to establish information highways. 4) Take measures aimed at placing the peripheral states of the community on an equal footing with the others in terms of infrastructure and modern services. 5) Consultation with social bodies on the policy measures necessary in the field of communications. 6) Finally, to ensure that member states do not attend international negotiations with the industrialised countries without prior co-ordination (Garric, 1994).

The European Commission set out the technological trends in telecommunications and in the progressive introduction of advanced telecommunications services, in the "Green Book for the development of a Common Market in telecommunications services and equipment." Up until 1987, when the Green Book appeared, the Community had concentrated on harmonisation measures and on R&D. In this document a stimulus was given to the modification and regulation of telecommunications services and equipment. In the first stage, up to 1992, support was given to the adoption of directives to liberalise telecommunication services (except voice telephony). The second stage started in 1992, and envisioned the liberalisation of voice telephony in the greater part of the community (except Spain, Portugal, Ireland and Greece, which have until 2003). This stage is characterised by the concepts of universal service, data security, protection of the citizen, industrial property rights, etc. (Garric, 1994) The harmonisation and liberalisation of

satellite communications was also initiated by the publication of a Green Book in 1990, and a future Green Book will deal with the future development of mobile communications.

Since 1984 there has been an effort to direct Community policy on communications towards the construction of trans-European networks. The initiatives culminated in Maastricht (1993) which devoted Chapter XII to such networks.

In 1993 a number of proposals were made for trans-European telematic networks through the administrations, and through the "tele-administration", for the development of ISDN and similar wide bandwidth trans-European networks. These were the three priority action areas in the management of the interior market initiated in January 1993, and they are reflected together with six other points in the proposals for trans-European telecommunication networks (Crecimiento..., 1994).

3.1.- The European Commission White Book (1994).

The document known as the Delors White Book envisioned movement towards a decentralised economy as one of the keys to the transition to the twenty-first century. This movement towards decentralisation, supported by new technologies, leads towards the information society, given that the processes of decentralisation bring with them the need to communicate and share information.

The spread of NICT is inevitable, and should be controlled in order to avoid the trauma of adaptation which has characterised the extension of mechanisation in the past century. Europe still suffers from some disadvantages, as there are too many monopolies, too much regulation and excessive fragmentation in a number of markets. The plan sets out five priorities: the extended use of information technology; the endowment of Europe with basic trans-European services; continued implementation of an adequate regulatory framework; development of training in new technologies and improvement in industrial and technological performance (Crecimiento...,1994 pp 27).

Information networks constitute the main axis of development in the White Book. While telephone networks are international, those which channel information in the form of texts, data and images are only developed in Europe on the national level. In order to overcome the weakness of both supply and demand nine strategic projects have been proposed, targeted at physical networks, services and applications.

Advanced interconnected networks:
- A high speed communication network, using ATM technology, necessary for the development of multimedia services.
- Consolidation of ISDN.

General electronic services:
- Electronic images. It is intended to guarantee the inter-operability of new services of video on demand on the European level for 1997.
- Electronic access to information. The gathering of information in data bases which are accessible to any user in the Community.
- Electronic mail. Services providing electronic transmission of documents, which must be inter-operable in order to maintain the ability to compete of small and medium sized companies.

The White Book of the European Commission proposes the development of four prioritised telematic applications:
- Teleworking. A number of the member states already have distance working projects. The EU will provide grants and set up pilot programmes for the creation of a trans-frontier network.
- Teletraining. 1996 is established as the horizon for the establishment of a network which connects more than a hundred universities or institutions in order to make common teaching modules available.
- Telemedicine. The objective consists in contributing to the exchanges of research findings. It is intended to set up multimedia connections between the major research centres; remote access to specialised centres and creation of grants for diagnostics and therapeutic decision making.

- Teleadministration. Improve the working of the interior market (taxes, duties, state organisms) through the exchange of data between administrations and access to them by firms and citizens.

The White Book states that the priority needs for the period 1994-1999 in the area of networks, services and applications are evaluated at 67 thousand million ecus. The creation of "information highways" will be implemented on the basis of collaboration between the public and private sectors, since the national and Community contributions will be of a marginal nature. (Crecimiento...,1994).

3.2.- The Bangemann Report.

The document known as the Bangemann Report (Europa y..., 1994) was written by members of the high level Information Society Group, headed by M. Bangemann. This report urges the EU to rely on market forces as the means of developing the Information Era. It indicates the measures to be taken, both at the European and national level, to do away with isolationist positions. It hopes to encourage an entrepreneurial mentality in order to stimulate the emergence of new dynamic economic sectors; establish a regulatory outlook which favours the emergence in Europe of a competitive market in information services; and finally it does not propose an increase in public provision, or of dirigisme.

At the same time the group proposes an Action Plan centred on specific initiatives, based on the co-operation between the public and private sectors (Europa y..., 1994, pp.5.) The proposed measures, networks, services and applications are designed to achieve the following objectives.

1) Raise the quality of life of citizens, who will have access to more services and entertainment. 2) The emergence of new creative opportunities. 3) New opportunities for the regions of Europe to express their cultural traditions and identity. Regions situated on the periphery of Europe are specifically mentioned, with the aim of reducing distances and isolation (Europa y..., 1994, pp.5.). 4) More effective public services which are nearer to the citizen. 5) Much more effective management and organisation of the European economy. 6) The capacity to offer a larger number of value added services. 7) Finally, new markets and vigorous growth of suppliers of equipment and support to the information and consumer electronics industry (Europa y..., 1994, pp.5.).

The mass consumer markets could become one of the main forces in the development of the information society, but, nevertheless, the market in Europe is still in an embryonic state, with significant internal differences. In the United States, for example, 60% of houses have cable television, whereas in Europe only 25% have this service. The distribution is not homogenous, as in Belgium 93% of houses have cable connections, whereas in Greece the figure is only 1%-2%.

In order to achieve the above mentioned objectives the Group recommended that the member states accelerate the current process of liberalisation of the telecommunications sector; establish a responsible authority at the European level, with a mandate to be defined as a matter of priority; ensure interconnection of networks and the inter-operability of services and applications as prime objectives of the Union; reconsider the process of European standardisation so as to increase its speed and responsiveness to markets, and adjust international long distance tariffs and rental of lines, bringing them into conformity with other advanced industrial areas.

The Group also recommends: paying special attention to the sector of small and medium sized firms, public administration and young people; that the opening up of the European market should be mirrored in markets and networks in other regions of the world; given that the information society is a global phenomenon, that the activities of the Union have as their goal the establishment of a common normative framework, agreed at an international level, to protect intellectual property and rights, privacy, and the security of information in Europe and internationally; that an effort should be made to avoid conflicting national legislation on ownership of the media in the internal market, by means of establishing efficient norms which protect pluralism and competition; finally, that the application of the norms concerning competition should reflect the reality of the new world-wide markets which are emerging as fast as the technological environment evolves (Europa y..., 1994, pp.12-20.)

All these recommendations are reflected in the elements which make up the information society, integrated by networks, services and applications.

As far as **networks** are concerned, the Bangemann Group maintains the same priorities as the White Book, although it places more emphasis on the importance of trans-Europeanisation. The recommendations for mobile and satellite communications include reduction of tariffs, promotion of the GSM (*Group Special Mobile*) on the European and international levels, establishing a normative framework for satellite communications, and to stimulate the European satellite industry to develop common prioritised projects and participate actively in the updating of systems on a world-wide basis.

Regarding **services** the Bangemann Group recommends encouraging the supply and generalised use of basic trans-European services, and the creation of a "European Forum for Basic Services" in order to accelerate the development of unified norms (Europe y..., 1994, pp. 21-23).

The Bangemann Group Report considers that supply and demand will only be nourished if a significant number of applications based on networks and information services are successfully launched throughout Europe. Specifically it proposes ten applications, of which four had been included in the White Book

1.- **Teleworking**. This will generate higher employment and new jobs in a mobile society.

Distance working is one of the most important telematic applications to have been established by the European Union, with the aim of maintaining the demographic balance of the rural zones and avoiding their depopulation. The aim is to create five million jobs in rural areas in the next decade, but additional objectives in the implementation of teleworking vary from country to country, and according to the economic context in which it has been applied.

The North Americans are the pioneers in this field (Hernández, 1991), and at present there are more than six million teleworkers in the United States. The father of telecommuting is Nilles who in 1976 proposed the elimination the time employed in travel and its replacement with work from home using telecommunications (Nilles, 1988, 1993). In Singapore the practice was established in 1980, and both there and in Japan teleworking has been a way to help qualified women to return to working life, and to stimulate birth rates (Spinks, 1993). In Europe there are a number of other reasons for implementing teleworking, as indicated by Johnstone (1993), director of the ORA programme for the organisation of the rural areas of the DGXIII. It provides more flexibility to employees, reduces transport costs, improves the quality of life of citizens, reduces congestion in the cities, and does not degrade the environment. In wider terms it contributes to increase in regional development, through to the decentralisation of business activities. The French DATAR has calculated that each job transferred from Paris to a medium sized city in the interior of France represents a saving of between 48.000 and 110.000 francs each year, although transmission costs need to be subtracted from these sums.

In the United Kingdom, where there are more than three million teleworkers, the expansion of this activity is due not only to the extension of telecommunications, and congestion in London, but also to meteorological factors which are common to the countries of the North of Europe.

2.- **Distance education**. In Europe the pioneer institution (1988) in the application of telematics to education was the Open University in Britain, although there are now more than 2000 centres in the United Kingdom (Valle, 1994). In Spain there is a significant satellite based distance education project (ETSIT, Diaz, 1994).

3.- **A network of Universities and Research Centres which** facilitate linking of the intellectual and research potential of Europe.

4.- **Telematic Services for Small and Medium Sized Firms** to re-launch growth and employment in Europe.

5.- **Management of road traffic**. The recent development of the application of telematic services to traffic flows is exhaustively analysed in Giannopoulos' article, included in a volume published jointly with Gillespie (1993).

6.- **Air traffic control** and the creation of electronic air lanes for the whole of Europe.

7.- **Health services** using more effective and cheaper systems, to provide a more effective service for European citizens.

8.- **Electronic legal services permitting verification of communications** for more effective and economic administration.

9.- **Trans-European Network of Public Administration** for improved and cheaper administration.

10.- **Urban information highways** to bring the information society to the private consumer.

Europe has the option to create lines of support for the implementation of these applications, and the Group considers that it may be necessary to redirect the budget of the Framework IV Programme for Research and Development and Structural Funds (Europe y..., 1994 pp.23-35), while the primary active agents should be the private sector and market forces.

Following the Bangemann Report, the European Commission has prepared a document for the Council and European Parliament, the Economic and Social Committee, and the Committee for the Regions, which contains the Commission's work programme regarding the information society (Europe..., 1994).

4.- The Mediterranean regions and European information strategy.

As the Bangemann Report indicated, information technology and communications will profoundly transform numerous aspects of the life of the various regions of Europe, and these should be integrated while adapting measures to their particular characteristics (Battistón, 1994) At the same time new technologies will reduce the distance and isolation of the more peripheral regions. In this way new communication networks may become an important element in the territorial integration and local development (Gillespie, 1991). A number of programmes set into motion by the EU have the aim of reducing regional imbalances, and it is hoped that the availability of infrastructure will not limit the location of new firms, but rather that it will help to remedy deficiencies in R&D, reduce the isolation of firms which are located in the less favoured regions of Europe, and help to update their products and find wider markets (Europe y..., 1994 pp.9).

Small and medium sized firms suffer the greatest difficulties in integrating themselves into the information society, and they form the greater part of the European business world, there being twelve million such firms in Europe, many of which are located in the Mediterranean regions.

4.1.- The leading role of the cities and regions

In a world-wide economy (Castells, 1989) which has a productive infrastructure made up of the flux of information, the cities and regions are acquiring a more prominent role, as are the supranational areas, such as Europe, or even the world-wide market. The cities and the regions are more flexible when it comes to adapting to changing market conditions, and while they have less power than national government, they nevertheless have a greater capacity to respond by creating development projects (Castells, Hall, 94). In this regard Roque (1991) suggests that the various economic agents involved in regional co-operation often have a greater capacity to intervene than governments.

As Mateu has said (1994), it may be foreseen that there will be competition between cities, which will publicise their qualities in an effort to obtain investment in technology and research, or to attract highly qualified workers. The largest cities will be most favoured because they will be able to offer the most services, while the medium sized cities will make up for their deficiencies through urban programmes which make them internationally known, which is why it is usual to rely on internationally known architects. Examples of this are the work of Boffill in Montpellier and Motz, Foster in Barcelona and Nimes, and Bohigas in Aix-en-Provence and Bologna. The competition for the MasterPlan of BITpark in Palma, celebrated in 1994, attracted seven very well

known architects, resulting in a high international profile for the development (Parc BIT, MasterPlan, 1994).

This impulse towards innovation has its reflection in the Mediterranean zones, such as the French Midi, from Sofía Antipolis, through Montpellier, to Toulouse, or the new projects in the south of Europe from Bari to Malaga and Seville (Castells, Hall, 1994). Innovation and technology parks, with a capacity to generate and maintain a concentration of firms producing new products using competitive processes, located in or near these cities, have made development possible in these areas. Of the approximately five hundred such parks, there are one hundred and eighty in Europe, which have established themselves networks for regional development, with greater or lesser integration in the territories in which they are located. The French parks, and in general those of the Mediterranean basin, have evolved from the combination of an institutional concept with territorial development, co-ordinated by public initiatives.

The first in Europe were those in the United Kingdom, France and Spain. In Spain the French model has been imitated with a local accent, sometimes without any of the essential components which are features of scientific parks, and nearly all the autonomous communities, seeking regional development, are implementing or planning at least one, as is the case of the community of Madrid.(Expansión, 25-03-93).

In Spain the three most developed regions in the information technology sector are Catalonia, Madrid and the Basque Country (Garola, López, 1991). An analysis of technological development, on the basis of the residence of the first applicant for patents, shows a polarisation around Madrid and Barcelona, while the remainder is localised in the community of Valencia and the Basque Country. Another indicator of technological innovation is the percentage distribution between all the autonomous communities of projects approved in the three ESPRIT programmes. This also shows a concentration, as Madrid has 52%, The Basque Country 20%, and Catalunya 16% (Sector...,1993).

It appears that technological policy gives a greater proportion of grants to provinces with a larger number of projects, with a higher degree of development and greater entrepreneurial capacity. This technological policy, which reflects inequalities between the various regions of Spain, is also to be seen in a comparison between these areas and the more developed areas of Europe in the distribution of the Framework programme (Jordá Borrell, 1994). In this sense, and as Coronado and Acosta (1994) suggest, the search for efficiency in technological policy creates a vicious circle opposed to territorial convergence. It is worthwhile paying attention to compensatory technological policies, which while they are less profitable in the short term, guarantee the thrust of technological development in other less favoured regions.

4.2.- New Information Technologies and regional development.

The Mediterranean countries cannot ignore the need to be competitive in the context of a global economy. The member states which are on the periphery of the Community are not on an equal basis with the more central regions, neither in terms of infrastructure nor in services. For this reason aid programmes are being established with the aim of reducing the distance which separate the both groups of countries. It is, nevertheless, necessary to increase efforts to help peripheral states make the most of the opportunities presented by the "information society" (Garric, 1994), given that they start from a disadvantageous position.

The European programmes which are most closely linked with information technology are ACTS, which has replaced RACE, Telematic Systems, which has replaced STAR (Special Telecommunications Action for Regional Development) and ESPRIT (Information Technology). They form part of the Framework IV programme of the EU, the objective of which is the promotion of the quality of life and the ability of industry to compete (Sector..., 1993). There has been a considerable increase in the budget allocated to each program in comparison with the Framework III Programme, which is significant in the increasing importance of the Union of European industrial policy, and its acceptance.

The STAR (1987-1991) programme, and subsequently the Telematic Systems programme, represented a commitment to the development of infrastructure and advanced telecommunication services in the less favoured regions, and the period over which the

programme has been developed has coincided with the great technological advances in telecommunications, and with the ever greater involvement of regional governments (Tirado, 1994) in the promotion of local or regional development policies.

The STAR programme was managed by the General Directorate for Telecommunications, which allocated about 15,000 million pesetas to the supply of and demand for services, and more than 47,000 million to the creation and modernisation of infrastructure. It involved fifteen autonomous communities and their corresponding small and medium sized firms. "Telematic Systems" continued in the spirit of the previous programme, and involved the regions classified under Objective 1 of FEDER. The actions related to advanced telecommunication services were covered by the ARCO (Regional Communication Actions) programme. FUNDESCO (Foundation for the Development of the Social Function of Communications) participated in these European programmes with various initiatives, among which are Bus-STAR, Arco BUS and Arcobus II, which have widened the efforts made to spread advanced telecommunication services (Granger, Gaitán, 1994).

Together with the European programmes, each country generates its own strategies and action plans for the development of NICT. In Spain the *Plan de Actuación Tecnológico Industrial* (PATI) includes four areas: the international context, with the programmes already indicated, along with EUREKA; regional policy, channelled through the STRIDE programme and the initiatives taken by the autonomous communities; industrial policy, which incorporates specific plans and programs for sectors, such as the PEIN, PIT. etc., and, finally, the national plan for R&D, which commissions research projects (Sector...,1993).

Taking these European programmes as a starting point, projects are prepared for the development of the least advanced areas with the aim of stimulating scientific capability and indigenous technology, and ensuring that the less favoured communities are not marginalised in technological terms..(Umberto Colombo, 1991, 18, 19).

More than a third of European citizens live outside the cities, and this residential dispersion is accentuated in the Mediterranean areas. In the EU there are approximately 120,000 population centres, of which about half, 62,000, are in Spain, 32,000 of them being in Galicia. The location of population centres is an endemic problem for the extension of the telephone network, (F. Mayoralas, 1993), which may be mitigated by technology, and investment in mobile telephony.

The rural zones of Europe have problems of demographic decline and the absence of economic incentives. NICT can contribute to improving the information level of farmers, develop teletourism, now that rural tourism has become the second source of jobs in rural zones, and, through teleworking, rebalance the rural zones in demographic terms. Teleworking s the key application for rural development. There are more than 800 experiments in Europe in regional development, whose objective consists in the revitalisation of these zones. Of these, in the context of the Mediterranean, it is worth considering the MEDORA project.

This is a European programme which has two basic objectives, to characterise the distinct rural zones in the Mediterranean, Ireland and South East Germany, and to evaluate the market potential of telematic systems for these regions. It is implemented using the information from five Mediterranean countries (Greece, France, Spain , Italy and Portugal), Ireland and SE Germany, with MEDORA applications, and experimental data from another two, Denmark and the United Kingdom.

It is envisaged that the results will be: incorporated into a map of digitised rural zones; used to estimate levels of telematic system use in the Mediterranean and in zones throughout the EU, evaluate parameters for each rural zone through data files and maps, and estimate the market potential for telematic systems in each zone, and the volume of traffic, equipment and systems; develop the socio-economic and socio-geographic models available to guide decision making on telematic equipment; and, finally, to give substantial support to ORA projects on typology and data (Fundesco, 1993, 137).

Another strategy used by a number of autonomous communities in Spain with regard to telecommunications and advanced services has been the creation of White Books dealing with Telecommunications (Granger, Gaitán 1994).

The first of these was written in Catalonia in 1992, a region which forms part of the Mediterranean European axis which extends through the South of France to the North of Italy. Its economy is more advanced that the rest of the state, and it is an appropriate region to explore the capacity of telecommunications to influence ability to compete and to anticipate the installation of infrastructure and the creation of services.

In Madrid the White Book took the form of a strategic reflection on the impact of telecommunications on the quality of life of citizens (Tirado, Battistón, 1994). In 1994 the White Book for Galicia was prepared (Fundesco, 1994, n° 159), and this was the first community to achieve universal telephone provision, through the application of mobile telephony (Fundesco, 1994, n° 159); the White Book for Castilla-Leon has also been completed (Fundesco, 1994, n° 158), and work has now begun on the White Book for Asturias (Fundesco, 1995, n° 161). The White Books of Galicia and Castilla-Leon reflect the fact that significant structural inequalities are still to be found in these regions, which justify their inclusion as zones within Objective 1 of the Structural European Funds.

There are other White Books in preparation, among them one for the Balearic Islands, a community to which we will consider in greater detail because of the recent strategy for innovation which has been evolved there.

5.- The Balearic Islands as an innovative region. A recent European strategy.

The problem experienced by the peripheral regions of the Mediterranean areas is inability to reach the levels of technological competition achieved by the central zones (Jordá Borrell, 1994). If they wish to be more competitive they can encourage the growth of infrastructure and technological transfers, or they can generate a model of innovation. Castells and Hall (1994, pp.30) define an innovative environment as a system of social structures, and organisational, economic and territorial institutions, which create the conditions for the continuous generation of synergies and investment in a process of production which originates in this synergetic potential, both in terms of units of production which form part of the innovative environment, and for the environment as a whole.

In the present decade the Balears have opted to generate a strategy for innovation.

5.1.- Maturity of the model of tourism
The adjective which best describes the present economy of the Balears is tertiary, given that services generate more than 80% of national wealth. The transformation of the Island economy to a service economy has been a recent development which has stimulated rapid growth. Tourism has been the main stimulus in this process. The opening up of the European tourist market led to a significant increase in wealth, and since the seventies the per capita income for the community has been the highest in the state, and above the average for the countries of the European Union.

"Sun and sand" tourism, has, however, reached maturity, and future solutions point towards alternative forms of tourism, and a review of the planning and administrative arrangements for the most saturated tourist areas. These efforts should be directed towards the development of sustainable tourism, and the expansion based model which has been dominant up until now should be abandoned. The short and medium term objective is to create sustainable development in order to ensure future well-being and a higher quality of life in the Islands.(Picornell, Seguí, 1994).

The maintenance of these levels of quality and the challenge of facing the immediate future with a certain degree of competitive advantage has stimulated the preparation of the *Pla Estratègic de Competitivitat de les Illes Balears* (1994) by the *Conselleria d'Economia i Hisenda* of the Government of the Balearic Islands. This is the plan which is driving the strategy for innovation in the Islands, initiated at the end of the eighties and known as the BIT strategy (*Balear d'Innovació Tecnològica*).

As far as tourism is concerned, the sector which creates directly or indirectly more than 50% of regional wealth, this plan presents a series of links between tourism and the main vectors of competition. One of these consists of making the Islands a centre of innovation in the tourist industry through measures such as the introduction of telecommunications technology in tourist processes, establishing booking centres and network terminals for tourist information and marketing, and another envisages the promotion of the Balears as a Business Resort, with support for hotels regarding the infrastructure necessary for serving the supertourist market.

Overcoming the difficulties which are inherent in the geographical facts of insularity and a peripheral position may be made easier by the process of integration of the community, especially in the liberalisation of telecommunications, air transport and by the opening up of public markets. The distance to the peninsula and the mainland of Europe is less and less significant as modes of transport are diversified and telematic infrastructures become generalised, so much so that separation from the mainland becomes a unique feature which may be exploited. As Majó (1991) indicates, our integration as the node of a good information network presents competitive possibilities.

The Balears may anticipate in a rational and creative way the impact which new technologies will have on the organisation of work and the location of economic activities. This strategy is related to the growth in the number of foreign residents, and is fully compatible with the present and future reality of the Balears as an established tourist destination for Europeans.

5.2.- The strategy for innovation and the Megapark telematic project in the Balearic Islands.

This strategy for development and innovation in the Balearic Islands was evolved in the regional administration, specifically the *Conselleria d'Economia i Hisenda* of the Government of the Balearic Islands, in the late eighties (Govern Balear 1991). It consists of positioning the Balears as a privileged region, within Europe, in terms of quality of life This is one of the competitive advantages which it enjoys compared with other Community regions with which it cannot compete in terms of demographic and economic power. In an ever more global economic system, within the framework of the EU, it is necessary to find factors of differentiation which facilitate competitive advantages, which are not questions of scale, but rather of innovation and differentiation.

A number of factors may be mentioned as contributing to this quality of life, including proximity to the main cities of Europe by air. The Balearic Islands are, at present, one of the tourist zones of the Mediterranean with the best transport links to the countries of the European Union, to the point that the airport of Son Sant Joan is the second most important point of entry of tourists into Spain, only surpassed by La Junquera on the frontier with France (Picornell, Seguí, 1994).

Secondly, a mild warm climate and an attractive landscape, in which 33% of the territory is protected, are also environmental factors to be taken into consideration. The conservation of the environment in the Balearic Islands is one of the keys to competitiveness in the medium and long term, and so the preservation of the present environment is a matter of crucial importance for the future of the Islands. The main city, Palma, is of medium size and does not suffer greatly from congestion. Other factors might include infrastructure and equipment, which are adequate, and legal and institutional security, artistic and cultural characteristics, etc.

There are two main thrusts to this strategic innovation. On the one hand, quality of life, that is to say environmental strategy as a attractive force, and on the other, telecommunications networks. The present strategy is to integrate the Balearic Islands into the development of the information society, specifically in one of its elements or aspects, and innovation will concentrate on developments in the field of information technology and communications. It is intended to stimulate a dynamic, the effects of which will be felt in all the islands and in each and every economic sector(Govern Balear 1991, pp 8). The Balearic Islands offer good environments and locations for firms with highly qualified personnel, and the region has the opportunity to become a pioneer in the

development of teleworking, be it at home, or in satellite offices or in decentralised productive units (Govern Balear 1991).

The Balearic Islands have consolidated their position as one of the European centres for recreation, mainly in mass tourism, and they have the opportunity to become one of the centres for distance working, which could combine leisure with work. The strategy for innovation sets out to diversify the tourist economy through the emergence of new forms of tourism, of greater quality, although attracting fewer visitors, which will only be possible through the development of the NICT. For this reason it is vital to create a high quality network of communications linking the Balearic islands with the most dynamic parts of Europe.

The idea itself is not sufficient. The future of the strategy for innovation in the Islands depends on the capacity of the regional government to proselytise and motivate the business class within the Balearic Islands and beyond, in view of the international dimension, to participate in a project which has a real chance of success in the medium or long term.

- The Telematic Megapark

The two main elements in the regional government's strategy for innovation are the Telematic Megapark and the **Balearic Innovation and Technology Park (BITPark)**

It is proposed to convert the Balearic Islands a Telematic Megapark, through the introduction of telematic networks in most of the activities and ways of life in the Islands. Teleinformation networks will provide the support for high value added services, and eliminate the physical distance between the islands, and in this way the region may become a leader in the field of teleworking and distance communications (Molini, 1993).

In an initial phase, MegaBIT (1), the islands will be interconnected, and telematic applications, such as telemedicine, teleeducation and videoconferencing will be developed. In a later phase, MegaBIT (2), the islands will be telematically linked with the world by teleworking, holiday offices for combining work and leisure, and special association projects. In a final phase the islands will be established as a centre for holiday offices (Govern Balear, 1992a). The Telematic Megapark (Mega BIT) will be a substantial teleworking network, with electronic mail, videoconferencing, EDI, etc, which will have a Teleworking Complex, located in BITpark, which will combine residence, recreational areas and teleworking centres (Govern Balear, 1992 a).

There will be a number of consequences for the society in which these new services are established, including reduction in travel, an improved quality of life; reduced costs for firms; new social relations and cheap access to new technologies.

The *Universitat de les Illes Balears* (UIB) will be one of the key elements in the strategy for innovation. It has made a strong commitment to providing qualifications in information technology and telecommunications. This links the institution strongly to the future creation of a technological innovation park, and the attraction of high technology firms, given that future technological development depends to a great extent on the presence of high quality educational centres.

The role of universities across the world has not always been the same in the various strategies for innovation, although most technological or innovation parks include universities. Frank Giunta, director of the Richmond Research Center of Berkeley University, has commented that the presence of a university is increasingly important in the choice of location for a high technology firm. The most recent project in Spain is that of Alcalá de Henares, which is promoted by the Community of Madrid, IMADE, the University, and the municipal authorities of Alcalá. These institutions believe that the main element of added value in the project will be the relationship with the University, given that it will be constructed within the campus itself (Expansión, 25-03-93).

According to Castells and Hall (1994, pp.324), three types of synergy may be achieved between universities and technopolis. The most important consists of the generation of new knowledge, both in pure and applied research; providing high levels of

training to a sufficient number of potential employees (scientists, engineers and technicians) and, to a lesser degree, universities taking the role of firms.

The *Universitat de les Illes Balears* (UIB), can supply qualified personnel and other support, such as laboratories and resources related to the latest advances in multimedia, synthetic images, virtual reality, and GISs, to mention areas associated with NICT. At present UIB Computer Services supplies the computing support for the administration of the University, teaching and research. A number of multiple participant video conferences have been held, the most recent of which was in the context of a course delivered in Polytechnic University of Madrid and transmitted to three other sites in the offices of the state telephone company in Barcelona, Seville, La Coruña, and to the installations of the UIB. This project was organised in collaboration with the state telephone company and Silicon Graphics (Fundesco, 1994, n²151).

Computer Services of the UIB also provide external services, such as videotext, or access to data bases through the Internet.

- The Balearic Innovation and Technology Park (BITpark)

The BITpark project is the vanguard of BIT initiatives in the Islands. The regional government plans to construct a technopolis (to use Castells and Hall's generic term) to the north of the city of Palma, some 7.5 kilometres from the urban nucleus, in the Son Espanyol estate, adjoining the UIB, in an area of 150 hectares. The park is conceived of as a space which will combine work, leisure and accommodation by means of connection with telematic networks

The project is to be seen in the context of a constellation of technopolis which have proliferated in recent years throughout the world. These represent the attempt to offer a differentiated product in response to intense competition to attract high technology firms and mobile worker. Many of them have failed, which makes the relatively late establishment of the Balearic Islands project a potential strategic advantage, rather than a handicap. In common base with other technopolis, BITpark is seeking to differentiate itself in a number of respects, among which perhaps the most important is the judicious use of technology to improve the quality of life and to preserve the environment.

Research will be the foundation of the project, and one of the most important aspects will be that related to the problems of the environment. The park itself should be a model of sensitive development and urbanisation. As Castells and Hall (1994) have pointed out, the ideology of image and of high technology have become powerful elements in the new type of regional policy, since the projection of an image is itself an key factor for success in today's competition for economic and cultural success. The park will include provision for leisure, work and accommodation, and because of this training and research centres will be sited in the park, along with intelligent accommodation for professionals, an advanced residential complex, sites for the location of firms and innovative institutions, and support services for productive activity.

5.3. The development of the BIT (Balearic Innovation and Technology) strategy

The development of the strategy for innovation was initiated by the regional government at the time when the single European market was being established, which deregulated transport and communications, and when the Delors White Book on achieving the information society was being prepared. The model of innovation implemented in the Balearic Islands is fully compatible with the objectives of the new dynamic to be followed by the European regions.

The BIT strategy for the development of telecommunication networks and telematic services consists of favouring endogenous and horizontal aspects of telematics which can be applied within the industry itself, services and the Community. This will confirm the identity of the Community as a telematic region, and be announce that the Islands are an appropriate place to consider when firms are considering where to locate.

A group of initiatives have been established on various fronts, many of them with support and funding from European institutions, which aim to generate favourable opinion to the BIT strategy, to develop territorial actions within the BIT framework, and to establish the telecommunications infrastructure and telematic applications which will

generate demand and create a need for these networks for a large number of residents and non-residents of the Islands. These actions have, inevitably, been undertaken in collaboration with the state telephone company.

- **Symposiums and conferences** and other forums of international debate have been held in order to create a critical mass in the business community and society in general which will generate demand and a need for telematic services.

It is worth mentioning, for example, "The Balearics 2001, New horizons, New challenges" (1993) programme, the subtitle of which proclaimed the Balearic Islands as the holiday office of Europe. This meeting was partially supported by the European Commission Telework Forum (ECTF, de the DGXIII). "The Global Economy and Telecommunications" (1993) was another forum for debate, which analysed the role of regional development in the context of the new world-wide economy, and the experience of the United States. In the present year the annual conference of the European Commission for Teleworking (ECTF) was celebrated in Palma, which analysed the repercussions of telematics, innovation, and new patterns of work and life in Europe (Telematics and Innovation. ECTF Annual Conference). In 1993 the Government of the Balearic Islands' project was presented in Japan at the fourth Kobe high technology conference, "Technology, Entertainment, Design", which is one of the most prestigious conferences in the world.

In the development of the most recent TECNOTURISTICA (International Assembly for Tourist Sector Services, 1994) a day was dedicated to the presentation of European projects which applied telecommunications and information technology to the tourist sector. Telematic technology can support the tourist sector in many ways, such as information kiosks, multimedia, videotext, reservation systems, etc. (INfo CE, 10). Recently (April 1995) sessions have been held concerning the use of EDI in tourist firms, as exemplified by the BIT strategy.

For its part the White Book for Industry (1993) devotes a significant amount of space to the development of NICT and the BIT strategy. One year later, the *Pla Estratègic de Competitivitat de les Illes Balears* (1994) appeared, with the strategy for innovation fully evolved.

- In terms of **territorial strategy**, at the end of 1993 the legal formulation of the BITpark was completed, and the public competition for proposals for the siting of the park was opened. A competition was announced for international ideas on the design of the park (May 1994), as a result of which Palma gained international attention, as a number of world famous architects participated (ParcBIT, Masterplan, 1994).

Norman Foster and Oven Arup, well known in Spain for the Collserola communications tower; Richard Rogers, joint designer with Piano of the Pompidou Centre; the Hiroshi Hara from Japan, joint designer of the Parc de la Villette in France and the Cité International in Montreal, Fred Cotter from the United States, creator of Port Greenwich on the banks of the Thames; Skidmore, Owings & Merril, designers of the Sears Tower in Chicago; Michel Mossessian, together with Desvigne and Dalnoky, designer of the Renault Technological Centre. To these may be added José Miguel Prada, the only Spanish architect who is recognised in the United States for his contribution in ecological matters, and creator of El Palenque in Sevilla: and Elías Torres from Ibiza, who is the most well known architect from the Balearic Islands. Two architects based in the Balearic Islands, Emilio Nadal and Antonia Mayol's team also participated

The documentation giving information on the geographic character of Majorca, Palma and Son Espanyol was presented to the architects in the form of a CD-ROM prepared in the UIB (ParcBIT, 1994) and prepared jointly by the Department of Earth Sciences, the GIS laboratory, and the Department of Mathematics and Information Technology. This was the first time in an international architectural competition for overall concepts that all the territorial information had been presented in digital form —the CD-ROM included the DXF of Son Espanyol—.

Another of the objectives of the regional government has been the construction of a **Centro BIT** in the Raiguer region, a zone categorised under Objective 2 -areas in the

process of industrialisation-. A technology centre will be built, with provision for establishing new firms, modules for training professionals, and a resource centre. In the BIT Centre advanced technologies will be taught and access to information networks provided. 130 proposals for the construction of the new building have been received from architects from all parts of Spain.

- Initiatives related to the **extension of telematic networks and applications** have been more numerous, and the most significant will be mentioned here.

- Arcobús II (an initiative within the programme of Regional Communication Actions, ARCO). This is not an initiative of the regional government, but rather a touring exhibition on advanced telecommunications services which since the end of 1994 has been travelling around the provinces which are not categorised as Objective 1 of the FEDER since the end of 1994, with the aim of amplifying the work carried out with advanced telecommunications services in the 15 most developed provinces of Spain. The first city to be visited is Palma (Fundesco, 1995, nº161; Granger, Gaitán, 1994; García Pérez, 1994).

- An agreement has been established between the regional government and the state telephone company to create a pilot project which will make the Islands the autonomous community with the most advanced telecommunications network in Spain (DM19-03-95). The telephone network in the Balearic Islands can compete with that of other European regions. It has 49 lines per 1000 inhabitants, while the average for the state is 34, and efforts have been concentrated on the establishment of advanced telecommunications services. The measures established by the state telephone company include:

- Extension digital telephony to 100% of lines.

- The disappearance of non-urban tariffs for the installation of telephone lines. Between 1994 and 1996 10,000 lines are to be installed at urban prices in peripheral areas of the region, subsidised by the regional government.

- The installation of GSM in mobile telephony, to make mobile communications available to a proportion of the eight million tourists.

- The installation of the PENBAL 5 optical fibre cable between Majorca and Minorca (DM-06-04-95). At the moment the Balearic Islands have four submarine optical fibre cables, known as PENBAL, connecting them to the peninsula. MAT 2 communicates with Palermo, linked with the Mediterranean and receiving international traffic. PAL 1 links with Algeria (DM19-03-95). The islands are integrated in a network of cables in the Mediterranean area, which reaches through other cables, such as EMOS, France, Corsica, Greece, Turkey, Israel and Geneva-Sardinia. Other submarine cables, such as the TAT, link Spain with New York. Spain is fully integrated into this network of cables and plays an important role as an intermediary between the Mediterranean area and America.(Hottes, 1993).

- There will soon be 2,500 basic ISDN connections. ISDN has been in operation in the Islands since 1994 and its installation was initiated in the city of Palma. In 1995 it is being extended to cover Ibiza, Mao, Ciutadella and Formentera. In 1996 Palma installation in Palma will be completed and extended to Inca and Manacor (UH 05-03-95). Hotel chains, travel agencies and bank corporations have shown their interest, given that ISDN supports a wide range of added value services which involve the transmission of voice, images, videoconferences, caller identification, and many other applications related to teleworking and teleinformation, etc.

- Creation of **centres for telematic applications and services** by the Government of the Balearic Islands, of which BITEL (*Balear d'Innovació Telemàtica*) is perhaps the most significant. This is the only policy making body which ensures co-ordinated action in projects related to telematic innovation. The services and applications to be developed will be very diverse: a major emergency telematic centre; electronic mail; EDI electronic legal services; Internet server; video conferencing and electronic mailboxes, with applications to tourism. BITEL intends that the better quality hotels will incorporate this service (DM 19-03-95).

- The EDI Awareness Centre of the Balearic Islands (1993) was created as part of the EDIBALEAR project, partly financed by the TEDIS European programme. It belongs to the European Network of Awareness Centres, and its functions include the promotion of EDI in firms and public administration, organising seminars, studying international standards, and participating in Community projects such as: EDIBALEAR I (1993), EDI BALEAR II, and III, (1994-95), Comtec (Programa Comercio 2000); The European EDI Inventory (1993-94), TEDIS EDI Information project (1995), EDREC (EDI Reference Centre, 1994-95), Euro-SPREDI (1994-95).

- Implementation of EDI. The Government of the Balearic Islands is the first administration to have regulated EDI for its own use (DM 24-10-94). EDI in the Balearic Islands is endorsed by the support of the EU (Programa TEDIS) and the UNO (EDIFACT standards). At the present time the government-has EDI connections with the state telephone network, and very soon this will be extended to the Sa Nostra bank and other firms in the tourist sector, with preference to providers who use the system.

- Electronic legal services. As a consequence of EDI, and so that exchanges have legal status, it has been necessary to implement an electronic legal service integrated into the system of public notaries. This project was established by the *Centre d'Estudis del Dret de the Informàtica de les Illes Balears* (CEDIB) (DM 24-10-94), and it demonstrates how the introduction of new technologies creates new legal problems (Roque, 1991).

- Other types of BIT services to be implemented in the near future are *Telegovern* and BITUR (Balear de Innovación Turística). This telematic service for users in the tourist sector (composed of hotel chains funded by the EU) has created a unique information system for travellers throughout Europe, accessible by users in any country (DM 24-10-94).

- Finally mention must be made of the recent establishment of the **Telematic Institutes and Study Centres.**

- *Centre d'Estudis del Dret de la Informàtica de les Illes Balears* (CEDIB) (1994). This was established to promote study of the legal framework governing information technology and juridical computing in the courses delivered by the Universitat de les Illes Balears, to assist in the training of specialists, and to encourage interdisciplinary activities. It is one of the bodies which has supported the creation of the electronic legal services project (EDI).

-*Institut Balear d'Innovació Telemàtica* (IBIT).
This has been an integral part of the *Conselleria de Economia i Hisenda* ministry of the autonomous community since the strategy for innovation was set into motion. It is concerned with the study, design and promotion of strategic actions, and the organisation of education, training and publication of matters related to NICT.   -

6.- Final reflections

In process of writing a chapter such as this, which is basically descriptive, one is forced to make a series of reflections concerning the onset of the information society.

Communication networks are not a panacea which can solve all regional imbalances and contribute directly to wealth generation and economic development in the peripheral regions. Their development, nevertheless, can help to mitigate the isolation of areas or zones in which they are established, and not only physical or territorial isolation, lessened to some extent by the transport network, but rather the economic and functional deprivation of the less developed spaces. Networks of information replace geographic centrality with the centrality of information fluxes. Access to information can bestow centrality on peripheral spaces, but the problem is in gaining this access, as these less favoured regions tend to lack adequate infrastructure, sufficient technological support, appropriate services and the applications necessary to compete on equal terms with more central regions

Because of this, one of the variables which it is important to bear in mind when analysing the impact of telecommunications in the territory is that the establishment of such networks, services and applications does not occur in a vacuum. The territory on which they are installed already has structures and hierarchies, a specific social fabric, dominant economic activities, a polarisation created by one or a number of cities and a

group of economic agents, which may be more or less favourably disposed to the development and spread of NICT.

The action plans developed by regional and state political authorities, together with the channelling of aid and incentives for the extension of innovative strategies, also differs between the various peripheral regions. As the regions are not uniform, neither are the economic, social and economic consequences of establishing these networks within them.

Another factor to be born in mind is the costs generated in the establishment of this information society. It is true that society becomes dematerialised through the virtual exchanges which occur in the territory, in effect eliminating distance, and that time as a measure of space disappears because access to information is instantaneous, but nevertheless all this is accompanies by real costs incurred in the establishment and use of these networks, and not all regions have such resources available.

The transformations which are approaching in the Single Market following deregulation of telecommunications services, including telephony, may be extraordinary. The regulatory mechanisms of the new supply and demand will be the market mechanisms themselves, given that the European Union is avoiding all dirigisme and interventionism in the establishment of the information society, and is relying on the private sector to be its true builder. It is enabling the mechanisms and programs required to provide less favoured regions with infrastructure, that is to say, to trans-European networks, which will permit them to initiate new information services.

The Balearic Islands, a preferred tourist destination for eight million Europeans, have been developing a strategy for innovation, since the start of the nineties, which aims to impregnate all sectors of economic activity in the Islands and the various territorial units of which they are constituted. The Balearic Islands are a clear example of the emergence of areas which have until now been considered peripheral, those situated to the south of Europe, in the western Mediterranean, and which are affected by the processes of deconcentration and counterurbanisation of the central areas.

The final goal is to maintain the ability to compete with other European regions and diversify the economy. Communication networks are proposed as the basis of this strategy, which will immediately lessen the territorial isolation of the archipelago, and make the Islands a focus of the information highways.

The remarkable physical environment, and the provision made for tourism, mean that the Islands possess significant capacity for the development of a network of teleworkers and holiday offices. The future BITpark, sited in the city of Palma, will be the vanguard of this strategy. The territorial disadvantages inherent in insularity may be turned into competitive advantages, and into factors of differentiation from other tourist destinations, because of the telematic networks which permit the combination of leisure and work. The BIT strategy constitutes a strategy of innovation in the medium and long term which aims, on a number of fronts, to extend networks, services and telematic applications, create demand, and generate favourable opinion towards these developments.

European funds will do no more than assist in the start up, and success depends on the magnetic effect generated by the movement of qualified professionals, and firms involved in NICT who decide to decentralise some of their services.

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