ACTION PLAN
FOR THE INFORMATION SOCIETY IN ATTICA

OPTIONS PAPER

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0. Executive Summary

This document ("Options Paper"), is the result of the collaborate work of the ATHINA project consortium, an initiative co-funded by the European Commission in the context of the "Article 10 of the European Regional Development Fund and the Article 6 of the European Social Fund".

The ATHINA project mission is to raise awareness for the issues pertaining to the Information Society and the way towards its building. The mandate of the project is for the Attica region and specifically for the urban conglomeration of Attica Basin.

The approach followed by the project for this document, consisted of a thorough investigation of the current status in the said area, with respect to the structure of society and economy, the introduction of new informatics and communication technologies (ITC), infrastructure investment plans, educational production and development plans. Based on these, the project team conducted a SWOT analysis and defined a first list of issues for which it will call the broadest possible public comment. The issues raised do not concern so much to technical or infrastructure aspects. Rather the focus is placed on policy and administrative issues, believing that the critical path for realising the economic and social benefits for all citizens lies principally in the active participation and the involvement of everyone in the process.

The Attica Basin has a special weight in the country. Apart from the obvious characteristic that it hosts the whole Central Administration of Greece and in it are living and working 1/3 of the country's population, it is the powerhorse for almost all economic, educational and industrial activities. As an example in the Information Technology sector (which evidently plays an instrumental role in building the Information Society), out of the 50 biggest companies of the country, 49 operate out of Attica. Furthermore, it is the base for most large corporations, the Central Administration and the Utilities of Greece, (i.e. the entities which will lead the way towards the Information Society). Therefore, the responsibility of the driving forces of the region, is not only to the citizens of Attica but also to all Greeks.

There are certain key points which will have an effect in the process : the economy consists mainly of a very large number of very small companies with limited access to international markets, know-how or investment muscle - there is a considerable polarization of income among the citizens of the region which also reflects employment and unemployment patterns - the per capita investment on IT is the smallest in the EU (albeit larger than the national average) - the IT industry shows a steady but not sufficient growth. In addition, it seems that despite the recent developments in state plans for large IT projects, the role of the Government and other public authorities has not been clearly defined in the process for developing the Information Society.What looks as most important, the cooperation of the parties involved (Government, the private sector, unions, the academia, etc.) is still quite vague, with no specific plans for policy options.

Looking at the experience of other countries, and also at the Greek experience of developing TV & radio broadcasting , the Internet and the IT sector, it becomes apparent that there is still a long way to go in practically every aspect of the Information Society. The most important findings are :

- The lack of a technology-based culture, as a basis for economic growth and reinforcement of the social fabric.
- the low level of per capita investment in IT.
- the necessity for considerable institutional and organizational reform required for implementing Information Society applications.
- The fragmentation of the economic basis, which consists of a very large number of SMEs, a large number of free lance and self employed professionals and workers.
- the urgent necessity of alignment of the educational production with the market requirements.
- the legal framework in existence does not provide adequately for protection of individual rights (privacy, non typical forms of work as well as copyright and Intellectual Property Rights).

On the other hand the Attica basin contains the best resources available in the country, in terms of expertise (technical and operational), as well as educational and cultural. In combination with the fact that almost 36% of the country's population lives and works here, the region shall definitely lead Greece in deploying Information Society services.

The Information Society is an important promise. However, in order to fulfill this promise, it is important that all Greeks benefit from its development, by having affordable access to its services. Moreover, there is a splendid opportunity, that Information Society be used in a manner which will reinforce the economic and social fabric of the society to the benefits of all Greeks and all citizens living here. In order to do so, a broad consensus is required from the state, the labor representatives, the private sector in general and the ITC and media companies in particular. This consensus should be based on the principle that Information Society cannot be guided solely by market forces but also by the concern for the public good and the protection of the national identity and culture.

The role of the state with all its ramifications (Central Administration, Local Authorities, Utilities etc.) is instrumental, not as in the past, by subsidizing the development of services and most of the infrastructure required, but by leading the way giving the example using novel methods and applications for improving the quality of services provided to the citizens. Moreover, the initiative for legal reform where needed (protection of non standard forms of employment, educational and copyright reform) rests to the state.

In Greece, much like in other EU states, the Information Society has started to emerge and take a shape; blurred but nevertheless without any doubt. Telecom infrastructure achieved the levels of digitalization and density of the EU average, mobile telephony is commonplace, networked applications of large scale are deployed. All these represent investment by both public and private sectors. This mix is inevitable in the future. The financial burden of the Information Society shall be born by everybody, the state budget, the private sector, the advertisement sector, the consumer. What is not clear are the priorities and the direction of the developments. This task should be undertaken by an initiative of the state. The ATHINA project, believes that the time is ripe for an open forum, under the auspices and control of the Parliament of Greeks, which will lay down specific initiatives for legal and institutional reform required as well as development and deployment of new services.

The framework under which the Attica Region and eventually the rest of the country will move towards the establishment of Information Society, should be technology neutral, in order to enable and encourage open and fair competition as well as to provide for the accomodation of emerging technologies, but also should ensure that all Greeks benefit from the rapid changes the new technologies are promising. Equally important, it should provide protection of our national identity and culture.

The ATHINA project encourages the planning and deployment of applications of high importance for the common good, such as telemedicine, electronic libraries, electronic commerce for the state purchases etc. Initiatives of this type are already under way in several crucial domains. Bolder steps are needed, as well as (much) better coordination of resources. It is apparent that investments of this type, have a secure pay off value. Moreover, this stepwise approach will provide the opportunity to refine and optimise the process on the way ahead.

1. The Project ATHINA

ATHINA (**Action Plan for the Information Society in Attica**) is an collaborative project conducted within the context of the European Commission's RISI (Regional Information Society Initiative) program, itself a component of the *Article 10 of the European Regional Development Fund and Article 6 of the European Social Fund* program. The European Commission awarded the ATHINA contract to a consortium led by the Municipality of Athens Information Technology Company (DAEM) and having as members the Hellenic Telecommunications (OTE), the National & Kapodistrian University of Athens, the Manpower & Employment Organisation of Greece (OAED), the Prefecture of Piraeus and the Local Enterprises of Piraeus (ANDIP). As associated partners act Intellserve Ltd and APEX SA. The ATHINA project represent a 500.000 ECUs investment, financed partly by the European Commission and partly by the consortium itself.

The ATHINA project belongs to a family of 23 similar projects conducted in various regions of the Union. These projects constitute regional initiatives and complement the efforts towards defining a European Information Society, conducted by the European Commission itself and by the national administrations of the member states as well as other forces of the European private and public sectors.

The RISI initiative and therefore the ATHINA project, has a dual objective :

1. The definition of comprehensive Strategy Plan for the regional development of the Information Society concepts, taking into account both the international and European developments as well as the «local» characteristics and concerns.
2. The creation of awareness amongst decision making bodies of the regions involved about the issues involved in the way towards a radically different society and therefore accelerate preparatory actions and social and financial reforms required.

This document is a first step towards the first goal described above. It is an «Options Paper», i.e. a description of the issues as perceived in the broad discussion conducted all over the world and in Europe in particular and a situation analysis of Attica with regards new Information and Communication technologies as well as human factors involved. The authors are making also an attempt to lay down issues and priorities which should draw the attention of the Greek decision makers in order to prepare the country, its citizens and all those living in it for the Information age, in cooperation with the other European nations.

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2. The European View of the Information Society

2.1 Preface

The rapid evolution of information, media and communication technologies in the past two decades created some unprecedented changes in the way people communicate, entertain themselves and conduct their business. In certain aspects of the daily life, these technologies enable activities which were unimaginable just few years ago. A notable example is the way financial markets operate today.

Eventually, the term "information society" has been coined. Although there are some terminology differences in Europe, North America and the Japan (which reflect a somehow different philosophy), the terms "information society", "information superhighways" etc., in essence represent the same thing : The ability of people and organisations of any type to communicate, to access the world's commercial, entertainment and educational resources over a universal network linking them together.

This vision is becoming reality with a speed unknown to the human history. It would be almost impossible for most people to conceptualise it, had it not be two major, technology-related developments in the last years : TV and the Internet. These two technologies gives us not only a manner to understand what we are talking about, but also, to have some insight to the issues involved. And the issues, are both in sheer numbers and in complexity, mind boggling. They are touching practically every aspect of our lives. In this context and in particular, given the very nature of the information society, it is impossible to address them in the framework of a single state. The issues and they way we have to address them, are universal.

The Information Society, in our view, is not so much about information as it is about communication in both its narrowest and broadest senses. It is not a cold and barren Society with exits and entrances that carry traffic, but ... *a personalised village square where people eliminate the barriers of time and distance, and interact in a variety of different ways*.

Electronic networks and services are putting the world's information and entertainment resources at our fingertips. They are transforming the ways we work and do business, the ways we study and do research, how we educate our children and retrain ourselves, and how we bank and pay our taxes. Networks and information services are vastly increasing the options available to us in education, health care, government services, and cultural and community activities.

The Information Society is a metaphor for the host of possibilities involved in the capture, storage, transmission and reproduction of information, whether it is text, visuals or sound. Through the rapid innovation of digital technology – the manipulation of data at high speeds – written information is not limited to the medium of paper; sound computerised recording is not limited to vinyl records; and audio-visual storage is not limited to film or videotape. These different methods for the storage and transmission of information have been replaced by the same digital codes used in computers. Computer
and compact disks have become a new medium for text and audio transmission. (In Greece, 90% of the computers sold in 1996, were equipped with CD-drives, the new prevailing medium for data transferring). Video will soon follow.

This paper uses the term "information" in its broadest sense, to include such diverse content as movies, data bases, messages, pictures, music, programming – anything available on our communications network. Sources of information include the government, libraries, universities and other cultural institutions, broadcasters, commercial information providers and individuals.

It means that producers of information services, whether voice, text, video or multimedia, have the potential to transmit information by a variety of communications networks. Coupling this potential with the interactive design of computers means rethinking and restructuring our traditional telecommunications and broadcasting industries. It means a revolution in how we entertain ourselves,

how we are educated, how we receive and create our news, and how we interact with each other, business and government. It means an enormous choice among entertainment and information products, new opportunities to create business, social and cultural alliances, and new possibilities to strengthen the participatory nature of our democratic heritage.

Greece, with its geography and unevenly spread population, can benefit from technological advances which reduce the effect of distance on economic, cultural and social activities. Network-based applications and services can also enable economic and social growth in small towns and rural areas as well as in cities.

New technologies and new media will present new opportunities and new challenges in the way we disseminate and access information and content. The Information Society will enhance communications and information exchanges among Greeks, and between Greeks and the rest of the world. *However, the Information Society must be developed in a way that ensures Greeks have access to the services they want and need*.

Apparently, this task is enormous. It requires a widely accepted consensus between the social partners (government, businesses, unions, citizens) and all these within the context of the international developments. The purpose of this project and of this document in particular, is to give some directions and possible options for the next step towards the information society in the Attica Basin. This attempt is done having in mind the society, economy, educational and entertainment structures of the area as well as those of the rest of the country.

Statements made in this document (in its analysis and in its conclusions) are not and cannot be complete, accurate or final. They simply represent the opinion of the authors *at a certain point in time* given the resources they have at their disposition.

2.2 General

All aspects of today's society - lifestyles, wealth generation and distribution, work and government, will change radically due to rapid technology convergence and globalisation occurring in the fields of computing, entertainment, communications and consumer electronics. A vision of the **Information Society** is required to understand and properly manage these changes which otherwise have the potential to de-stabilise society.

In the Information Society, traditional forms of activity such as agriculture and manufacturing industry will not be displaced, but a world-wide **Information Market** selling information services will result in benefits to most commercial activity. Markets will move from places to networks, consumer bases will be widened and a closer relationship will develop between suppliers and their customers.

In Europe, there is a widely accepted notion that the Information Market needs to be expanded beyond consumer information and entertainment services to include socially useful applications such as education, health and social welfare. These should enable new lifestyle choices supporting individual freedom and personal self-realisation. They should be made available to all sectors of society. Both businesses and individuals need to develop the skills to take advantage of new opportunities and avoid the emergence of a new info-illiterate class.

The well established understanding that all activities are confined within geographical and national boundaries, will become increasingly irrelevant. New forms of **regulation** will be needed to police commercial activities and protect the rights and privacy of individuals. Regulation can no longer be solely the responsibility of national administrations, but must be trans-European. The form of this regulatory environment will greatly affect the development of the European Information Infrastructure.

The physical **Information Infrastructure** that underpins the Information Society will be developed from today's telecommunications networks. Major investment in new fibre access networks and

distributed computing environments is, however, required. The European Public Network Operators (PNOs) are in a prime position to implement and manage the **European Information Infrastructure - EII.** However, with increased completion and liberalisation of the telecommunications market, there is concern about how the new Information Infrastructure is to be financed.

ROLES OF KEY PLAYERS

The roles of some readily identifiable key players of the Information Society are:

1.Users.   Businesses, professionals, semi-skilled and residential consumers of information. **Business Users** will exploit new opportunities such as virtual companies and globalisation. They will expect applications that support distributed work groups and teams and will exploit new opportunities for consumer research and services. **Individual Users** will be composed of professional, semi-skilled and residential consumers. They need to gain a proficiency in the new technology, a failure of which will create new social divisions such as computer and info-illiteracy. Privacy and security measures are important.

2.Service Providers.   Those who retail and package services and applications to end Users. In the Information Market, consumers will have a choice of Service Provider. Customers will be looking for packages of features, products and applications meeting a spectrum of needs. These will be provided by **Service Retailers and Service Brokers.** The service retailers' role will be to manage the availability of services and applications as well as providing the necessary support activities to the customer. **Service centres** will be the focus for the development, supply and management of the new information services and applications. They will be the key component of the Information Infrastructure as the switch (telephone exchange) was of PSTN.

3.Information Providers.   Those who create and supply new and existing information across a broad range of media types. A rich diversity of Information Providers, new and old, will appear in the Information Society, differing not only in size but in degree of commerciality. These will include people at home who will by-pass traditional distribution channels, making their products and services directly available to other Users.

4.Network Operators.   Those who provide and manage the physical infrastructures of the Information Society (OTE, Panafon, Telestet in Greece). These include communications networks (fixed and mobile) and information processing platforms. The **PNOs** traditionally provide and manage telecommunications services and networks platforms. Through liberalisation and competitive activities, the PNOs have to compete with new Network Operators and reduce the price of information transport while meeting existing obligations. The issue is raised whether Network Operators will be able to fund the building of the new Information Infrastructure while providing a viable return on the investment. Concerns are expressed that the rapid growth of new networks may produce a surplus of capacity, leading to market instability and lack of revenue to support new developments.

5.Political Authorities.   Global, trans-national, regional, national and local decision makers. Political Authorities at present are passively relying on commercial enterprises to provide the Information Society. Provision of socially useful applications will require direct public policy intervention. In particular the provision of education and opportunities available over Information Infrastructure to deprived sections of society will prevent the perpetuation of poverty in these areas into the next century. **Universal Service Obligation** in this future environment needs to be examined. The current obligation on PNOs will have

to be extended or shared with other players in the Information Society. **Mechanisms of regulation** must be standardised, including those involving the media industry and technology Manufacturers.

6.   Manufacturers. Those who provide hardware and software for use within the Information Infrastructure.

2.3 Move to a Post- Industrialist Society

Currently the developed nations (i.e. the major world economic areas, North America, Europe and Australasia) are experiencing subtle, but significant changes occurring within their societies. These changes are caused by such diverse trends as: new social behaviour; changing political priorities; rising unemployment; increasing leisure expectations; focus on individual aspirations; rapid technological innovation; business globalisation; economic uncertainty and increasing environmental awareness.   The free and rapid exchange of information can now be seen as a fundamental mechanism in facilitating and in some cases driving these trends. In many respects these developments can be regarded as a liberalisation and empowerment of the individual.

Since the recessions of the 1980s the traditional manufacturing industries of Europe have been going through a period of major restructuring. In part this has been driven by the need to remain competitive in the face of increasing global competition from the Far East. Greater production efficiency has been achieved through increased automation, improved manufacturing processes and the merging of commercial activities within a particular sector. Today the manufacturing base is under the control of multi-national companies. These companies, through their financial and political influence are able to position their activities around the world so as to develop their goods and services at the most economic costs. One consequence of this globalisation is that industries once the source of affluence in many Western countries will employ (globally) fewer and fewer people.

A significant trend during the 1980s was the move towards service-based industries in sectors such as finance and leisure. Now increased competition, partly through greater liberalisation, has meant that companies within the service sectors are also undergoing radical re-engineering to take advantage of new Information Technology and Communications (ITC) facilities. The result in many Western countries is higher unemployment, less long term employment and fewer opportunities for the young.

A radical change is occurring in the economic activity of Western societies that has the potential to undermine the source of affluence and welfare of many people in the Western World. Society has to come to terms with the move to a post-industrial era.

2.4 The Information Revolution

Computing technology is having an all-pervasive reach into the fabric of everyday life. Processing devices are found everywhere, in washing machines, video recorders and cheap throwaway watches. The desktop Personal Computer (PC) of the early 1980s has grown from a typewriter replacement to an interactive, multimedia workstation. The mainframe computer, once the backbone of many data processing departments, has been replaced by smaller, cheaper, more powerful networked computing systems. Modern communication brings global events as they happen into the living rooms of millions. To entice the consumer to purchase their products, advertisers are accumulating personal details on individuals, which may often surpass that held by national authorities.

For many people the new technologies are offering the opportunity to restructure their own lives. Individuals are experiencing greater flexibility in personal lifestyles, with greater choice being offered to them over the products and services they wish to purchase. Products derived from new ITC technologies are providing new forms of entertainment and business opportunities.   Even the mechanisms of government may take advantage and this will have the potential to reshape the form of our democracies.

These changes have been under way over the last two decades, but the impact is now being felt across all of society. Commentators are labelling this the Information Revolution. This will be a revolution, not just within an information context, but in the way that our lives and work are evolving. If it is really a revolution, like the earlier agricultural and industrial revolutions, then it is very likely to de-stabilise the structure of today's society. In its place a new Information Society will grow, although what it will look like is still highly speculative.

For this revolution to be beneficial there has to be a balance within society between the market aspects and the responsibilities to the members of the community as a whole (see Figure 1). For example wealth has to be generated but not to the detriment of society, as a whole.

Figure 1 The Information Society Balance
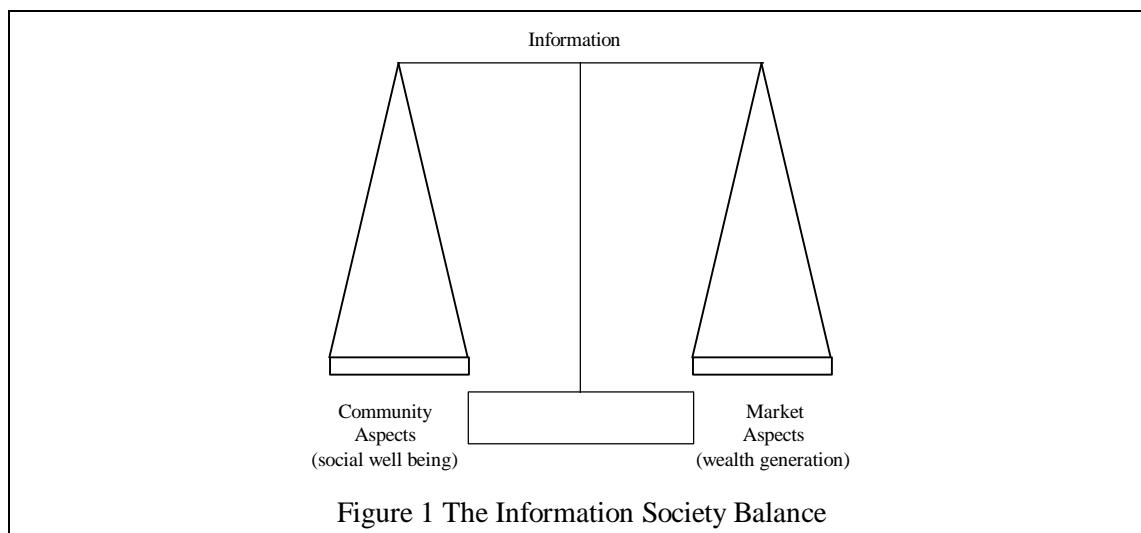
Key Issues

- Free and rapid flow of information is essential for a modern society and economy
- There will be major changes in the way that we live and work
- The Information Revolution may de-stabilise today's society
- The pace of technology change is greater than the ability of the PNOs to economically deploy new products

2.5 The Information Society

This chapter states the generally accepted vision about the impact of the Information Revolution on the world up to 2005. It does this by trying to understand the role of some readily identifiable key players, these being:

- Users
- Service Providers
- Information Providers
- Network Operators
- Political Authorities
- Manufacturers
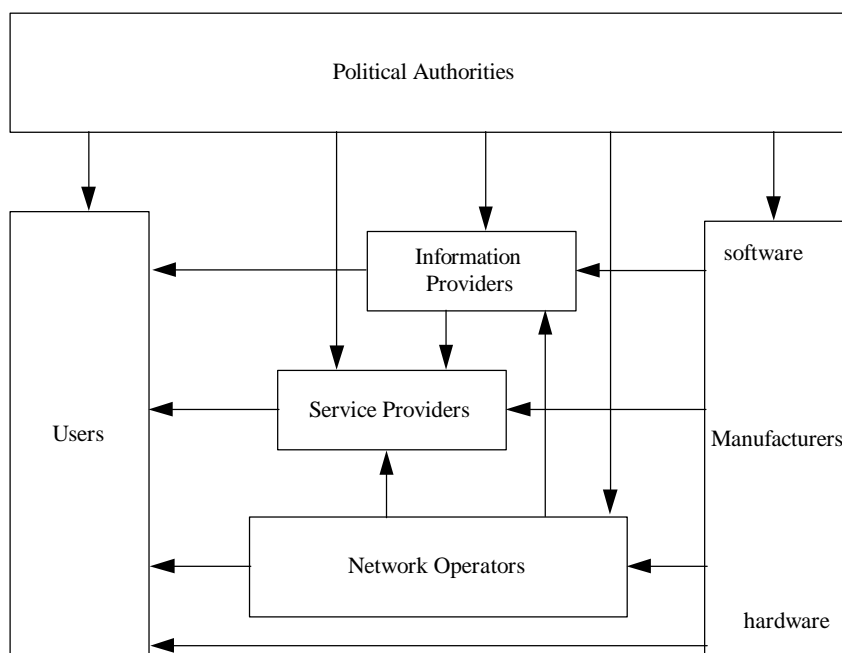
Figure 2: The players in the Information Society

Figure 2 shows some of the major interactions between these players. Political Authorities for example, will have an impact on all the players in the Information Society. Service Providers are supported by the networks operated by the Network Operators. Service Providers are likely to be the retail operation which provides Users with access to the content material provided by the Information Providers. The Service Providers operate over and above the basic telecommunications offerings of the Network Operators. Manufacturers supply hardware and software to the Network Operators, Service Providers, Information Providers and Users.

The development of an Information Society within Europe is not just about introducing new consumer information and entertainment services. It is about enabling new lifestyle choices providing more individual freedom and a higher degree of personal self-realisation. No-one should be made to feel alone or isolated in the Information Society.

The first elements of this new society will arise from the development of information services that can be sold within an Information Market. This market is being brought about by the convergence effects of industries built upon information technology, i.e. telecommunications, computing, entertainment.

2.5.1 Information Market

The Information Market is not just about the movement and processing of information in its many forms. This Information Market will facilitate the exchange of goods, the pursuit of new leisure activities, provide greater opportunities for communication and the development of new cultures and communities. Anyone will be able to sell anything, to anybody, anywhere. It will provide new opportunities for trade, connecting suppliers of raw material to Manufacturers, Manufacturers to retail distribution, retailers to customers. Companies will be able to respond to customers direct needs, reducing stocks held and indirectly lowering cost of distribution and maximising efficient use of raw materials, thus impacting upon environmental concerns. Pricing will be far more competitive, with suppliers responding directly to customers specific requirements. The Information Market allows for greater outsourcing of specialised skills by providing the virtual space for people to work in, often will be from their homes and local communities. The global monopoly over manufacture and distribution enjoyed by today's global conglomerate will be challenged by smaller companies or individuals who will have equal access to the customers in the Information Marketplace.

The Information Market will grow from the developing web of globally interconnected computer systems and networks. Already today computer networks such as Internet illustrate some of these possibilities. As these networks evolve and more powerful commercial oriented networks arrive driven by user friendly interfaces, the Information Market will have arrived in our own homes and work places.

As the Information Marketplace develops upon the Information Infrastructure new processes will link individuals, businesses and governments to a myriad of new business and lifestyle services and applications. Compared with today's segmented telecommunications and computer networks the Information Infrastructure will become a massively integrated distributed processing environment that will support operation of user oriented applications in real time, the intelligent processing and integration of information, large flows of raw and refined information, interactivity and co-operation between different processing devices across geographical distances, delivery of any medium (video, image, text and audio) or a mix of these (multimedia).

For those trading in the Information Market, benefits include:

- suppliers having access to a wider customer base
- greater responsiveness to customer needs
- more economic production through less waste, e.g. lower stock levels held
- closer contact with customers

The form of markets will change from "places" to "networks". Major out of town shopping centres will re-locate to virtual shopping malls on the Information Infrastructure. Major nodes will appear on the Information Infrastructure that will have global significance equivalent to the development of today's towns and cities. The nodes, built around a Service centre, will house the new information environment. New information will be processed and transported to homes and offices across Europe and the world. Some times these nodes may coincide with today's business centres so as to place information as close to the Users as possible, but this may not be necessary.

In an Information Market, not everyone will have the same view of the marketplace. The market will stimulate via competition, innovation and differentiation of products and services to meet customers needs.

Inter-working through de-facto "standards" is essential to the exploitation of the Information Market. The development of these standards will not be orderly or coherent, as witnessed in today's computer industry, but there will be increasing pressure from Users for standards to allow efficient information exchange.

Regulation (an attempt to promote competition and constrain the market to avoid serious damage to society, business or politics) will grow increasingly complex as new technologies by-pass previous rules. As a result of using the new technology, issues, such as copyright, security and privacy, will pose new challenges to Political Authorities.

2.5.2 Future Information Society

A healthy Information Society will not necessarily arise from of the Information Marketplace alone. All members of society need to be aware of, and to take an active part in formulating the type of society that they wish to live in. The challenges and opportunities of new technology must be apparent to all members of society and its institutions, and a healthy debate must be encouraged.

New technology will allow the efficient and cost effective decentralisation of support services, such as medicine, education, back towards local communities. The Information Infrastructures extensive reach within an Information Society will enable an equalisation of opportunity and more economic provision of support services. Local communities will be in a position to pro-actively help meet the needs of those sectors of society with special needs, e.g. the elderly, disabled, sick, etc. There will be an opportunity to make the support services customised to the needs of individuals within these groups,

e.g. continuous medical and location monitoring, sophisticated and effective telemedicine and telediagnosis, etc.

Key Issues

- The Information Society will develop from an initial Information Market
- The Information Society is not just about introducing new consumer information and entertainment services
- The form of markets will change from physical places to networks
- Users will expect standards to be developed to allow the efficient exchange of information

Suggestions

- The challenges and opportunities of new technology must be apparent to all members of society and its institutions, and a healthy debate must be encouraged.

2.6 The Users

There will be a movement towards supporting local communities. The homogenising effects of the Information Market will be counter-balanced by encouraging local diversity. Local heritage and group identities will become important once again. However, the communities need not be geographically co-located, they may spread around the globe as global communities.

Figure 4: Influences on Users
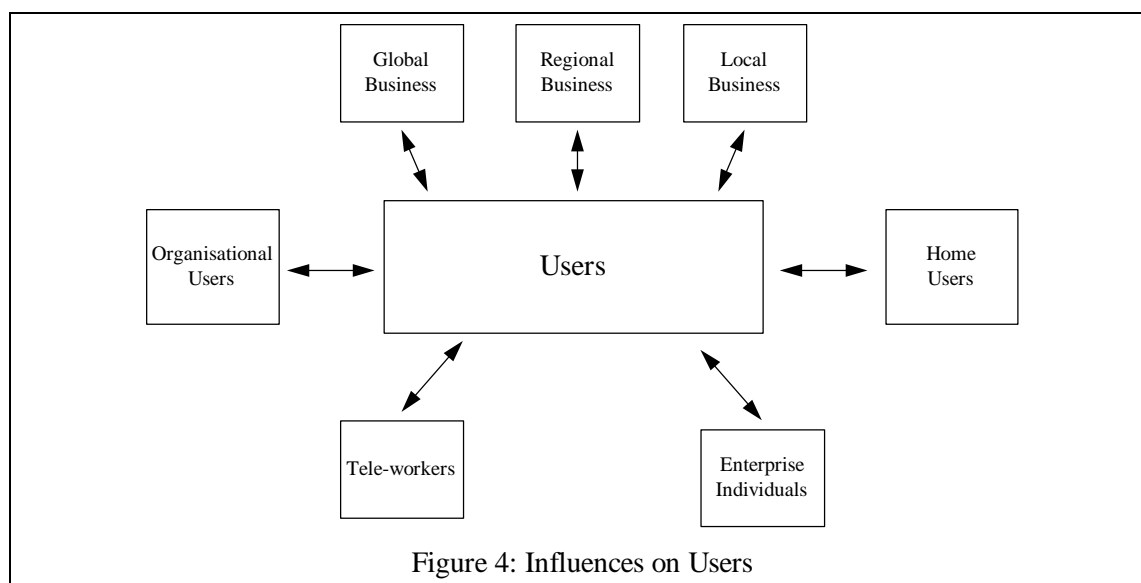
Through the adoption of an Information Society, people will have greater personal empowerment. Through better access to information and the use of electronic voting they will have an influence on decisions that affect their day to day lives. Traditional activities carried out by government and political agencies may provide new business opportunities. For example, governmental institutions could make available their information that can be exploited by new business ventures adding value and reselling. Local councils could put information such as land registry information into the electronic public domain, which could then be used by estate agents and the legal profession to speed up the process of house purchase.

The Information Society will have an effect on people's working lives. There will be a greater number of people who will move from traditional working patterns to new flexible methods of working e.g. home workers, mobile workers, part-time working and distributed teams. Education and training

packages will be delivered to people's homes over the network to help them adopt these new work practices. Changing employment patterns will accelerate these demands. However, the question is, will all members of the Information Society have equal access to information no matter where they live or how much they earn? If not, a new division will be created between information "haves" and "have nots".

There are three broad categories of Users in the Information Society. Each have their own needs and priorities that need to be fulfilled:

- Business Users
- Individual Users
- Home Users

The first group of Users includes the business corporations (both small and large); also included are large organisations such as governmental departments, hospitals, schools, etc. The individual Users in their professional or semi-skilled activities are the representatives of the second group of Users. In the third category are the home or family Users.

An important trend of the Information Society is the technology and service blurring that will occur across all the user segments.

2.6.1 Users today

No matter what type of user, liberalisation has widened the choice of communications products available. The Users are faced with a bewildering choice of differing services, each with their own capabilities and benefits. For many, competitive choice has meant confusion as well as lower prices and new innovative products.

Hard sell marketing presents the Users with conflicting information over the product most suitable for their needs. To make a choice is to take a financial gamble on which solution will commercially succeed. To back the wrong one is to be left with useless equipment and software. Imagine a User who wishes to use e-mail: he has a choice of e-mail products based upon differing protocols, Service Providers and Network Operators. But there is no guarantee that one e-mail system will interwork with another. For Users standards provide the stability for investment.

Similar difficulties are encountered with products from other parts of the information industry. The Users have to choose which computer system to buy or application package to run. Should they take satellite television or cable television? Will this choice limit the content they wish to view? Will they be left with no maintenance and support when the product operator or manufacture ceases to trade?

Standards can and do succeed, and the wider they are adopted the safer the customer will feel. Many of the most successful standards like compact disc have been proprietary but based upon co-operation within industry. The success of networks such as Internet is based upon a commonly agreed protocol. The Internet, until recently a non-commercial system, has seen significant growth. It provides an environment which is rapidly evolving to enable easy access to information. It also demonstrates the Users' requirement for sanity and stability in the technology marketplace.

Probably the most important lesson to learn from the Internet is that there is a considerable demand from all types of Users for the new information capabilities on offer. Contrary to popular opinion Users are not afraid of adopting new technology, but they are concerned with the consequences of its failure.

2.6.2 Users in the future

It needs to be understood that in the Information Society the infrastructure is there primarily to support activities which are important to the user. As a result it will be the Users who determines what they want to do and what applications are necessary to support this. Each User will have their own

requirement and will require the information environment to be personalised for their use. Consequently Users will want full participation in the Information Infrastructure that will eventually underpin the society they live in.

Business Users

The Information Marketplace will be global. All business Users will be confronted with a globalisation of their commercial activities and face international competition. Through the new Information Infrastructure globalisation will reach down to affect local business communities. While on the one hand this will strengthen the position of the major global companies there will be increased scope for small local companies to reach new global markets.

Meeting the needs of the business user will be the most important driver for the development of the new Information Infrastructure. The ability of business to link their customers and suppliers to support new business activities will be critical for their competitive advantage. Early on these requirements will be met by the new specialised global Network Operators who are able to offer specialised and cost effective solutions. But their role will only be transitory, as the advantages of price differentials and the current barriers to provide global connectivity for advanced features diminish. User pressure will ensure that regional networks are upgraded and interconnected to provide direct high capacity global inter-connectivity and information processing.

New universal multi-media capabilities will enable people geographically apart to work together. Some business will only operate for short periods or for specific purposes. The virtual company will have become a common commercial entity. Other alternative business organisational methods are very likely to evolve.

The Information Infrastructure has to be more than just a replacement for today's public and private communications networks. It will provide businesses and organisations with the platform for efficiently employing technology advances in many areas including education, administration and health.

Individual Users

Both in the professional, non-professional and residential environment, a multitude of new information facilities will require individuals to be increasingly adaptable to change. The changes will enable some individuals to develop marketable skills which will enable them to be employed within the Information Society. There will be some members of the society that will not feel at home with these new techniques and cannot develop these new skills. Without positive political action this will develop into a society of "haves" and the "have nots". Such a polarisation will not only occur between the rich and the poor people but also between other groups of society, e.g. the young and old, the highly and less educated people. With the right combination of political and commercial will, the Information Infrastructure can liberate the individual from current social divisions.

The Professional Users Environment

In the future, people will enjoy shorter and probably more intense working lives. The professional work which is available will demand better educated people with a broader range of skills. There will be rapid changes of disciplines required and people will need to have a portfolio of job experience to remain employable. They will increasingly come to rely upon professional knowledge-based applications on the information network to support them.

There will be a need for continuous education and new learning experiences. Telelearning will provide a flexible, accessible and potentially cost efficient means of equipping the individual with the required skills necessary for competitive industry. Small sized enterprises will benefit from obtaining access to sources of knowledge and skills previously outside their reach.

The future professional will work in widely dispersed teams, linked only by the information network. Rather than move physically from work-place to work-place, many individuals will work from their home or local business centre. The benefits of teleworking for both the individuals, the company and society are many, including reduced travelling costs, overhead and accommodation costs and environmental damage.

Semi-Skilled User

Everybody will be affected by the new technology irrespective of their type of employment. While the impact for professionals is perhaps clearer, insufficient attention has been given to the non-professional or trade worker i.e. bricklayers, plumbers, electricians, shop workers. These types of enterprise activities will still employ significant numbers of people. All such groups will have enhanced business opportunities if the new technology is tailored to their needs. This means inexpensive terminals, the right type of applications and information sources. For the semi-skilled worker most activities are locally based. To support them there needs to be good local information and communication. The information network will need to stimulate small enterprise operations and serve the local needs of the community.

But there is still the concern that many people will not have the ability to develop the skills needed. Info-illiteracy will be a greater problem for individuals then illiteracy is today. The appearance of un-educated, unemployable and marginalised groups is a threat which could in turn lead to increased social disorder. Active stimulation and education by the government to equip everybody with the required skills in handling the new facilities seems a prerequisite.

Home Users

There are various influences of the Information Society on the individual user in their residential environment (see Figure 5). The integration of various media with telecommunications will touch upon a broad range of activities, for instance:

- Information services
- teleshopping
- tele-education
- TV-distribution

Information sources available from the home will provide people with instance access to many different sources of help and advice. A key driver for information services will be advertising which may sponsor these new services.

Teleshopping may make the daily housekeeping easier. Interconnection of teleshopping with a telebanking facility will yield an integrated home-shopping facility. Apart from physical goods, a broad range of services (travel agencies, libraries etc.) can be accessed in a similarly.

Tele-education will enhance the learning capabilities of large groups in society. Interactivity with a remote tutor by means of teleconferencing will give access to high quality educational resources.

Health care is of increasing importance in society as the mean age of people increases. Tele-observation and teleconsulting facilities will help the development of pro-active rather than reactive health services for sick and/or elderly people. This will reduce the number of visits to hospitals or perhaps avoid stays in nursing-homes.

Entertainment facilities will expand significantly. The choice of content material will be sourced either globally, regionally, or from the local community. Entertainment is recognised as an excellent medium to impart information, so called "infotainment" will play an important part in educating and informing people. Access to video material on demand will become the norm, while simultaneous broadcast will specialise on events in real time i.e. news, sports. The interactivity and increased band width of the information network will encourage social and group activities such as games. People will be able to

play with anyone around the globe interactively. The use of virtual reality will add new dimensions to these social activities.
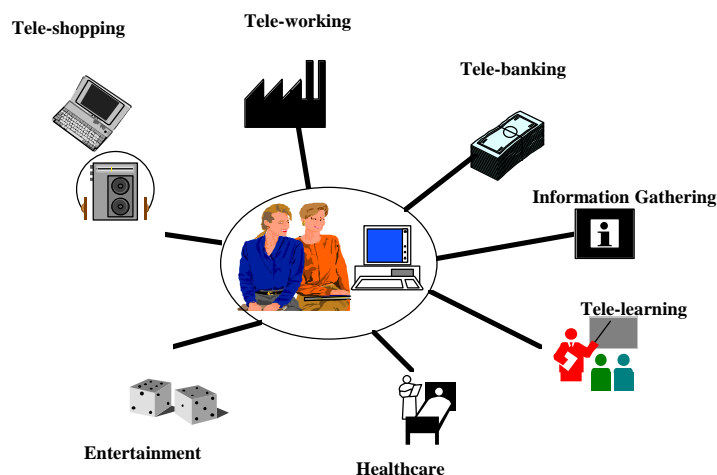
Figure 5: The User's Environment

However, large the opportunities seem to be, there are threats to be considered. The people that might be helped most by the new services may be the ones who have the most difficulties in acquiring the necessary skills to access them (e.g. the sick, elderly and computer-illiterate people). User-friendly interfaces and active governmental stimulation in using them are therefore of utmost importance to get a wide-spread acceptance. Another element of society that may miss out on the Information Society are the poor who cannot afford the access in the first place. By not having access to the infrastructure of the Information Society, there may be a chance of an information underclass developing that will permanently miss the advantages of the new society. To overcome this, a new service concept of Universal Service Access needs to be developed. This should ensure all citizens have a right of access to the Information Infrastructure.

The Users will experience challenging new issues such as having to deal with a flood of unwanted and possibly incorrect (junk) information. How people's privacy and the security of their information is ensured, will be a major issue. Hence, the need for an information constitution is apparent that lays out the rights of the user within the Information Society. A clear role for Political Authorities in this is envisaged.

Finally, with the increasing development of time saving information services, the question will arise, what will people do with the spare time that is left. Will they spend more time working, or will they spend more time entertaining themselves by interacting with a display screen in the home?

Key Issues

- The Information Society will allow new ways of working to develop, e.g. the virtual company
- Users will need to develop new skills to take advantage the Information Society
- There is a chance that information "haves" and "have nots" will develop
- There a risk of people becoming info-illiterate
- Advertising will be a key driver for information services

- There is a need for an information constitution that lays out the rights of the user within the Information Society.

Suggestions

- The participation and enthusiastic support of the user is needed to counterbalance the excesses of commercial enterprise.
- The information network will need to stimulate small enterprise operations and serve the local needs of the community.
- User-friendly interfaces and active education in using them are of utmost importance
- A new service concept of Universal Service Access needs to be developed.

2.7 Service Providers

Of the roles identified for the Information Society understanding that of the Service Provider is probably the most important, it is also the most complex. All parties with a commercial product to sell will view themselves as providing a service to their particular customer. In a strict sense the issue of who is a Service Provider depends on what is meant by and constitutes a service to a particular end-user. It is doubtful whether current telecommunications based definitions of service are sufficiently sound for use in the future Information Society. Without a clearer understanding of what does and does not constitute a service on the new information networks there will be increasing confusion, particularly with regards to infrastructure ownership, policing, legislation and regulation.

The Service Provider role may be simply broken down into three types of activities, see Figure 6:

- the service retailer selling direct to the customer
- the service supplier providing the services and applications
- the network operator providing the physical infrastructure.

The future service centre is important to them all. In the ideal situation everybody would like to have control over the whole of this continuum. Recent events in the US illustrate this as large corporations attempt to dominate the whole information supply and distribution chain.

As the range of features and applications increase with the advent of the new Information Society it is unlikely that the range of choice on offer to the customer will be satisfied with either the traditional Network Operator or the major content producers. To increase the range of choice to the customer PNOs will be forming business alliances with different players in the information industry. It is from these relationships that the new business organisations of the Information Society will develop.

In the liberalised environment of the future it is very likely that PNOs will separate out different business activities. This will most likely be forced on them by new regulatory action and the effect of competition. We can expect many of today's

Service
Retailer

(Tailored Service

packages to Users)

Service
Centre

(Information Management,

Storage and Processing)

Service
Supplier

(Application Creation)

Network
Operator

(Information Transport)
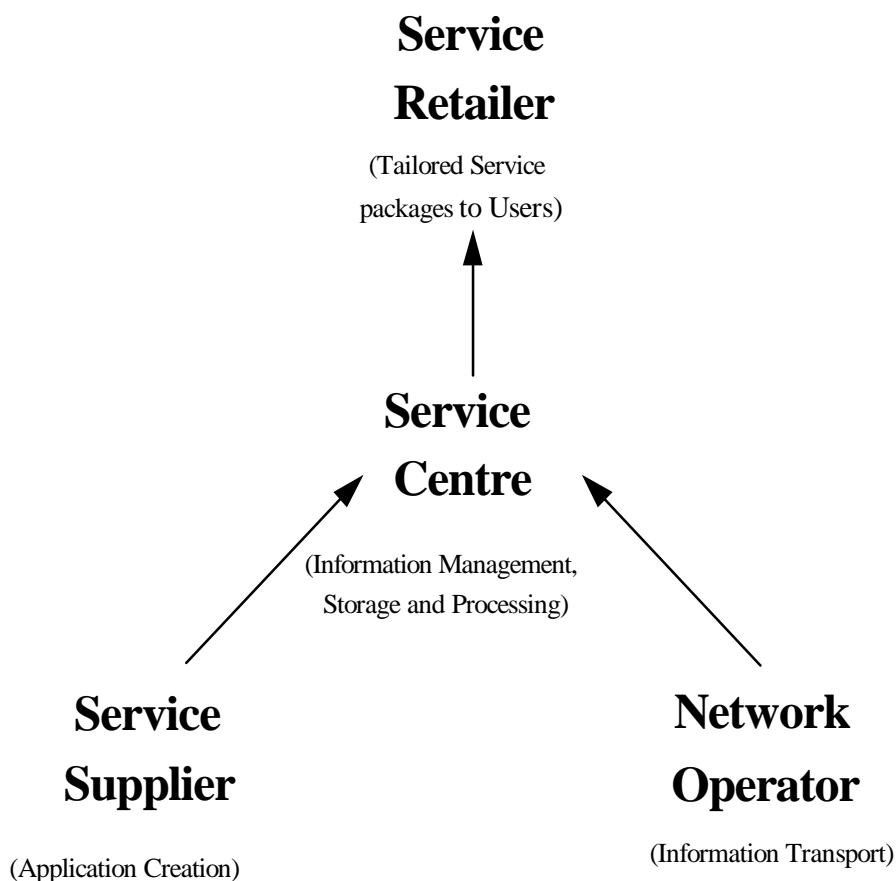
Figure 6: The Roles of Service Provision

Network Operators to specialise in specific business roles and provide additional products and features through contractual arrangements with other service suppliers, such as Information Providers.

2.7.1 The role of Service Providers today

The term Service Provider is currently used to describe a diverse field of activities and roles. Today's PNOs are licensed to provide a range of telecommunication services to their customers. In this role they are the dominant telecommunication Service Providers in the marketplace today. PNOs are currently structured around a very integrated business activity spanning the retailing of services through to the provision of supporting network infrastructure. The PNOs have traditionally viewed it as their role to provide this totally integrated approach.

Although this approach is unlikely to survive in the longer term, it has been followed by many of the new entrants to the marketplace who are building alternative physical network infrastructures for the provision of their service. To exercise choice, customers are physically disconnected from one network and reconnected to another. Once with the new operator the customer only has access to the service options available over the new network and is unable to gain access to features he enjoyed on the other network. To overcome such difficulties PNOs are under pressure from regulators to provide open interconnection at all levels of their networks.

As part of the provision of its services the PNO has to fulfil certain contractual agreements with their customers regarding the provision, maintenance and billing of services. Enhancements to these basic services are marketed as additional or value added services. Enhancements may be provided by independent value added or third party service suppliers. The PNO as a Service Provider bills and collects on behalf of the service suppliers the revenue earned by the services. The services supplied are generally of an information type or involve some simple interactively like voting or playing a game.

In response to competition a key trend is towards the marketing of service packages which include selections of value added features and attractive tariffing options. Features included within such a service packages may be sourced from a variety of service suppliers. However, as they are still predominantly telecommunication features they are likely to be supplied by the PNOs rather than by alternative suppliers.

The retail Service Provider role is most developed in the mobile communication area. This trend has not yet developed strongly in the fixed network. The development of service packages comprising entertainment, mobile and fixed communications sourced from different suppliers is likely to enhance their role. Future services will not necessarily be based on one technological platform or delivery medium. Service retailers will take the most suitable solution from a diversity of technical possibilities. New services and applications already involve the processing of information and much of the added value is passed to the owner and processor of the information. The revenue for transport of information is declining as it becomes commoditised and the marketplace liberalised. The dilemma facing PNOs is that although the production and packaging of information services and entertainment gives important added value and new revenues, a significant proportion of these revenues will not go to the PNO.

2.7.2 The role of Service Providers in the future

To understand the future role of the Service Provider we need to take a customer perspective. Customers will be looking for packages of features, products and applications meeting a spectrum of needs. These will include interactive television, health monitoring, electronic messaging, etc. as well as standard voice and visual communications. Some of these features may be offered as free features e.g. electronic messaging. Most importantly the customer is looking for access into the new information environment.
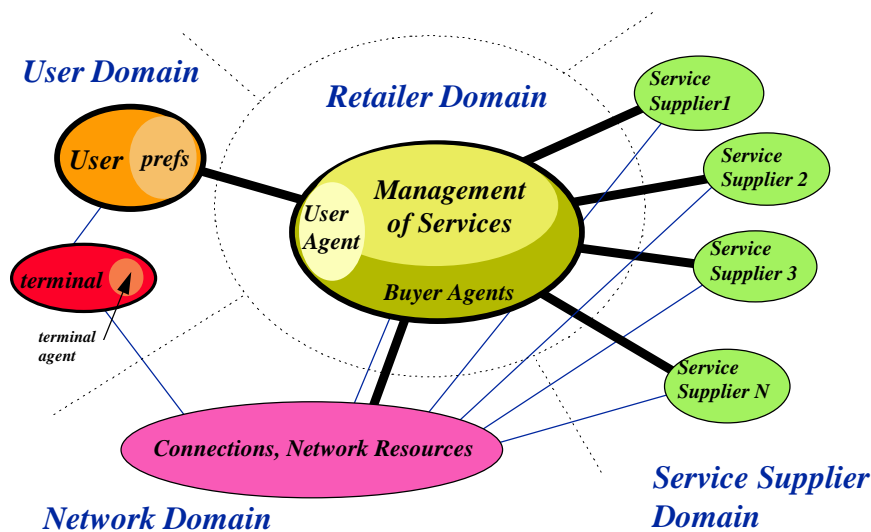
Figure 7: The Information Services Supermarket

To obtain these features the customer is likely to choose a service retailer or broker who matches their requirements to available services and applications (see Figure 7). Service retailers may be new independent organisations or develop from the customer facing activities of current PNOs. The services sold by the retailers are unlikely to be all available from a single service supplier. The service retailer's role will therefore be to manage on behalf of the many suppliers the availability of services and applications as well as providing the necessary support activities to the customer. These include fulfilling of contractual agreements for the provision of service, e.g. maintenance, quality, reliability, price, geographic coverage, etc. including the preparation and handling of billing for suppliers. The retailers will provide their own window into the information environment with associated advertising and special offers. Premium brand and own brand services and applications will be sold.

In this new environment the service retailer will have to concern themselves with new issues of information security and privacy. New standards of reliability will have to be adopted to ensure that customers are not disconnected from the applications they are subscribing to. There will be new roles, for example acting as gatekeepers to many specialised information and application providers. Retailer's emphasis will be on providing a rich and stimulating experience for their customers.

There will be very little to choose between alternative physical infrastructure suppliers as the underlying telecommunication technology and features will be similar. Service Providers will differentiate their products using software, product packaging and access to content.

As mentioned elsewhere in this document the telecommunication network is migrating towards an information network as an intermediate stop towards the Information Infrastructure of the future and a key evolutionary step in this change is the concept of service centres. In the past the switch (telephone exchange) was the key component of the network, in the information network the service centre will be the key component. Service centres are the focus for the development and supply of the new information services and applications. At a service centre the customer can access and in some specific cases manipulate information stored on specialised computers. The information stored on these computers allows the provision of a large variety of applications:

- entertainment (e.g. films, interactive TV, games, concerts, etc.),
- commercial (e.g. electronic mail, teleadvertising, electronic yellow page, teleshopping, etc.),
- educational (e.g. teletraining, video encyclopaedia, etc.)
- social (e.g. Telemedicine, etc.)

Although in the early stages there may be a close coupling between the service centre and the underlying telecommunication transport network, the centres need not necessarily be owned and managed by telecommunication Network Operators. The service centres will evolve to be transport media independent. As such they will increasingly become important for the support of mobile and personal services (i.e. UPT, PCS, etc.), the delivery of broadcast material and the integration of these with current fixed telecommunication networks. Some applications at the service centre will require sophisticated coupling with telecommunication functions (i.e. handling the various parties involved in a multi-party communication). In the future an increasing number of multimedia applications will use the information stored in the service centre. Consequently the service centres will become multimedia service centres and provide the basis for the evolution to a fully integrated Information Infrastructure.

The multimedia service centre concept is very important to the future service supplier, as it is here that the customer's new information applications and services are provided by the application and Information Providers. The service retailer is now in a position to mix and match those applications to the customer's need. As it is very likely that all service centres, irrespective of where they are located or who they are owned by, will be interconnected by the information network the service suppliers will be able to offer global access to any information source. The service supplier will require open interfaces and equal access to Network Operators thereby creating a choice for customers. There will be a complex billing system between the service retailer and their suppliers with electronic funds transfer enabling real time division between all the parties involved in the transaction. Thus creating an effective Information Marketplace.

2.8 Information Providers

With an advanced communication infrastructure emerging, the role of the Information Providers will become more prominent. In this section we will respectively consider who the Information Providers are, what information will be available to the individual Users, how information provision can be tariffed and finally how it can be accessed. Information Providers will supply the key element to the success of the Information Society. They will either supply or own the information that they provide to the Users of the information network.

2.8.1 The role of Information Providers today

Current Information Providers include:

- publishers (e.g. films, newspapers, books, TV, magazines, CD-ROM, games, music, etc.),
- broadcasters (e.g. radio, TV, etc.),
- agencies (e.g. Reuters, etc.), database providers
- traffic Information Providers, weather forecasters and many others.

At present Information Providers develop information sources that are aimed at a single distribution method. For example, telephone information services (premium rate services) are only accessible via telephone and not necessarily via computer. Other niche markets for Information Providers, although highly profitable, include the production of television programmes and movie titles, and information applicable to financial institutions that aid their investment decisions. The services that are developed by most Information Providers are usually sold to a market segment so that they can provide a source of revenue to their producers based on the exploitation of copyright. It is clear that information is increasingly important to the success of companies in the face of strong competition. The information industry is thus growing rapidly.

2.8.2 The role of Information Providers in the future

Information Providers - who are they?

A rich diversity of Information Providers will appear in the Information Society, many already exist and many others appear. They will differ not only in size but also in their degree of commerciality, as is illustrated in Figure 8. Some providers, especially those existing for social reasons such as clubs, produce information for free, others will require just a token payment. Others will have information as their sole source of revenue (e.g. news, broadcasting and film companies) and are therefore highly commercialised.

In general, commercial information is valuable initially, but the competitive value drops very quickly. There is thus a high premium on first access. "Information is power" has never been so true. Other types of information such as films, books etc., drop in value much more slowly, and do not command such a high premium for first access (see Figure 9).

Figure 8: Information Providers

As technology becomes cheaper, more powerful and more widespread, people at home will become capable of acting as Information Providers (or information smallholders) generating novels,

multimedia, games, directories, music, art, etc. These people can by-pass traditional distribution channels, making their products and services directly available to other customers. There will be obvious opportunities to provide directories for this information, and marketing channels for those who wish to derive income from their work.

An information cottage industry can therefore be expected, which may change the nature of information supply dramatically, since this will compete very effectively with "mainstream" production. Information smallholders will not have the same overheads as large firms, but in principle can get access to most of the same information. Much low cost (but high value) information will come from this sector. This will bring down the cost of information in many categories, especially since much of this can come from non-European sources where costs are even lower. However, without branding, it will be difficult for Users to instantly appreciate the quality of the information (i.e. that it is factual, accurate, does not breach copyright, its entertainment value, value for money, etc.). Additionally, public information will be available, from tourist information, bus timetables, and what's on guides, to government statistics, regulations, and free advice.

Some information will simply be too difficult or expensive to be produce by smallholders. For examples large feature films may not be possible but good quality plays or soap operas would be within the capability of local community groups. It is likely that such local productions will challenge the American domination of the film industry and revitalise the European industry.

Charging for Information

All of this has implications for charging. This will change dramatically from today's methods, with many charging methods being used, i.e., subscription, pay per use, integrated transport/application charging or separate charges for each component and many other methods. Since it is so unclear which methods will be preferred by the market, the only sensible approach is to aim for as much flexibility as possible. When transfers of small amounts of information are considered, payment for these transactions may be less than the cost of the billing. In these cases an electronic form of cash may be an alternative to that of purchasing via credit card.

Other Aspects

Another area of difficulty is privacy, which generally links to security. Many services need privacy before they can take off, and today's networks do not meet the requirements for some services. For instance, analogue cellular is a very insecure medium. Secure networks can be used for transfer of financial and personal information, allowing services such as banking and telemedicine to take off. These are not likely to be accepted without privacy and security guarantees. However, guaranteeing privacy makes censorship difficult, so some undesirable services may need to be accepted. A main method of ensuring privacy and security is to encrypt information. In the US, the government has tried to retain code keys to enable them to decode any transmissions, though this has had limited enthusiasm from industry and the population.

Censorship is even more difficult to reconcile with privacy on a global level. The Information Society will be a truly global one, with people in many countries socialising and working together. They must be able to exchange information freely with privacy and security.

The new Information Society will also have a positive effect on democracy. More information will be available on every issue, both to government and the electorate, so better informed decisions could be made. Electronic voting, too, will evolve. In its simplest form, electronic voting can make results of elections known much quicker. In a more developed form, it can make it more easy to gather public feeling on a wider range of issues. Electronic referenda or opinion polls can be taken more frequently. With so many impacts from the Information Society, we will see gradual but strong changes in culture. New, facilitated means of interacting will change the way people socialise, and the range of media to which they have access will increase. It is impossible to predict the full impact of information accessibility but it will be very significant.

Key Issues

- Information services will not only be developed for financial reward
- Products will need to be developed to aid information retrieval
- Security and privacy conflict strongly with censorship and government access
- Copyright protection will be a major issue
- People at home will become significant providers of information

Suggestion

- People must be able to exchange information freely with privacy and security

2.9 Network Operators

Within Europe today networks are generally owned and operated by state run Public Network Operators, like OTE in Greece. They offer well-defined, but often separately run networks such as telephony and data (e.g. X.25, Frame Relay) to customers within their own countries. These operators often have some form of service obligation to provide basic services to anywhere within their regions. International services have been traditionally offered on a bi-lateral bases.

Network Operators will provide the basic infrastructure over which information services will be delivered. Hence the role of the Network Operators is likely to be pivotal to what is happening in the Information Revolution. It is clear that within a very short period of time the PNOs will have to move from state monopolies to operators working within a competitive environment, carrying a wider variety of traffic compared to the basic telephony of today.

2.9.1 The role of Network Operators today

Today's operators are seeing challenges in their traditional marketplace of telephony services. The competition comes from several areas. In some countries, Cable TV (CATV) operators are introducing the carriage of telephony. Independent long distance carriers are undercutting the prices of the PNOs in the national marketplace while global resellers are stripping PNOs of their highly profitable international services to businesses. Competition is particularly fierce when new Network Operators install networks that take advantages of the latest technological advances, for example SDH or ATM. The new operators have to address few of the issues affecting the PNOs, who have to evolve their networks to the new technology while maintaining existing systems.

PNOs are also being forced to reduce their prices as a result of the actions of regulators. Tariffs are being re-balanced in a move to directly reflect the cost of the provision of service, which is itself rapidly falling due to advances in technology. Since 1/1/1998 the European telephony market (with the exception of the Cohesion countries, including Greece) is opened to competition.

The consequences of new competition and reductions in revenues mean that there is less money available to invest in new network technology. It is here that the PNOs are faced with a great dilemma: if they do not invest in new technology, they will not keep their market share, but how do they finance this investment if their revenues are diminishing?

Although this scenario paints a particularly bleak picture for the PNOs, these companies do have a significant advantage over their competitors. They have a very large geographical reach and they have an existing customer base that they can try to keep by providing a better service than the competition (see Figure 10). It is therefore clear that PNOs will have to change to meet the challenges of the future Information Society, and it is these changes that are examined in the next section.

2.9.2 The role of Network Operators in the future

One of the great challenges of the Information Society will be the construction of new networks that will support the wide variety of new services and applications, while trying to evolve from legacy networks.   These networks are becoming known throughout the World as "Information Superhighways" a term first coined by the Vice President of the United States, Al Gore. The term does not reflect any particular technology type. It paints a picture of a fully interconnected networked world where information, be it the "heavy juggernauts" of interactive videoconferencing, can coincide with "cyclist" delivering e-mail.

Network Operators will have to evolve their perspective of telecommunications services. Up to now

Figure 10: Unification of Networks
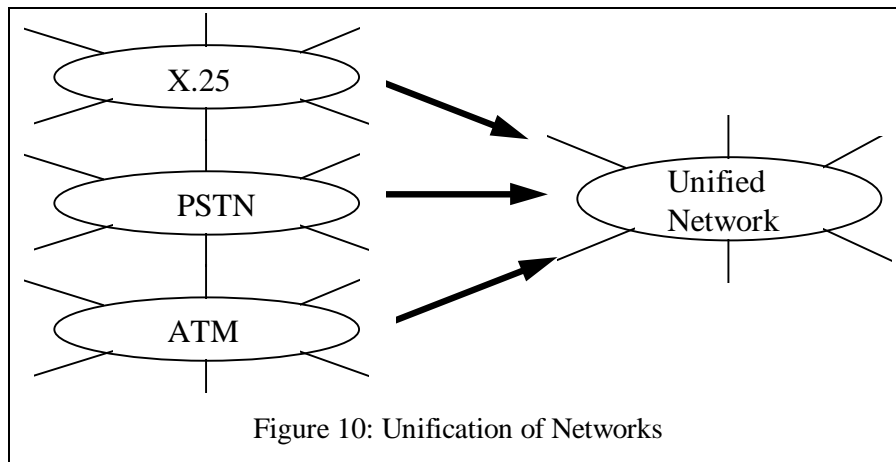
new services have almost entirely been developed and run by the Network Operators themselves. Noticeable exceptions to this have been telephone information services, often offered using "Premium Rate" telephone numbers, where the content of the service is created by a third party. In the future, increased collaboration will be needed, as a higher proportion of revenue will be derived by applications from the wider information field. This switch in revenue generation will accelerate as technology brings the cost of transmission (bit transport) down.

This model will increasingly be developed in the Information Society. PNOs will not have the skills to develop all the interactive multimedia services that a customer will want.   Therefore the Network Operators will have to learn to work in co-operation with Service Providers and Information Providers to develop and operate new and exciting services that customers will want. PNOs do not want to be

Figure 11: The pressures on Network Operators
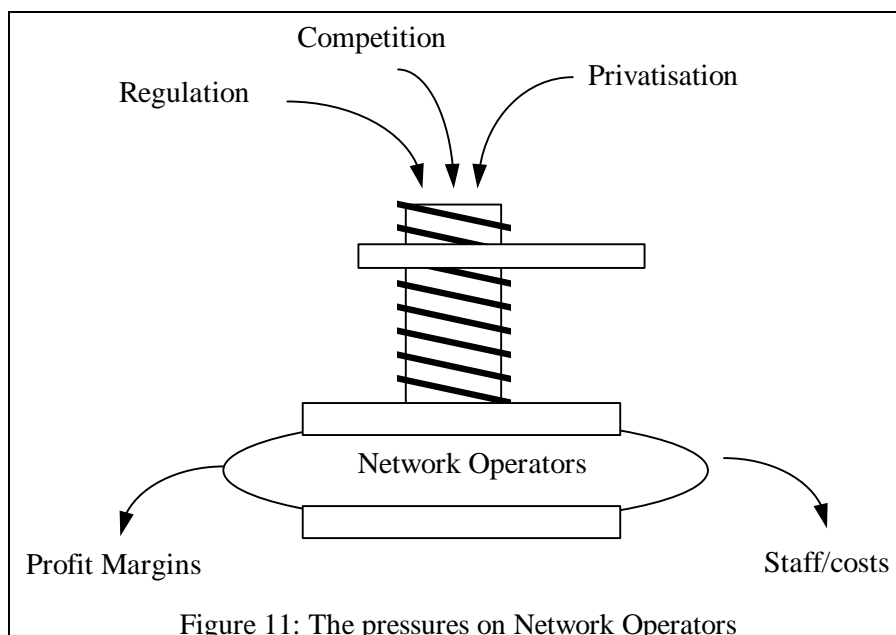
merely bit carriers for the Information Infrastructure, but would rather like to offer multi-media bearer services, that will generate more income. Collaboration must also extend to the building of the network, which must be able to carry the wide range of services that the user wants across national boundaries. No single country can by itself design and build its own network in isolation from other countries. Thus, there needs to be agreement among the European countries about the way forward to the new multimedia networks from today's legacy systems.

Today's narrowband networks will be replaced by broadband networks, capable of carrying the new services, and simultaneously allowing both rationalisation and cost reduction. It is expected that new competition and new technology will change the structure of the network dramatically, as will the corresponding structure of the industry. We may see networks run across Europe by super-carriers, or at least spanning several countries.

In spite of this cost reduction, the new network will be expensive, and there is probable significant gain to the country involved, and risk to the operator. As a result there is strong debate about who should pay for the new network. This is made even more difficult by the demand for a new type of universal service.

In many European countries PNOs are obliged to provide basic telephony service to anyone that requests it. In the Information Society this concept may be developed to include a variety of multimedia services. How service obligation is developed and enforced, has yet to be decided. Whether it will be national or Europe-wide, which services will be included, and how it will be enforced remain to be decided.

It is questionable whether the PNOs or even the telecommunications industry as a whole will be able to raise the funds required to build an overall network with multimedia functionality (even if its complexity is appropriately reduced). A massive effort from Political Authorities may be required to enable a fast enough extension of network capabilities. Doubts are, however, expressed from politicians based on the priorities of national budgets.

A compromise may be that public funding of a broadband network is used to initially interconnect educational and other public institutions. Through the guarantee of initial network revenues, it is hoped that an impulse will have been given that will stimulate private efforts which will then be driven by market dynamics. Interestingly enough, the GU-Net project (the high speed network interconnecting all Greek Universities and other tertiary educational schools, now well under way, is an early example of this observation.

There will be a fundamental shake up of the role of Network Operators in Europe (see Figure 12). Regulation, competition, and market pressure will restrict the revenue to be gained from bit transport and restrict the gains from network ownership. The resulting redistribution of revenue between transport and applications will force an industry restructure and strategy rethink, pushing investment into other IT areas.

Key Issues

- New competitive environment for PNOs may mean fewer funds to build new infrastructure
- What will be the Universal Service Obligation/Access of the future?
- How will efficient interworking between networks, while allowing competition, be ensured?
- PNOs may be forced to invest outside the telecommunications industry
- PNOs will develop business enterprises active in the new roles of Service Retailing and Information Provision.
- Regulation will greatly affect the final structure of European telecommunications

Suggestions

- PNOs will have to radically change to meet the challenges of the future Information Society
- Increased collaboration will be needed, as a higher proportion of revenue will be derived by applications from the wider information field
- Network Operators will have to learn to work in co-operation with Service Providers and Information Providers to develop and operate new and exciting services that customers will want
- There needs to be agreement among the European countries about the way forward to future Information Infrastructure from today's legacy network systems
- A massive effort from Political Authorities may be required to enable a fast enough extension of network capabilities.
- Public funding of a broadband network is used to initially interconnect educational and other public institutions

2.10 Political Authorities

In an Information Society, as described at the beginning of this document, telecommunications is only a part of the larger communication and media industry, which includes broadcasting, producing/delivering movies, producing/delivering newspapers, book publishing, advertising, etc.

Technological revolution is provoking synergy and future convergence of these sectors. The challenges are largely due to the difficulties in anticipating and influencing the effects of technological breakthrough. In time, these will blur the traditional boundaries between sectors of the industry. Each sector is attempting to protect its position by reshaping its business activities through acquisitions and alliances. The industry is no longer constrained by national boundaries, major global industries are being formed which are beyond the control of national Political Authorities.

As part of their role Political Authorities have tried to foresee the consequences of these developments and to act in due time in the political environment. This section examines the impact of information networks on Political Authorities and the role Political Authorities could play in the short and medium term development of an Information Society.

2.10.1 The role of Political Authorities today

Decision making bodies in all their guises (global, pan-national, regional, national, and sub national) are intimately entwined with the development of an Information Society. Three main points need to be considered now by the Political Authorities:

- effects on political process
- creation of a safe/trustworthy environment
- changing structure of Political Authorities "the disappearing middle"

Effects on Political Process

Decision makers such as national governments are acutely aware that the media (newspapers, TV, etc.) are having an increasing influence over the political process (see Figure 13). Perhaps more so than electoral systems and political parties.
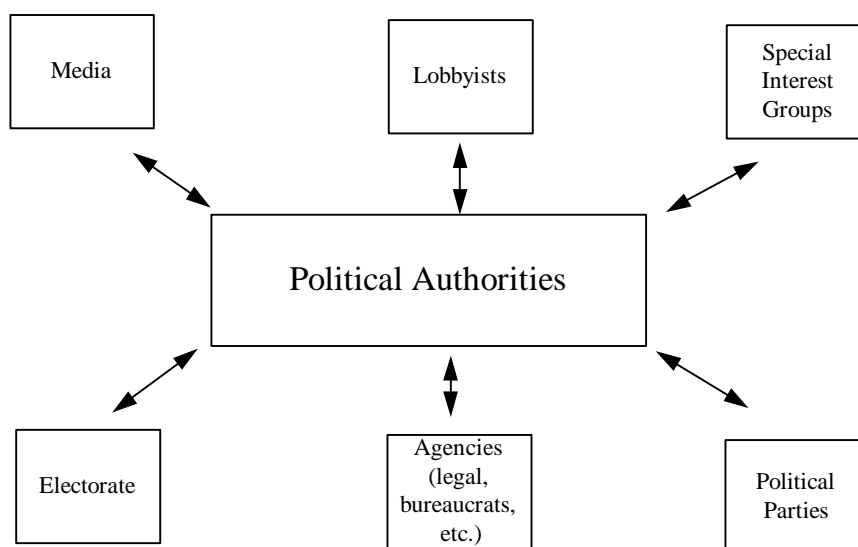
Figure 13: Political Interactions

Political Authorities could use the development of the Information Infrastructure connected to the population at large to extend the democratic ideal. Referenda using the Information Infrastructure could occur more regularly with the aim of taking to extreme the goal of "government of the people, for the people". But can this be realised when the trend is for increasing numbers of citizens withdrawing from politics preferring to leave decision making to the political class (politicians, journalists, lobbyists and the like)?

However, Europe could start to experience a considerable rise in participation by lobby groups as the Information Infrastructure promotes development of special interest fora as witnessed on Internet. Special interest groups will freely exchange ideas over larger geographical regions. This may strengthen their ability to organise campaigns (by projecting their power and influence) which could distort the current political process. Ultimately governments will witness the rise of cyber-nations. That is, groups of like-minded individuals in many countries joining supranational information exchange communities that share common values and agree to abide by their own codes of behaviour (laws).

Taming the Wild West

Political Authorities in the past played a significant role in taming abuses, the creation of social welfare to mitigate the extremes of the industrial revolution. The Information Society needs active consideration.

What of the basic guidelines pertaining to responsibility for incorrect information, fraudulent entry, copyright protection, decency (pornography and political extremism) and privacy? A set of rules, guidelines and voluntary codes of practice are needed to create a framework for the market. Clearly the EC Data Protection Directive is an early example.

The framework needs to address an information value chain as shown in Figure 14 and not be tied to old concepts of companies only active in one area of business. Due to the very nature of information

and its communication this framework needs to be pan-national and ultimately global. One of the priorities of the latest round of GATT negotiations was to address the free flow and commercial exchange of information as a tradable commodity on a global basis. Copyright and intellectual property issues pertaining to software are a major concern to all information creators.

Finally there are the seemingly intractable problems of unemployment and taxation:

- Taxing invisible exports is difficult, putting value and detecting information transfers and assets that move across borders will create problems for Political Authorities.
- Unemployment as a result of structural inflexibility in the supply side will be magnified without an adequately prepared work force. Clearly Political Authorities can play a major role in education and training to prevent a painful transition from one society to another.

The Disappearing Middle

Political Authorities like all areas of activity are under pressure to operate as efficiently as possible. Businesses across Europe are subject to the trend of right sizing and there is a clear indication that the concept of the lean organisation is just as applicable to political and administrative authorities as it is to commercial organisations.

2.10.2 Role of Political Authorities in the Future

A passive mode of behaviour for Political Authorities will be evidenced by a reliance on commercial enterprises to lure the mass market to the Information Society on the promise of creating a global shopping mall or games arcade. This would take a long time to achieve and only the most affluent sections of society would participate. Political Authorities could take a more pro-active role by:

- seeding a transformation
- creating a critical mass
- training and education
- enforcement
- regulation

These are explored below:

2.10.2.1 Seeding a Transformation

Political Authorities naturally imagine the Information Society as consisting of classrooms and public libraries. But commercial forces seem to point the way to an electronic arcade (movies and games). As a representative of the Consumer Federation of America said in a speech to Congress "Providing socially useful applications will require direct public policy intervention, not reliance on corporate philanthropy".

How can Political Authorities promote the establishment of mass participation in information and hence in the early establishment of a post industrialist society? Political Authorities have, like no other grouping, information pertaining to every individual ranging from records of births and deaths through to land ownership and income tax records. Every sphere of human activity is covered, monitored and administered.

Figure 15: Seeding a Transformation
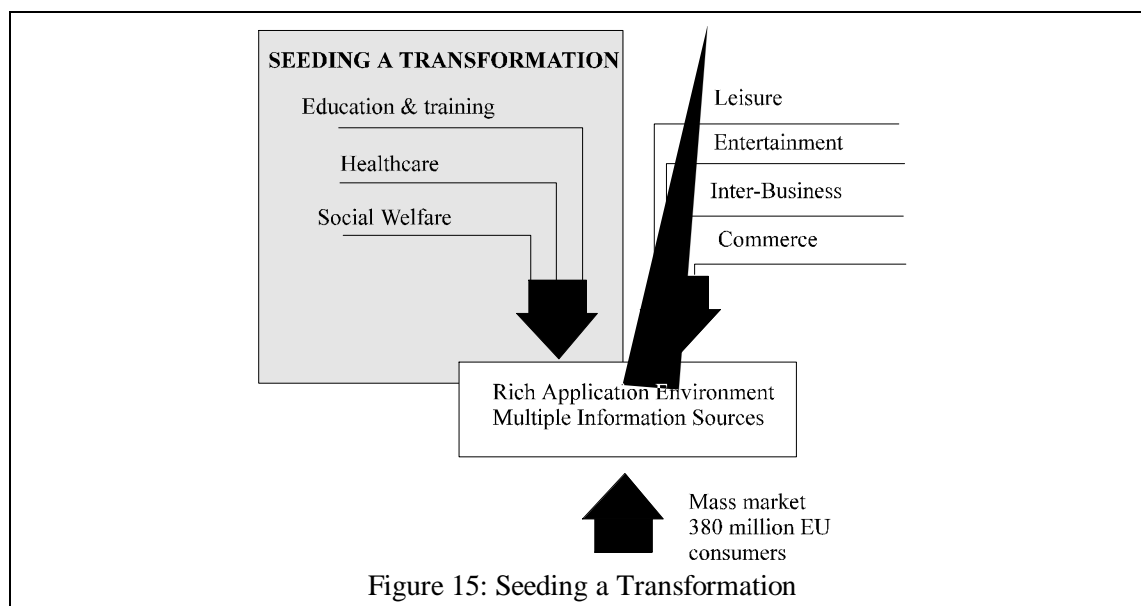
The Bangemann document identified some principal application areas that will give a push to the Information Society ranging from distance learning to health care. This concept of balancing commercial applications with socially useful applications is shown in Figure 15.

2.10.2.2 Creating a Critical Mass

Systematic denial of education and opportunity available over the Information Infrastructure to poor people in poor areas will only perpetuate a continuing cycle of poverty amongst these groups into the next century. What about access to a minimum set of information sources as a fundamental right of every citizen?

- Should a connection of a percentage of publicly funded accommodation via subsidy of the Information Infrastructure similar to the postal service be an aim?
- Should part of an Information Providers licence include free access to a minimum subset of information sources?
- Should free access points such as public multimedia information terminals be located in public places?

Evidently, these questions require from Political Authorities a firm position but also, other players

2.10.2.3 Training and education

The transformation of today's predominantly industrial based society into an Information Society implies some radical changes to the way we work, generate wealth and live our lives. Training and education is needed to prepare society to take advantage of the new possibilities. This should aim to prevent the generation of an information under class. Focus should be placed on the development skills and competencies which add value to information and become the differentiation in the global marketplace:

- ingenuity
- creativity
- imagination
- ability to transform information
- ability to draw conclusions from the known and apply to the unknown

Given this stimulus, the supply side of the marketplace should become sufficiently flexible to mitigate the effects of reductions in employment opportunities in the traditional industrial society. Whether it

will be sufficient to make an impact on the 17 million unemployed in the EU, and prevent the EU becoming a net importer of multimedia goods and services, depends on timing and competitive forces.

2.10.2.4 Enforcement

The engagement of the mass market will require the establishment of a trustworthy and respectable marketplace, similar to hyper markets and shopping malls rather than bazaars or market stalls. This requires the Political Authorities to develop and/or promote (via voluntary means) some mechanisms of enforcement.

But how many policemen currently understand or could investigate computer-related crime in the EU?

Enforcement of laws, where every citizen can be regarded as an information creator, is much more difficult than in today's society, where mass circulation is limited to few large commercial organisations in publishing and broadcasting media. Perhaps the idea of licensing individuals to use the new information environments should be introduced. There is here an analogy with the current driver's license. This approach while not limiting personal freedom or the establishment of an open market would bring an element of control over the use of the technology and content. Universal licensing would also provide the Political Authorities with important sources of income for supporting other aspects of the Information Society.

2.10.2.5 Regulation

To control and regulate the Information Society a fresh approach will be required. At present regulation is uneven across the key industries involved. Current legislative practices favour some and penalise others. The PNOs are only one element for consideration by the Political Authorities. The companies currently identified as PNOs will have diversified into other sectors ranging from information creation and service provision through to bit transport. The media industry and the Manufacturers of the new technologies, both hardware and software will also be worthy of consideration .

Experience of information networks such as the Internet illustrates how difficult it will be to provide a fair and equitable system of regulation and control, let alone guarantee commercial and personal privacy.

It is possible that a system of licensing will be adopted. The system would be based upon the framework developed to describe the roles present within the Information Society.
Licenses would be granted for activities such as creating and providing information, producing broadcast programme material, educational material and providing infrastructure, etc. The licenses would lay down the code of practices that have to be followed and incorporate appropriate social obligations. The granting of licenses would be non discriminatory, technology neutral and available to any competent person or organisation.

2.10.3 Summary

The Information Society will only materialise if Users find the facilities and social changes on offer attractive. PNOs need to work with Political Authorities to develop and deliver real added value applications made possible by the new technology.

A strong interaction between Political Authorities and the various actors from Network Operators to Information Providers is an implicit requirement. Political Authorities have the opportunity to play a key role in the establishment of the Information Society. Besides co-operation with the communication business in regulation, liberalisation, licensing and the creation of new applications, the Political Authorities could play a major role in providing an environment for financing the infrastructure requirements. The Political Authorities will, through the development of a new communication policy, be regarded as an integral part of the Information Society. The Information Society (with all its

facilities and potentials) will evolve into a cornerstone in the community, whether on local, regional, national or global level.

Key Issues

- A new regulatory structure will be needed for Europe as a whole
- Political Authorities need to encourage the introduction of the Information Society
- The Information Society will have a major impact upon political institutions
- There is a potential conflict between the interests of individuals and that of Political Authorities over security and privacy issues

Suggestions

- A set of rules, guidelines and voluntary codes of practice are needed to create a framework for the market.
- Legal acceptance of digital signatures predicates the movement of commerce into the Information Society
- Training and education is needed to prepare society to take advantage of the new possibilities
- Focus should be placed on the development skills and competencies which add value to information and become the differentiation in the global marketplace
- To control and regulate the Information Society a fresh approach will be required
- A strong interaction between Political Authorities and the various actors from Network Operators to Information Providers is an implicit requirement

2.11 Conclusions

Across the industrial world there is general agreement that we are entering a time of major change that will affect many aspects of the way we live and work. The accumulative effect of these profound changes on individuals and organisations will alter the nature of society itself and bring about the Information Society.

Within the IT industry the winners will be those who make appropriate and timely decisions based upon a coherent and purposeful understanding of the issues. Many of these issues are far more fundamental than just being about technologies, economics and markets. The issues identified in this document may appear to be very diverse, but on closer examination are actually subtly related. Through examination of these issues the document urges a deliberate, prosperous and beneficent Information Society.

Today's PNOs will be radically affected by the new environment but they are also in a position to make positive contributions to the development of the Information Society. However, they cannot achieve this transition on their own. Similarly the development of the Information Society can not be left to either the technologist or marketers alone, a wider debate needs to be encouraged. Different sectors of society will have to work together to achieve the kind of Information Society that will satisfy the people of Europe.

Users, meaning most of the population, will have dramatic changes forced upon the way their lives are lead. They will have to develop new skills to take advantage of the Information Society. The new technologies offer the possibility of improvements in areas such as education and health care and environmentally friendly alternatives to road transport. There is a risk that those who are unable or

unwilling to adopt to the Information Society may become an underclass of this new world. This is a situation that Political Authorities should attempt to avoid from the outset.

Political Authorities within Europe have always been concerned to temper the market with social values, a concept less apparent in the US, Japan or other major groups in the industrial world. Aspiring to an Information Society will exploit the revolution in information technologies to enhance the quality of life for all members of society. In this concept there is a recognition of something new, something challenging, something to develop, a goal for politics; it will exploit Europe's strength.

Within the Information Society two new groups will play an ever increasing role. These groups are the Service Providers and Information Providers. The Service Providers' role will develop from its existing limited position into a retailer of new services, applications and information. They will act as a broker between the end user and the information, networks and services that serve them.

Other issues to be decided in a spirit that will enhance Europe's chances in the Information Society will include the settlement of a new universal services obligation for the future, a pro-active regulatory structure for the European Information Infrastructure, allowing efficient inter-working between different parts of the infrastructure.

Other major issues specifically for PNOs are the increased affects of competition, investments outside the telecommunication industry and the development of new business enterprises active in the new roles of service and information provision and network operation. These business enterprises may buy and sell services from other competitors in addition to, and even in competition, with their own companies.

European Political Authorities as represented by regulatory authorities, industry departments, social departments etc., need to recognise the significant and active role they must play in the Information Society. The impact of the Information Society upon political and administrative institutions must be considered and action taken to ensure that positive steps are taken to phase in appropriate change to their structures. There must be a recognition that they are essential partners in the creation of the European Information Society.

Each of the "opportunities" implied above for the Information Society will become very real threats if the opportunity is not seized firmly, consciously and deliberately. To select one issue from all those raised, it would be that of partnership between the builders of the Information Infrastructure and the representatives of society in bringing about the Information Society. This partnership could be realised, perhaps, by Political Authorities making a commitment to invest in new technologies for areas such as public administration, education and health. This would give the builders a certain assurance of the possibility of a market for the completely new services and technologies they are deploying.

Such action could introduce a dynamism that would not exist at the extremes of total public funding of the infrastructure or totally private funding. With the help of such dynamism, Europe can introduce an Information Society that will give its people pre-eminent advantages in the next millennium.

3. The Region of Attica

3.1 History of Attica and Athens

The history of Attica is in its major part the history of Athens. The olive tree has been treated as sacred in the ancient ages since, according to mythology, goddess Athena gave the city an olive tree as a token of her protection of the city after her conflict with god Poseidon. In antiquity, the history of Athens was illustrious, giving to the human heritage people like Plato, Aeschylus, Euripidis and Sophocles and constructions like Parthenon and the other buildings of the Athens Acropolis.

In 1834 Athens was proclaimed as the capital of the newly formed Kingdom of Greece. the capital to Athens. Until 1834, few years after the revolution from the Turks, when Athens was proclaimed capital of Greece, it was a miserable village with very few people and piles of ancient ruins and stones. Nevertheless it was accepted as a place with a very strong presence of memories of the past. Since it was made the capital, its rebirth from the ruins was initiated. New buildings were built in a close architectural connection with the ancient Greek style, and Acropolis and the rest of the ancient monuments were restored. In 1896 the first modern Olympics were held in Athens.

 Today, Athens, together with Piraeus and the suburban areas form a single urban conglomerate, with 3.600.000 people living and working in it. It is a bustling place, where the Greek political and administrative, commercial, academic and cultural leadership resides, millions of people work and create and also it is burdened with problems, some quite severe. Information Society might be a way to alleviate some of these problems, strengthen social and commercial fabrics and it is apparent, that it is the role of the city and of the people living in it, to lead the rest of the country into the world digital marketplace.

3.2 Population and Distribution

The Region of Attica consists of the Greater Athens and Piraeus urban conglomeration ("the Attica Basin"), the rest of the mainland Attica as well as of 8 small islands. Although it covers only the 2,81% (3808 sq. km) of the total national area, it has almost the 35% of the nation's population, i.e. 3.522.769 inhabitants. It is interesting to see the explosion of the Attica population with reference to the rest of the country since the commencement of recording Census statistics in 19th century.

Census Year	Attica	Greece	%	Change	
				Attica	Greece
1870	136.804	1.457.894	9,38%		
1896	313.069	2.433.806	12,86%	128,84%	66,94%
1928	1.033.211	6.204.684	16,65%	230,03%	154,94%
1940	1.394.021	7.344.660	18,98%	34,92%	18,37%
1951	1.556.000	7.632.000	20,39%	11,62%	3,91%
1961	2.058.000	8.389.000	24,53%	32,26%	9,92%
1971	2.798.000	8.769.000	31,91%	35,96%	4,53%
1981	3.369.000	9.740.000	34,59%	20,41%	11,07%
1991	3.522.769	10.264.156	34,32%	4,56%	5,38%

Population Increase : Attica vs Greece
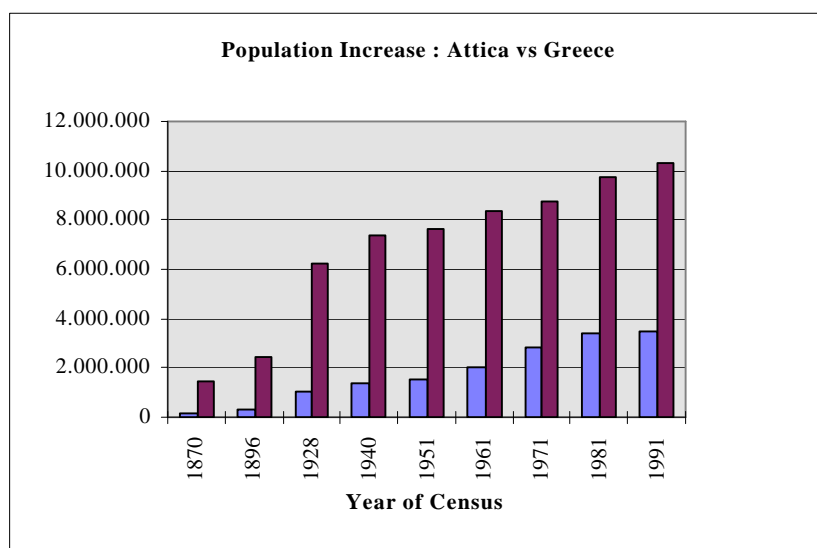
The trend of urbanisation is evident. As a consequence, the role of Athens as a capital, is much more important than perhaps any other European country, to the disadvantage of the periphery and the city itself.

3.3 Economic Structure

The average density of the population, is 925 people/sq. km but in the Attica Basin this index is 7090 people/sq. km. The active population is 1.304.000 (45,7%). It is distributed as follows :

1. Primary Sector : 1,2%
2. Secondary Sector : 29,6 %
3. Tertiary Sector : 69,2%

In 1991 the unemployment figure in the region reached 9,9% which is higher than the national average (7,7%) hitting with greater impact (30,3%) young people below 25 years of age. 13,5 % of the people are above 65 years of age.

The per capita GRP (Gross Regional Product) is about 105% of the national average but only 51% of the EU average. On the other hand the region contributes to the GNP by 36%.

Attica has an advantage by its high level of skills of its workforce.

The insignificant primary sector (2,22% of the GRP) is pressed further more by the intense tendency for buildings and construction, a reason for the severe forestry depletion. The secondary sector possess the 26,17% of the GRP. In the region we observe the concentration of the 38,5% of the country's industries with a total number of about 50.000 units (5,23% and 19% correspondingly of the economic activity of the region). The Census figures of 1988-1992 show trends of industrial decline, however the Region is still the premier industrial centre in Greece with a considerable specialisation in the dynamic sectors of the Greek economy.

The tertiary sector (71,61% of the GRP) is the only one which shows increasing tendencies, having as most dynamic sectors commerce (21,9%), banking (8,7%) and services (26,7%). Tourism specifically (77.400 beds capacity and contribution to the total employment by a 6%) during the last decade showed a decline by almost 20% in hotel occupancy, mostly due the unattractiveness of Athens as tourist destination which in turn is due to aggravation of urban problems and atmospheric pollution.

In the region terminate the two principal national highways and railways while the port and air terminals are the main country's gateways servicing loads of 21,3 m passengers and 136 m tons of cargo annually. In the Attica Basin there are the 43,6% of the vehicles of the country.

Today, all systems in the region present intense phenomena of saturation and malfunctioning. The environmental situation is reaching frightening levels. The pollution, a cause created by the vehicles and industry, is responsible for the well known "Athens smog" problem. Industry is dumping in the sea 150.000 cubic meters of waste daily while the region is generating 4.000 tones of garbage every single day, which in relation to the haphazard and without proper infrastructure, economic and urban development has created severe environmental problems with grave social consequences.

3.3.1 Basic Economic Figures of the Region

Constitution (%) of the Gross Regional Product per Sector		
	1981	**1991**
Primary Sector	1,93	2,09
Secondary Sector	29,84	26,14
Tertiary Sector	65,23	71,77
Total of Domestic Production	100	100

Sectoral Distribution of the Gross Regional Product (million Drs)			
	1981	**1991**	**1994**
Mines	1.286	2.585	3.064
Agriculture - Animals - Forestry - Fisheries	12.790	91.068	128.084
Power - Gas - Water	10.773	111.115	169.893
Banking - Insurance - Real Estate	27.994	189.218	258.255
Construction	38.358	215.848	277.937
Health - Education	44.771	343.017	531.614
Housing	55.079	366.228	598.826
Various Services	60.192	310.361	569.440
Public administration - Security	79.010	540.512	738.225
Transport - Communications	77.140	404.079	583.723
Commerce	106.815	620.268	971.146
Industry	146.807	718.582	1.002.727
Total	**661.015**	**3.912.881**	**5.832.934**

Basic Social & Economic Indices of the Region of Attica					
	1991	**1992**	**1993**	**1994**	**1995**
Population	3.523.407	3.510.566	3.494.774	3.487.074	3.464.866
Employed	1.315.600	1.350.500	1.348.100	1.376.100	1.401.900
Unemployed	144.200	157.800	183.000	185.600	185.700
Unemployment	9,9%	10,5%	12,0%	11,9%	11,7%
Gross Regional Product (GRP)	3.936.739	4.548.253	5.288.725	5.832.934	6.561.896
GRP per Capita	1.117	1.296	1.513	1.673	1.894
Consumer Index	19,5%	15,8%	14,4%	10,9%	9,3%
Public Investments	111.905	72.069	91.889	129.146	128.054
Private Investments	374.412	330.880	353.113	365.227	N/A
Private Vehicles	953.684	981.920	1.045.406	1.103.156	1.170.948
Private Vehicles / Inhabitants	0,27	0,28	0,30	0,32	0,34
Telephones	2.213.048	2.335.967	2.416.896	2.506.090	2.682.696
Telephones / Inhabitants	0,63	0,66	0,69	0,72	0,77
Hotel Beds	71.412	70.845	70.880	71.370	71.522
Primary School Students	316.489	270.730	254.459	239.798	223.263
Primary School Teachers	13.422	13.284	11.656	11.311	11.224
Students / Teachers	24	20	22	21	20
High School Students	160.283	159.938	159.183	156.566	150.156
High School Teachers	9.889	10.065	9.915	10.136	10.761
Students / Teachers	16	16	16	15	14
Lyceum Students	110.839	148.854	153.681	150.994	147.716
Lyceum Teachers	7.613	9.187	10.659	10.855	10.621
Students / Teachers	15	16	14	14	14

3.3.2 Production and Productivity in Attica Region

Attica, just like the other regions of Greece, differentiates from the others in terms of production and consequently in terms of employment, by exploiting its comparative advantages.

The sectors contributing to the largest extend to the GRP and to the regional employment, are the Commerce (wholesale & retail) of Restaurants & Hotels (17,3% of the GRP and 24% of Employment). The corresponding figures for Greece as a whole are 13,8% of the GNP and 22,2 % of Employment. Employment in Attica for this sector shows short term increasing tendencies. In 1992, it employed the 21,6% of the total workforce. The produced output per worker was 2,12 millions Drs for Attica, lower than the national figure 92,36 million Drs).

second sector in terms of importance and size, is industry, which by 1995 employed in Attica the 19% of the workforce vs. 15,1% for the nation. This sector produced the 15,8% of the GRP, considerably higher than the corresponding figure for the country as a whole (13,9%). However, there is a considerable decrease of employment in this sector which in 1992 employed the 23,7% of the workforce. The productivity of the employees in Attica was slightly higher than the national one (4,33 and 4,30 million Drs per employee correspondingly).

Other important sectors with significant contribution to employment was the health sector (13,4%), the Banking - Insurance - Real Estate sector (11,1%), the Communications - Transport Sector (9,6%) and the Public Administration & Social Security Sector (9,6%). In comparison to 1992, the sector which showed increase was the banking sector, while the rest remain roughly at the same levels.

From the productivity viewpoint, the highest output per worker, is produced by the Construction Sector (14,31 mDrs), various services Sector(8,89 mDrs), Power - Gas - Water Sector (7,91 mDrs), Public Administration and Social Security Sector (6,88 mDrs) and the Communication - Transport Sector (6,05 mDrs). Peculiarly, very low productivity shows the banking sector (2,12 mDrs), since it is widely accepted that the bank employees are amongst the highest paid workers.

Conclusively, we may observe that employment in Attica Region shows significant differentiation from the national patterns. Primary sector is practically non existent, secondary sector (which employs one in every four workers), shows decreasing employment (only in industry, while in Construction and Water, employment is stable) and finally, the tertiary sector (already employing three out of four workers) shows considerable increase.

With regards productivity overall, the average figure for Attica is considerably higher than the national average (5 vs. 4,5 mDrs correspondingly).

3.4 Urban Characteristics of the Attica Basin

The Urban Conglomeration of the Capital (UCC) is defined by the mountainous areas around it. Therefore there are quite few entrances - gateways, which are mostly in the levelled areas between the mountains. Housing remains the principal and most extended land use. Its extension has been inhibited by the physical borders of the basin, i.e. the mountains and the coastline.

The traditional centres of the Basin, the cities of Athens and Piraeus, are nowadays the metropolitan nuclei of the UCC, with Athens dominating. Drawing the structure of the UCC, reveals the linear expansion along the basic axes of traffic, with a N-S direction, for both the central functions and the industrial activities, which function as obstacles for the housing structures.

Land Use

1. Housing

   A decisive factor for the development of housing in the capital was the rapid increase of the population after the 2d World War. During the 1951-81 the population of the UCC was doubled and the construction activities were very intense. The ways for housing construction were a) self-housing, b) commercial production c) production from state authorities. In contrast with other European countries, the housing programmes of the state played an insignificant role, without influencing much the housing development.

   The housing activities were a private initiative. The state was absent in regulating and controlling housing development. The legal framework was proved insufficient for the creation of a city with satisfactory environment level. Dense housing areas is the norm, while no measures were taken for reserving areas for social service facilities.

   From 1980 and onwards the north and south municipalities of the UCC, received substantial influx of population, becoming preference zones for housing. At the same time and for the first time in its history, the Municipality of Athens showed a decline of population (-15.5%) due both the trend towards the suburban and the competition from other land uses.

2. Industry
   The establishment of the industry in the UCC was not based on sound planning of zones specially designed for this purpose (organised industrial zones, industrial parks etc.). In contrast it was concentrated in areas having the best prerequisites for establishment (availability of land along main traffic roads). Industrial use covers an area about 4.640 ha. Various units cover an area of 2140 ha (46%) with 214.000 people working in them while areas of industrial concentrations cover an 2500 ha surface with 128.000 people.

   Industry has been developed mainly in the west (along the Kifissos river) and around the port of Piraeus. This concentration today forms an industrial axis splitting in two the housing structures. This dense concentration has created severe problems in the function of the city, in the environment quality but also, in the proper function of the industrial enterprises themselves. For relieving the situation, the Thriasion field, (west of the Attica Basin) became the point of concentration of the heavy industry, with national importance, while a secondary point was created along the national road at the north of the basin.

3. Main Functions & Administration
    In the boundaries of the Municipality of Athens (the nucleus of the UCC), are concentrated the main functions with a metropolitan character. An exception is the Municipality of Piraeus which maintains functions of national importance, specialised in shipping and marine related fields. All Ministries are located within the boundaries of the Municipality of Athens, with the exception again, of the Ministry of Mercantile Marine which is in Piraeus.

    There is a series of problems with this situation. The Central administration is not in buildings designed to meet its needs but in buildings available in the real estate market. Inevitably, there is very bad quality, complete lack of ergonomic design of the available spaces and the fragmentation of Ministries in many buildings. 19 Ministries departments are accommodated in 183 buildings with only a 19% belonging exclusively to the State, while the rest are on rent.

    With all Ministries in the centre there is a very big number of travels for both public servants and citizens, loading further more the centre of Athens. Access is problematic.

    Some ambitious relocation projects were not implemented for various reasons, so it is expected that the relocation will be at a small scale, mainly towards West Attica (Agioi Anargyroi - Peristeri) and towards the north (Marousi - Likovrisi).

    In the centre we have the biggest concentration of other main functions as well (Bank, Insurance headquarters, law firms, engineering offices, large corporations headquarters etc.) From the middle 1980's and onwards however, we observe an expansion of such activities on the N-S axis, along the main UCC arteries of the Kifissias and Syngrou Ave. In general the trend for moving away from the centre, is mainly due to the traffic and environment conditions. The main phenomenon is also observed in the centre of Piraeus, with the traditional shipping companies.

    With regards retail commerce, traditionally the centre of Athens ("the commercial triangle") had a dominant role with a metropolitan range. During the last decade, there is a very strong trend for the creation of peripheral commercial centres which created a sharp decline for the Athens centre.

4. Health
    With regards the hospital bed capacity, the Attica Basin has almost the 50% of the national total. It becomes evident that the health related infrastructure of Attica, has a national importance.

    However, there is a dense concentration of hospital units in the Municipality of Athens (55%) and in particular in its east sector. A second pole of concentration exists at the north (mainly private operations) creating thus an axis of health care along two main avenues (Vas. Sofias and Kifissias Ave). There is a very bad health service for the west of the UCC (there is no hospital there) while the south has better accessibility to the Athens hospitals. Needless to say, most specialised medical and health services are close to the hospitals.

    So the distribution of health care facilities are :

    - badly distributed with reference the whole country
    - badly distributed within the Attica Basin

5. Green Spaces
    With regards the green zones around the UCC, we refer mainly to the mountainous zones. The forestry on these mountains is problematic, with grave soil erosion phenomena. Thus, there is no sufficient relief for the environmental problems of the city, control of the temperature changes and of air pollution. In particular, we face problems at Aigaleo and Ymittos mountains while the north Parnitha and Penteli mountains have a better coverage.

    Within UCC, the situation is very insufficient. There is a relation of 2,25 Sq. m per capita, while the minimum internationally accepted standard is 7,5. This situation is due to the inability of the state to reserve spaces for this purpose.

In the boundaries of the Municipality of Athens, the situation is relatively good (5,3 sq. m per capita). This is due to the existence of parks with metropolitan importance (National Garden, Champ de Mars, Acropolis zone). The situation is terrible in the west of Attica Basin and in Greater Piraeus.

3.5 Employment - Social Structure

It is evident that the issues which deal with the workforce of a region (employment structure - unemployment) and the economic activities which in turn influence the constitution and the distribution of income, represent important factors for the development. Moreover, they define the framework of the development interventions and actions.

3.5.1 Employment Patterns

Basic Figures of the Labour Market in Attica Basin vs National Figures							
	Total	14 years	15-19 Years	20-24 Years	25-29 years	30-44 years	45-64 years	>65 Years
National Total								
Active Population	4.248.528	4.035	118.080	403.879	556.557	1.634.152	1.402.895	128.930
Employed	3.823.809	3.298	76.111	289.699	465.236	1.519.779	1.341.974	127.712
Unemployed	424.719	737	41.969	114.181	91.320	114.373	60.291	1.218
Unemployment	10,0%	18,3%	35,5%	28,3%	16,4%	7,0%	4,4%	0,9%
Attica Basin								
Active Population	1.429.312	449	33.057	151.001	222.650	596.974	409.400	15.781
Employed	1.258.641	374	17.725	106.501	185.853	550.754	382.177	15.257
Unemployed	170.671	75	15.332	44.500	36.797	46.220	27.224	524
Unemployment	11,9%	16,7%	46,4%	29,5%	16,5%	7,7%	6,6%	3,3%

Source : National Statistics Service of Greece 1995

Unemployment : Greece vs. Attica
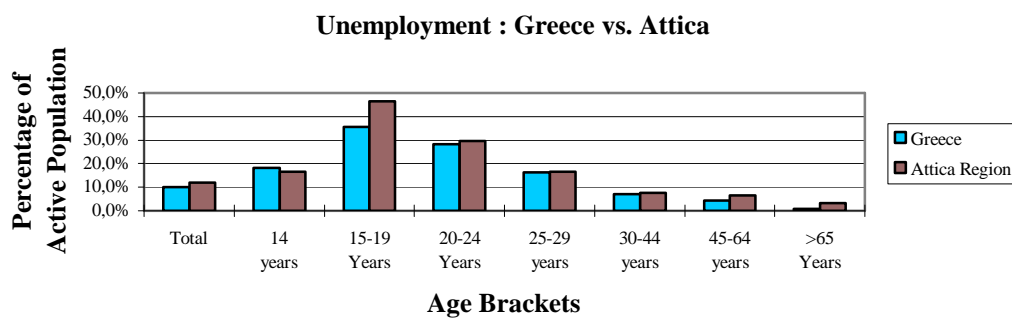
The structure of employment of the active population per sector in the Attica Basin has as follows :

Municipalities	Agriculture/Mines		Industry		Energy		Construction		Commerce		Transport/Communications		Banking		Other Services		Other	
	1971	1981	1971	1981	1971	1981	1971	1981	1971	1981	1971	1981	1971	1981	1971	1981	1971	1981
Attica	1,2	0,6	29,8	26,5	1,4	0,9	10,7	9,5	17,8	16,4	11,1	11,7	5,8	6,9	17,8	22,3	4,4	4,9
Athens	0,9	0,6	22,2	22,6	1,6	1,1	7,3	7,1	19,8	17,4	9,1	9,2	9,2	9,1	22,8	28,4	7,2	4,5
West Attica																		
ASDA	1,3	0,6	38,8	35,0	1,2	0,8	18,2	15,1	14,8	14,5	10,7	11,1	1,9	3,1	10,4	14,3	1,7	5,5
Ag. Anargyroi	1,9	0,5	36,2	32,7	0,9	0,7	16,8	14,7	14,8	14,6	11,3	10,2	2,6	4,7	13,9	15,3	1,7	6,5
Aigaleo	1,1	0,3	43,8	41,0	1,1	0,6	14,0	11,9	15,4	15,0	1,6	11,6	2,0	2,5	10,5	13,2	1,4	3,9
Elefsina	5,9	2,7	50,2	55,9	0,6	0,0	12,2	12,0	9,6	7,6	10,2	7,4	1,2	1,2	7,4	9,2	2,7	3,9
Haidari	1,3	0,2	36,7	34,2	1,1	1,0	12,1	9,6	14,1	14,3	15,8	12,7	1,9	3,8	15,4	19,6	1,6	4,7
East Attica																		
Ag. Dimitrios	0,9	0,3	32,8	30,7	1,2	1,1	20,7	16,9	16,0	15,0	11,5	11,9	2,4	4,2	12,0	15,5	2,4	4,5
Argyroupoli	1,2	0,1	29,7	28,7	0,7	0,7	18,8	13,4	18,3	16,6	10,6	11,6	3,1	3,9	15,6	19,7	1,9	5,2
Dafni	0,8	0,2	33,8	29,5	1,3	0,5	11,4	10,6	18,5	19,4	11,0	10,8	4,2	5,0	17,0	19,3	1,9	4,7
Kaisariani	0,8	0,2	29,7	23,2	1,7	1,1	12,2	10,9	21,0	20,5	7,8	9,3	5,0	7,7	18,6	23,6	3,1	3,9
North Attica																		
Erithrea	1,7	1,3	22,0	21,0	1,7	0,6	19,9	17,4	18,6	18,4	10,3	9,5	3,5	6,9	16,2	16,8	6,1	8,1
Iraclio	0,9	0,4	42,0	31,4	1,6	1,3	14,2	12,2	14,2	11,7	8,6	10,1	3,2	6,3	13,1	20,6	2,2	6,0
Nea Ionia	0,6	0,9	45,3	37,1	1,2	0,9	15,7	13,3	15,8	14,1	7,1	8,3	2,0	4,3	10,7	14,3	1,5	6,8
Halkidona	1,2	0,6	34,6	29,3	1,5	0,6	9,7	8,8	17,4	19,4	9,6	8,0	6,3	6,8	18,6	22,3	1,1	4,3
South attica																		
Alimos	2,3	0,2	22,3	21,3	1,1	0,5	11,3	10,3	19,7	21,2	12,5	14,3	4,6	8,2	22,7	18,6	3,5	5,4
Kallithea	0,6	0,4	33,2	28,8	1,5	0,7	7,5	7,8	17,2	17,8	11,4	12,1	6,1	6,8	19,2	20,5	3,3	5,1
Lavrio	8,5	9,5	54,8	48,3	7,5	1,3	6,9	6,6	9,0	9,3	4,6	6,0	0,9	1,1	6,5	9,8	1,3	8,0
Moshato	1,4	0,3	43,8	34,9	2,1	1,0	8,8	8,6	15,4	14,4	11,3	13,0	3,5	6,2	12,0	17,8	1,8	3,8

| Municipalities | 1973 | | 1978 | | 1984 | | 1988 | | Change | | | | | | | |
| | | | | | | | | | 1973/78 | | 1984/78 | | 1988/84 | | 1988/73 | |
	Units	Employees	Units	Employees	Units	Employees	Units	Employees	Units	Employees	Units	Employees	Units	Employees	Units	Employees
Attica	35.999	221.632	47.332	287.020	48.631	241.452	48.656	246.880	31,5%	29,5%	2,7%	-15,9%	0,1%	2,2%	35,2%	11,4%
Athens	18.677	90.887	18.547	89.696	17.504	70.972	16.532	70.364	-0,7%	-1,3%	-5,6%	-20,9%	-5,6%	-0,9%	-11,5%	-22,6%
West Attica																
ASDA	5.022	41.740	6.966	46.900	8.084	41.759	8.167	41.672	38,7%	12,4%	16,0%	-11,0%	1,0%	-0,2%	62,6%	-0,2%
Ag. Anargyroi	375	2.343	478	2.770	627	1.862	587	1.967	27,5%	18,2%	31,2%	-32,8%	-6,4%	5,6%	56,5%	-16,0%
Aigaleo	1.100	10.839	1.501	12.298	1.479	10.084	1.459	9.875	36,5%	13,5%	-1,5%	-18,0%	-1,4%	-2,1%	32,6%	-8,9%
Elefsina	239	7.785	286	9.657	269	8.404	315	6.540	19,7%	24,0%	-5,9%	-13,0%	17,1%	-22,2%	31,8%	-16,0%
Haidari	525	8.137	355	6.976	463	6.453	468	5.511	-32,4%	-14,3%	30,4%	-7,5%	1,1%	-14,6%	-10,9%	-32,3%
East Attica																
Ag. Dimitrios	839	4.215	1.009	4.761	1.322	5.331	1.397	5.097	20,3%	13,0%	31,0%	12,0%	5,7%	-4,4%	66,5%	20,9%
Argyroupoli	241	1.193	293	1.232	390	1.725	378	1.563	21,6%	3,3%	33,1%	40,0%	-3,1%	-9,4%	56,8%	31,0%
Dafni	622	2.261	584	2.010	554	1.676	546	1.585	-6,1%	-11,1%	-5,1%	-16,6%	-1,4%	-5,4%	-12,2%	-29,9%
Kaisariani	322	1.143	315	1.014	289	792	401	1.068	-2,2%	-11,3%	-8,3%	-21,9%	38,8%	34,8%	24,5%	-6,6%
North Attica																
Erithrea	82	607	83	860	102	803	93	761	1,2%	41,7%	22,9%	-6,6%	-8,8%	-5,2%	13,4%	25,4%
Iraclio	450	3.324	553	3.455	585	2.924	555	2.895	22,9%	3,9%	5,8%	-15,4%	-5,1%	-1,0%	23,3%	-12,9%
Nea Ionia	1.241	8.089	1.207	7.085	1.299	6.991	1.305	6.853	-2,7%	-12,4%	7,6%	-1,3%	0,5%	-2,0%	5,2%	-15,3%
Halkidona	145	1.234	142	1.645	138	1.130	145	1.168	-2,1%	33,3%	-2,8%	-31,3%	5,1%	3,4%	0,0%	-5,3%
South attica																
Alimos	333	4.488	200	1.883	323	5.125	305	3.118	-39,9%	-58,0%	61,5%	172,2%	-5,6%	-39,2%	-8,4%	-30,5%
Kallithea	1.305	7.525	1.722	7.858	2.001	7.318	1.998	7.910	32,0%	4,4%	16,2%	-6,9%	-0,1%	8,1%	53,1%	5,1%
Lavrio	53	3.268	72	2.866	84	2.896	70	3.305	35,8%	-12,3%	16,7%	1,0%	-16,7%	14,1%	32,1%	1,1%
Moshato	722	11.253	893	11.825	969	9.478	802	7.701	23,7%	5,1%	8,5%	-19,8%	-17,2%	-18,7%	11,1%	-31,6%

3.5.2 Income Constitution and Distribution

Spatial inequalities, unwanted in most countries, are due to the fact that the development and prosperity of the people living in certain areas is retarded, with a consequence the necessity, usually expensive, of structural interventions at a financial and social level.

In Greece, a 35% of the population lives in the Attica Basin (a 51 % of the total number of city dwellers). This population volume is not uniform in its constitution nor evenly distributed, spatially speaking. The centre, Municipality of Athens, is surrounded by several other municipalities and communities with very different social and financial attributes. Consequently, the Constitution and Distribution of household income varies greatly as can be seen in the following table.

District	Municipality / Community	Average Gross Income	Average Net income	Net/Gross (%)
North - Northeast	Ag. Paraskevi, Holargos, Papagou, N. Penteli, Ekali, N. Erithrea, Kifisia, Metamorfosi, Marousi, Pefki, Filothei, P. Psihiko, N. Psihiko, Iraklio	1822,6	1564,6	85,84%
Rest of East Attica	Zografou, Vironas, Kaisariani, Ag. Dimitrios, Dafni, Imittos, Ilioupoli	1586,2	1371,5	86,46%
West	Galatsi, N. Philadelfia, N. Ionia, N. Liosia, Kamatero, Petroupoli, Ag. Anargiroi, Halkidona, Peristeri, Haidari, Ag. Barbara, Aigaleo	1490,2	1328,4	89,14%
South	Argyroupoli, Moshato, Kallithea, Alimos, Glyfada, Voula, Tavros, N. Smirni, P. Faliro, Kalamaki, Vouliagmeni	1971,1	1698,9	86,19%
Piraeus	Koridallos, Nikaia, Drapetsona, Keratsini, Rentis. Piraeus	1687	1498	88,80%
Athens I	Pagrati, N. Kosmos, Abelokipi, Hilton, Kolonaki, Neapoli, Gyzi, Exarhia, P. Areos, Kipseli, Poligono	2138,9	1865,3	87,21%
Athens II	Patisia, Ag. Meletiou, Aharnon, attiki, Sepolia, Kolonos, Plaka, Metaxourgio, Petralona, Koukaki	1736,5	1503,8	86,60%
Total		1776	1548,6	87,20%

By looking closely to the characteristics of the region's income (size and source for both the gross and the net form) we observe substantial variations amongst the capital's zones. The zones North - Northeast, the South and the zone Athens I have an average gross income much higher than the rest or the total average. The zone Athens I can be said that is the "richest" in contrast with the west, which is the "poorest" and its income is by 16,1 % below the average income for the whole region or by 36,5% below that of the richest area.

By sorting households on the basis of the average net income (I.e. after taxes and social contributions) we observe that the relative advantage of the "rich" areas is maintained. Therefore the taxing and social security system does not function towards the elimination of variations. The percentage of the net income into the gross, varies between 85,8% and 89,1% (with an average of 87,2% for the region as a whole). The contribution is highest in the west (89,1%), which because of being poorest, accepts lower taxes and social security contributions.

The income constitution per type of source, varies also considerably as can be depicted in the following table.

District	Municipality / Community	Salaries	Business activities	Fixed Assets Income	Agriculture	Pensions	Social Provisions	Other Sources	Total Gross Income
North - Northeast	Ag. Paraskevi, Holargos, Papagou, N. Penteli, Ekali, N. Erithrea, Kifisia, Metamorfosi, Marousi, Pefki, Filothei, P. Psihiko, N. Psihiko, Iraklio	52,1	19,8	6,3	0,1	18,6	0,8	2,3	100
Rest of East Attica	Zografou, Vironas, Kaisariani, Ag. Dimitrios, Dafni, Imittos, Ilioupoli	45,5	22,3	3,2	0,7	23,1	0,3	4,9	100
West	Galatsi, N. Philadelfia, N. Ionia, N. Liosia, Kamatero, Petroupoli, Ag. Anargiroi, Halkidona, Peristeri, Haidari, Ag. Barbara, Aigaleo	52,8	17,4	4	0,8	20	0,4	4,6	100
South	Argyroupoli, Moshato, Kallithea, Alimos, Glyfada, Voula, Tavros, N. Smirni, P. Faliro, Kalamaki, Vouliagmeni	51,8	21,8	5,7	0,2	17	0,2	3,3	100
Piraeus	Koridallos, Nikaia, Drapetsona, Keratsini, Rentis. Piraeus	53,1	18,9	3,7	0,7	17	0,3	6,3	100
Athens I	Pagrati, N. Kosmos, Abelokipi, Hilton, Kolonaki, Neapoli, Gyzi, Exarhia, P. Areos, Kipseli, Poligono	46,5	18,8	12,6	0,5	17,4	0,2	4	100
Athens II	Patisia, Ag. Meletiou, Aharnon, attiki, Sepolia, Kolonos, Plaka, Metaxourgio, Petralona, Koukaki	52,7	20,5	4,7	0,7	16,5	0,4	4,5	100
Total		51	20	6,1	0,5	18,3	0,3	4,3	100,5

The income from salaries is the main source of income for an average 51%. The zone Athens I and the rest of East Attica, have the lowest contribution of salaries (46,6% and 45,5% correspondingly) while they have high contributions, the former from fixed assets (12,6%) and the latter from business activities (22,3%).

The spatial comparisons with regards to the intensity and extend of the income inequalities in every zone, are presented in the following table, using Gini factor. The variation of this factor from zone to zone, reflects the different distribution of the income which exists at the various layers of the population. The gretest inequality exists at the south zone and secondly the Athens I zone. The relative unevenness existing in the households of these zones and the great distance between "rich" and "poor", increase the value of the Gini factor which is sensitive to these variations. The greater uniformity is existing at the north - North East zone.

District	Municipality / Community	Gini Factor
North - Northeast	Ag. Paraskevi, Holargos, Papagou, N. Penteli, Ekali, N. Erithrea, Kifisia, Metamorfosi, Marousi, Pefki, Filothei, P. Psihiko, N. Psihiko, Iraklio	0,3401
Rest of East Attica	Zografou, Vironas, Kaisariani, Ag. Dimitrios, Dafni, Imittos, Ilioupoli	0,3225
West	Galatsi, N. Philadelfia, N. Ionia, N. Liosia, Kamatero, Petroupoli, Ag. Anargiroi, Halkidona, Peristeri, Haidari, Ag. Barbara, Aigaleo	0,3023
South	Argyroupoli, Moshato, Kallithea, Alimos, Glyfada, Voula, Tavros, N. Smirni, P. Faliro, Kalamaki, Vouliagmeni	0,3256

Piraeus	Koridallos, Nikaia, Drapetsona, Keratsini, Rentis. Piraeus	0,3121
Athens I	Pagrati, N. Kosmos, Abelokipi, Hilton, Kolonaki, Neapoli, Gyzi, Exarhia, P. Areos, Kipseli, Poligono	0,3427
Athens II	Patisia, Ag. Meletiou, Aharnon, attiki, Sepolia, Kolonos, Plaka, Metaxourgio, Petralona, Koukaki	0,3334

Income Comparison
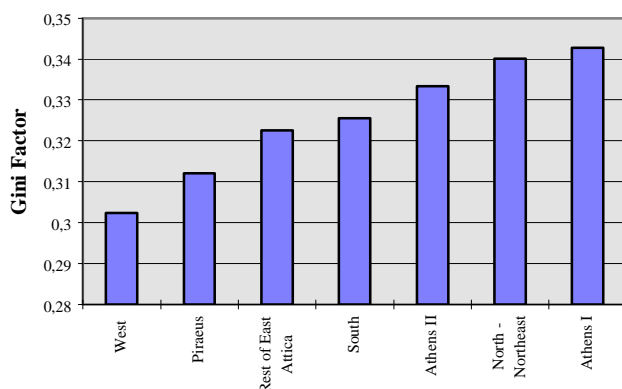
3.6 Goals - Development Strategy & Axes of Intervention

It is officially stated that it is not possible to pursue further development of the region and of the Attica Basin in particular without freeing the vital arteries and restructure the financial activities on a more rational basis. This statement has been adopted by the Greek Government and has been included as mission statement in the Regional policy leg of the 2d Community Structural Funds. The regional strategy adopted aims to give solutions to more than one problems. The effort is towards stopping the decline phenomena through complementing and activating the current structures. Furthermore, sustainable and balanced development of new financial activities will be pursued.

This strategy focuses to the following objectives :

- Restructuring of the spatial planning of the financial activities and supporting of their development.
- Amelioration of the quality of life and of the functioning of the infrastructures.

For achieving these objectives the Greek state, with the support of the European Union has designed the following axes of intervention :

- Urban environment and quality of life.
  - It is aimed to improve the quality of life solving problems in the sewage systems and waste management (the major centre for urban waste processing in the islet of Psittalia, just off the port of Piraeus operates at a first level. Secondary processing is due to commence operations before the end of the century).
  - The water network requires considerable extensions as well as a water refinery for the needs of the west suburban of the cities of Athens and Piraeus.
  - An acute problem exists with regards landfills for garbage disposal. Current ones are 5 years beyond saturation points and the selection process for new facilities has created severe social problems.
  - extensive parts of the city of Athens require urgently anti-flood protection works.

- Extensive intervention with regards new forestry has been designed, in particular on the mountains surrounding the Attica Basin. Moreover the state and the local authorities have designed an important set of works for the coasts of Attica.
- Support and relocation of the productive activities.
    - A rich set of selective interventions is under execution for supporting the entirety of productive sectors through constructing important infrastructure works. These measures will relocate some activities on a more rational basis, will upgrade declined areas and will attempt to upgrade the tourist and cultural activities.
    - The Greek state supports strongly applied medical research as well as research related to the productive sectors, actions for the benefit of the (small) primary sector and actions for balancing the functions between the urban zones and zones dedicated to agriculture.
- Traffic and transport
    - Transportation will undergo a deep restructuring. The Athens Metro system is going to extend with two more lines (together with the ageing existing one), scheduled for operation at the end of the century. Public transportation means will be restructured with reference the Metro system, attempting thus to change the habits of the Athenians to use private means instead buses and the metro.
    - The new "Eleftherios Venizelos" airport at the NE of the city of Athens, scheduled for operation early in the 21st century, will be one of the premier air hubs of Europe. At the same time it is expected that the area occupied by the old Hellinikon Airport will be freed to the benefit of the citizens living in the south suburban of Athens.
    - A major public work is the construction of the peripheral expressway linking NE with SW (Stavros - Elefsina) which will give great relief to the urban centre, will facilitate cargo transport and will reduce the time needed to bypass the city by almost 30 min. This road will be complemented by intercity roads and terminals construction.
    - Extensive works, including state-of-the-art EDP systems are designed for the Port of Piraeus, in order to play its role as the main gateway of the country with regards import-export activities and increase its share in the Mediterranean trade.
- Human Factor
    - Priority has been given to continuous education & training programmes in high technology fields, attempting thus to maintain and advance the existing industrial level and the level of the tertiary sector as well as to improve the productivity in these sectors.
    - Also top priority are programmes for fighting unemployment and exclusion from job markets which has taken frightening proportions. In certain areas (e.g. Lavrio, a city about 50 km south of Athens, with an unemployment rate close to 50%) alternative forms of employment are sought. However other areas and fields (most notably the ship repair zone of Perama, west of Piraeus, with an unemployment rate hitting 60%)   very little have been done.

3.7 Piraeus - The City, its History and the Role of the Shipping Industry

The City of Piraeus is the third largest city of Greece (following Athens and Thessaloniki), having a population of 671.631 inhabitants according to the 1991 National Census. Piraeus is the largest port of Greece, home port of the premier merchant fleet on earth and consequently has a heavy concentration of shipping related businesses, which give the character of the city. The city of Piraeus has six distinct Municipalities, those of Piraeus, Keratsini, Drapetsona, Korydallos, Nikaia and Perama. About 488.000 inhabitants live within the administrative borders of the Municipality of Piraeus.

Traditionally, Piraeus was the workhorse of the Greek industry, particularly during the second half of the 19th century. After 1922, because of the amelioration of the land transportation means and the availability of cheap labour from other parts of the country, Piraeus loses its economic advantage and slowly is going towards a de-industrialisation. This trend accelerated considerably after 1980 when many important units ceased operations.

During the period between 1960 and 1980, when Greece became a full member of the European Union, Piraeus followed the basic economic trends of the country as a whole. There was a strong investment activity in industrial activities, however, without any sound planning, which resulted in

unbalance, uneven distribution, strong employment and low technology base. Thus, the collapse became inevitable, with hardest hit, the heavy industry sectors, such as steelworks, chemical, textiles and shipyards. When other European countries, decided to focus on high technology and high value added sectors, in order to face the emerging countries, mainly from Asia, Greek governments tried to assist the said industries with short term results without any longer term prospects.

After 1980, all industrial sectors, having low productivity, low technology, lacking research and development, and having labour intensive character, faced problems and several companies disappeared, creating an unemployment figure considerably higher than the national average.

Today, after 15 years in the European Union, industry in Piraeus still tries to survive, having reduced employment and having done some technology upgrades. Structural problems still exist and may possible be around for several years. These are :

- Low investment, both public and private.
- Low productivity
- Low technology base.
- Lack of research and development.
- Lack of highly skilled personnel.
- Focus on traditional consumer sectors.

In addition, we have to add the wrong decision of the state to assume the responsibility of several big and important companies.

3.7.1 Economic Activities - Employment and Distribution

The 74 % of the industrial enterprises of the Greater Piraeus are within the Municipality of Piraeus. Specifically, Piraeus has the 77% of small enterprises, 67% of medium size enterprises and almost all (90%) of large enterprises.

In Nikaia we have the 9% of the industrial enterprises, mostly small and medium, operating in textile, clothing, metal processing and electrical engineering sectors. In Perama, we have also a 9% of the industrial enterprises, mostly small and medium. Drapetsona has a 3 % of the industrial enterprises (mostly in food and beverage sector), in Keratsini a 4% (small and medium enterprises in the transportation sector) and in Korydallos a 1,5%.
An 86% of the commercial enterprises are located in Piraeus. We have here the 82% of all small companies, a 93% of the medium size and 75% of large companies. Nikaia has a 6% of the commercial enterprises of the city, mostly small retail shops. Perama has a 4% of the commercial enterprises (mostly small and medium retail companies). Keratsini has another 4%, mostly small retail shops and finally Korydallos has an 1% of the commercial enterprises with one major wholesale enterprise.

We have to underline here the role of shipping in the Piraeus industry. As examples :

- In the transportation sector, 97% of the total are ship repair and construction companies, leaving simply a 3% for the automobile related activities.
- In the mechanical engineering sector, 80% are activated in ship related electrical and mechanical business.
- In the printing - publishing sector, 83% of the total are working with nautical publications.

3.7.2 The Distribution of the industrial activities with regards size

The 6.780 industrial enterprises of the greater Piraeus region (recorded in the 1988 National Economic Census) are classified as follows with regards their size :

Number of Employees	Number of Companies	%	Total work force	%
0-1	2843	41,92%	2841	8,78%
2-4	2873	42,36%	7465	23,06%
5-9	686	10,12%	4352	13,44%
10-49	335	4,94%	5908	18,25%
50-99	17	0,25%	1134	3,50%
100-249	13	0,19%	2213	6,84%
250 and more	15	0,22%	8458	26,13%
Total	6782	100%	32371	100%

From this table, it is observed that 5716 units with 0-4 employees are the 84,3% of the total and employ 10.306 employees or the 31,9% of the total. 1021 units with 5-49 employees are the 15% of the total and employ 7460 employees or the 34,6% of the total.

Overall, companies with 0-49 employees cover the 99,3% of the total and the 63,5% of the entire workforce.

30 enterprises with 50-249 employees represent the 0.4% of the total and employ 3350 people or the 10,3% of the entire workforce in industry.

Given the definition used in the European Union, that small, Medium and large companies are those with 0-50, 50-249 and more than 250 employees respectively, we estimate that more than 95% of the Piraeus industries are small, 0.4-0.5% are medium sized and 0.2-0.3% are large companies.

3.7.3 Unemployment

The developments in the Piraeus economy, illustrated by the figures presented earlier, created a severe unemployment problem, which is amongst the highest in the country (18% as opposed to the 10,4% national average).

According to the skills and specialisation, the unemployment in the Greater Piraeus area is as follows :

Specialisation	Percentage of the overall sector workforce
Seamen	14%
Ship repair specialisations	61%
Textile workers	39%
Construction workers	20%
Custom Clearance activities	67%
Administrative Workers	11%
Metal Workers	29%
Unskilled workers	21%
Other	12%

During the last years there is an important reduction of employment in the textile, ship repair, clothing, oil and coal products, wood and furniture, food and paper sectors. Stable is the employment in the tobacco, metal products, publishing and basic metal processing sectors. Small increase is observed n the public works, elastics, plastics and electrical engineering sectors while considerable increase exists in the transport and various other sectors of the industry. Overall, the last 15 years, the Piraeus industry saw a net loss of 20,000 jobs.

With regards the level of education, unemployment is structured as follows :

Level of Education	Percentage of the overall workforce
Primary Education	34%
Secondary Education	19%
Technical Institutions Graduates	11%
University Graduates	21%
Post Graduate Degree Holders	7%
Other	8%

With regards the age, unemployment hits mostly the young (32%), a smaller percentage is observed in the 30-45 bracket (19%) and fairly high (27%) in older people.

Given the data of the local Manpower Organisation branches, unemployment in Piraeus regions is as follows :

Municipality	% of the unemployment
Piraeus	16%
Drapetsona	12%
Perama	37%
Nikaia	9%
Korydallos	9%
Keratsini	19%

It becomes evident that the fight against joblessness, is not simply an issue of investments; moreover it is an issue of education in new skills, because availability of jobs in sectors such as textiles and (to an extend) ship repairs will never exist.

3.7.4 The Shipping Industry and the Port of Piraeus

Economic life in Piraeus was always interweaved with the development of the port. From the declaration of Athens as the capital of Greece and the establishment of the Municipality of Piraeus in 1835, the port traffic increased dramatically both in terms of cargo and in term of passengers. As the steam replaced sails in mid-19 century, the port of Piraeus became the premier port of Greece, a position it still has. During the war the port facilities were totally destroyed, first by the blowing of the Clan Frazer ship, secondly by the pointless bombing of the allied air forces and finally by the retreating German forces. As a result, thousands of families emigrated overseas.

After the war, the area around the port became one of the leading shipping centres of the world. The Laws 89 and 378 helped considerably in this direction. Greek ship owners managed rapidly to regroup Greek shipping (after the almost complete destruction of the war), exploiting in full the purchase from the USA of 100 vessels of the "Liberty" class. In 1958, 85 shipping companies were located in Piraeus, instead of the 280 during the 30's. Today, there are more than 800 shipping companies located in Piraeus, covering the 2/3 of the entire Greek-owned merchant fleet.

In 1960, there were 1043 vessels in Greek registers, flying the Greek flag (with a capacity of 5,4 GWT) and 585 vessels under other flags flag (with a capacity of 6,02 GWT). In 1980, the Greek-owned fleet was 3942 vessels strong (a capacity of 41,228 GWT). During the crisis of 1980's, about 1000 vessels were lost from Greek Registers while another 500 were decommissioned. Today (1995) there is a considerable improvement with regards the number of vessels but with a huge increase in capacity : 2925 vessels - 117 millions GWT.

The Greek owned merchant fleet is the 44% of the combined European Union merchant fleet and the 16% of the world fleet.

In 1994, the net income from shipping activities was more than 2 billions USD.

During the past 20 years the Port of Piraeus traffic was increased slightly, but because the traffic of other Greek ports was increased in a much bigger pace, its contribution to the national total was decreased considerably. This is a factor of the development of certain regions of the country on the expense of Athens.

Arrival of ships ('000 GWT)					
	1969	1975	1980	1984	1988
National Total	84.400	121.180	148.266	144.371	177.897
Piraeus	20.574	23.158	26.255	27.092	29.282
%	24,38%	19,11%	17,71%	18,77%	16,46%

Domestic Passengers ('000)				
	1975	1980	1984	1988
National Total	14.426	18.070	17.290	21.548
Piraeus	5.408	5.866	5.248	6.286
%	37,49%	32,46%	30,35%	29,17%

Domestic Cargo ('000 tonnes)				
	1975	1980	1984	1988
National Total	26.170	33.940	37.006	38.302
Piraeus	4.128	4.037	2.470	3.188
%	15,77%	11,89%	6,67%	8,32%

In general the Port of Piraeus is an important passenger port, holding the third place world-wide (because it is the main port for servicing Greek islands). It is also an important cargo port, the 4th in the Mediterranean, playing a serious role in the import - export activity of the nation.

4. Information Society and the Attica Region - Current View

4.1 General

This chapter attempts a review of current situation and future prospects with regards key components of Information Technology & Telecommunications as well as human resources related issues. Evidently, the descriptions are far from being exhaustive or complete.

4.2 Telecommunications

4.2.1 Regulatory Framework

Telecommunications deregulation is expected to cause one of the more profound I.C.T. market transitions of our time. Recognising the need to accelerate the diffusion of telecommunication networks, to facilitate service and network innovation, and to bring down the costs of usage, leading to further development and deployment of new applications and services, the European Commission has promoted and supported the liberalisation of telecommunication markets. The Community telecommunications regulatory framework, which has as its objective the creation of a **liberalised and harmonised European market for telecommunication services** is now nearing completion. A relatively small number of directives, already in a more or less finalised state, remains to be adopted formally. The date for full liberalisation, set for 1 January 1998 and many of the intermediate deadlines laid down in the framework are approaching or have passed.

The Community regulatory framework has evolved out of three basic principles, first set out in the 1987 Green Paper on the development of a common market for telecommunications services and equipment. These are:

(a)   Liberalisation of areas under monopoly
         The process was carried out by the issuing directives liberalising :
         -       the supply of terminal equipment
         -       the supply of value-added services, data communications and voice and data services
                 for corporate networks and closed user groups ("Services Directive")
         -       the provision of satellite services and equipment ("Satellite Directive);
         -       the use of cable TV networks for the provision of liberalised services ("Cable
                 Directive")**;**
         -       the provision of mobile communications services and infrastructure ("Mobile
                 Directive");
         -       the provision of voice telephony and infrastructure ("Full Competition Directive").
         The latter directive leaves open the possibility of additional implementation periods for full
         liberalisation of up to five years for Member States with less-developed networks or up to two
         years for those with small networks, provided they are needed to achieve the necessary
         structural adjustments.

(b)   Harmonisation of the European market
         The harmonisation legislation lays down a body of rules for the creation of a European market
         based on common principles for access to public telecommunications networks and services
         ("open network provision" - "ONP"), a common regulatory environment and harmonised
         standards for services and technologies.

 (c)   Application of competition rules
         In 1991 the Commission published guidelines on the full application of EC competition rules
         (Articles 85, 86, and the Merger Regulation) to the emerging liberalised Community
         telecommunications market. In addition the Commission issued in 1996 a notice on the
         application of the competition rules for access to telecommunications networks.

Despite the fact that the liberalisation and harmonisation directives are based on different Treaty provisions, the Community considers market opening and Community regulatory reform as two aspects of the same process. It is therefore inevitable that there will be a very tight interlinkage between the directives adopted under each of these legal bases.

The state of implementation of deregulation directives in Greece is not, as can be expected, fully aligned with that of other EU member states. Greece, as a Member State with less-developed network, along with other Member states lacking in the development of telecoms infrastructure had requested additional implementation periods for certain of the deadlines laid down in the Mobile and Full Competition Directives. The Commission decided to grant additional implementation periods to Ireland, Luxembourg and Portugal as well as Greece. These derogations relate only to certain provisions of the competition directives, however, and are without prejudice to the obligation on the part of the Member States concerned to implement on time all other provisions of the regulatory package. [regf97]

Derogation for the implementation of the Directive on full competition (liberalising all telecommunications services including voice telephony) had been requested by Greece until January 1, 2003. Similarly, a derogation for lifitng restrictions on use of alternative infrastructure for services already liberalised (all telecommunications services except public voice telephony) was requested by Greece for July 1, 2001. [sreup97]. However, the Commission decided in June 1997, to extend the transition period for full liberalisation of all telecommunications services for Greece only up to 31/12/2000. The following table lists the most important dates in the liberalisation process for Greece.

Key Dates for Telecommunications Deregulation in Greece	
1-10-1997	Liberation of Alternative Telecommunication Networks
18-3-1998	Necessary Legal framework for full liberation of telecommunications including the issue of financing universal access to services
31-12-1999	Announcement of plans for the issue of licenses for the provision of voice telephony services and associated networks
30-6-2000	Publication of terms concerning the granting of licenses for voice telephony services and associated interconnection costs
31-12-2000	Modification of existing licenses and granting of new licenses in order to commence deployment of competitive voice telephony service provision
1-1-2001	Liberation of the market for voice telephony service provision

Outstanding matters
Despite recent initiatives by the Greek Government, Greece has accumulated considerable delay in transposing Commission Directives concerning deregulation. In particular, Directives 93/97/EEC, 94/46/EEC, 95/51/EC, 95/47/EC, 95/62/EC and 96/2/EC are not yet transposed in Greece. The Commission also regards the transposition of the Leased Lines Directive as being incomplete. In addition, the procedure of granting mobile licences has raised concerns regarding conformity with Community legislation. A matter of additional concern is the issue of drafts on the implementation of the forthcoming directives.

4.2.2 National Regulatory Authority

In October 1994, Greece adopted a new telecommunications law (Law n° 2246/94) establishing the National Telecommunications Committee ("EET") as the regulatory authority. EET began to operate in July 1995. The Presidential Decree defining EET's internal rules has not yet been adopted. On 6 February 1997 the Law was amended to bring into general use a declaration procedure for the provision of already liberalised services. A licence is still required in cases where there is a need for

access to radio frequencies, numbers or satellites. Certain of the provisions are not yet, however, in conformity with the Licensing Directive.

EET is responsible for regulatory actions concerning Telecommunications in Greece. EET is an independent authority partly supervised by the Ministry of Transport and Communications. The main tasks of EET are :
* responsibility for planning and implementing National Policy
* monitoring the correct application of related Legislation and imposing of penalties in cases of Law violation.
* management of Spectrum allocation
* granting of licences to Public Telecom Operators
* monitoring the state of competition
* providing consultation for National regulatory actions
* intervening in order to solve differences between telecom operators
* intervening actions (ex price regulation) for the benefit of end-users

4.3 Existing Infrastructure

4.3.1 The Telecom Providers

Telecommunication service provision in Greece was governed by a State Monopoly until fairly recently. The Hellenic Telecom Organisation (OTE SA) was responsible for network development and service provision, except for broadcast services, such as television and radio. Today, it still remains the largest telecom provider and holds a monopoly on the operation of the voice telephony network. A few alternative providers have emerged mainly in the areas of mobile telephony and Internet services. The market is expected to change drastically as the filed becomes more competitive. Pending the liberation of alternative networks, the NTC has received already 7 applications from independent companies or consortia for licenses to build and operate such networks. Most of these prospective new entrants, at least in the short term, target the financial and business sector as potential customers and expect to gain market share for services which are not in offer today or for which demand is much higher than current availability. For these reasons, the region of Attica and in particular the cities of Athens and Piraeus are considered the prime areas for service commencement.

In the sections below we provide brief profiles on the major telecom providers currently in operation :

4.3.1.1 Hellenic Telecom Organisation (OTE S.A.)

The Hellenic Telecom Organisation S.A. (OTE S.A.) was established in 1949 by law No. 1049/1949 of the Greek Government as a state owned and supervised public utility company responsible for developing and operating the public telecommunications network in Greece. OTE was created out of the merger of the state Telegraph company and the local branch of the international Telegraph company Cable & Wireless. In 1994, in alignment with Commission directives, the legislation was revised to allow OTE to function as an anonymous enterprise and cease to be subject to the decrees in force for companies belonging to the Public Sector. The company is based in the Municipality of Athens. The company's duration was set for 100 years starting from 1994. Initially, the Government was the sole shareholder but since 1996 in a two phase privatisation proceeding about 20% of the shares were released to the private investors. The company's turnover for 1997 is estimated at about 2.5 billion ECU. Almost 90% of this income is generated by voice telephony services.

OTE holds a monopoly in the offer of generic telecommunication services. It remains the sole provider of local, long-distance and international telephony in Greece through the fixed public network. The company will retain this exclusive right for voice telephony through the fixed network until 2001 (see section on deregulation).

4.3.1.2 Other Independent Telecom Operator

4.3.1.2.1 GSM Network Providers

In September 1991, the Government announced an open bid for two GSM network licences of national coverage. The two licences were granted in August 1992 to Panafon S.A. and Telestet S.A. respectively. In less than a year (July 1993), the first GSM network installations were activated and mobile telephony was a reality in Greece and Attica in particular.

4.3.1.2.2 Internet Providers

Internet Services emerged as a commercial activity out of the academic community networks and quickly formed into a lucrative but highly competitive market. Two of the pioneers in this field were the National Center for Reasearch and Technology (NCSR Demokritos) and the Institute of Computer Science in Crete (ICS-Forth). From the initiatives of ICS emerged one the largest ISPs, Forthnet S.A. Today there are quite a few providers in the Internet Services scene, including OTEnet a subsidiary of OTE.

A listing of the major Internet Service providers is given below :

Provider Name	Home Page Internet Address (URL)
AcropolisNET	http://www.acropolis.net
AIASnet	http://www.aias.net.gr
Ariadne	http://www.ariadne-t.gr
Compulink	htttp://www.compulink.gr
Domi pliroforiki	http://www.domi.gr
EEXI	http://eexi.gr
Ermis on Line	http://ermis.gr
Internet Hellas	http://internet.gr
Forthnet	http://www.forthnet.gr
Groovy Net	http://www.groovy.gr
Hellas On Line	http://www.hol.gr
IBM Global Network	http://www.ibm.com
Matrix BBS	http://www.kapatel.gr
Hellas Net (Netor)	http://www.netor.gr
OTENET	http://www.otenet.gr

Table 1 : Major Internet Service Providers

4.4 Generic Services

Telecommunication services are considered by themselves to form an independent market belonging to the larger IT industry sector market. The potential of this particular market is largely affected by demand and the degree in which the required infrastructure is developed.

Demand for every telecommunication service at a particular point in time depends on a variety of factors. Determination of the more significant factors influencing the demand and market potential (in terms of penetration) of a particular service is a difficult problem, especially for new services based on novel technologies. The main reason for this is the high rate of change in immature markets based on novel technologies . Of course, the ability to offer a given service depends on the availability of the required telecommunication infrastructure.

The elements of the necessary infrastructure for a given service may consist of network equipment (transmission and switching facilities) or even other services. Based on this distinction we partition the telecommunication service market into generic services (the type of service offered by a particular type of telecommunications network) and value added services (services built on top of generic services). In this sense generic services are classified by the type of network (infrastructure) which is necessary

for their deployment. It should be obvious from the above distinction that investment costs for introducing or upgrading a generic service is in general orders of magnitude higher than the corresponding investment cost of value-added services.

According to the CCITT, telecommunication services offered to end-users are categorised according to the following three types :
a) Bearer Services
b) Teleservices
c) Complementary Services

Bearer Services refer to the actual service offered by the network at its termination point (or customer interface) (ex. the service offered by a regular phone line interface). **Teleservices** refer to services made possible by attaching a particular type of network equipment or device at a given customer interface. (ex. By attaching fascimile equipment at regular phone lines we realise a fax teleservice). **Complementary services** are additional services offered by the Bearer or Teleservice Provider (such as call waiting, call forward, caller ID. **Value added Services** are services relying on teleservices to provide a value-added (in the sense of additional cost) service facility or application (ex. A fax-bureau offers a value added service as do directory services).

A further and more important distinction between network and bearer services is made with respect to support for mobility. A comprehensive but non-exhaustive table of generic services which also illustrates the corresponding status in Greece is given below :

	Service	**Availability**	**Competition**
Fixed Networks	Voice Telephony	x	
	Narrowband-ISDN	x	
	Broadband-ISDN		
	Leased Lines < 2Mb/s	x	Commencing
	Leased Lines > 2Mb/s	Under Terms	Commencing
	Packet Switched Data Network.	x	Internet based only
Mobile Networks	Cellular Telephony	x	Yes
	Paging	x	
	Satellite	x	
	Packet Data Net.		
	Private Mobile Radio		

Table 2 : Generic Telecommunication services in Greece

Access to all the above mentioned available services is possible in the greater Athens metropolitan area (including Pireaus) but some of them are unavailable in certain areas of the Attica region.

In the following sections we provide a general overview of the offered telecommunication services and provide statistical data and correlation with national or EU data where possible. In the cases where data was not available for the region the figures for the whole of Greece are given.

Note :   Where present, the *cohesion average* reflects the value of the parameter being measured in the cohesion regions which include EU member states Greece, Ireland, Portugal and Spain as well as some regions in Italy.
The *European core*, includes all EU member state countries except the cohesion regions.

4.4.1 Universal Service

The Commission policy for deregulation was based on the recognition that in the emerging pro-competitive environment in the field of telecommunications, it is essential to ensure the provision of *universal service*. The concept of universal service emerged as an essential element of economic and

social cohesion in the EU but also plays an important role in the uniform perception, from the user's point of view, of service quality at a regional level as well.. The concept of universal service encompasses the three main quantifiable parameters of telecommunication service provisioning: **Availability** (accessibility), **Affordability** and **Quality**.

Although for the purpose of benchmarking, commonly established indicators of Universal Service deployment could be applied just as well for any type of public telecommunications service, in areas with less developed networks (such as those in the cohesion regions), it makes sense to consider only voice telephony under this scope.

4.4.1.1 Voice Telephony

4.4.1.1.1 PSTN Network

Even though it is often neglected in our days, since it is taken for granted, one of the more essential generic services is the voice telephony service provided by the Public Switched Telephone Network (PSTN). The PSTN infrastructure in Greece was very much underdeveloped until fairly recently. The situation was much more pronounced for the region of Attica and in particular the cities of Athens and Piraeus. Most of the network was based on analogue switching equipment and quality of service left much to be desired. There were long waiting times for line installation , high failure rates and network congestion because of low capacity. Some key indicators revealing the status of the PSTN network in recent years are given below:

- the number of main lines in Attica was only 1,75 Million in 1991
- there were more than 1 million pending applications for phone line installations in 1991 of which about 379.000 in the region of Attica.
- today there are less than 60.000 pending applications for the whole of Greece of which less than 20.000 in the region of Attica
- average waiting time for new line installation reached almost 4.000 days in 1991 for the region of Attica.
- the percentage of digitally switched subscriber lines was only 8% in 1991 at a time where most European Countries reported figures above 50%.
- teledensity figures for the region of Attica in 1991 were 49,3 lines/100inhabitants versus 38 for the whole of Greece.

The situation for Attica was drastically changed in the years 1992-1994 with the adoption and implementation by OTE of the CRASH programme which was partly founded by the EU. The Crash programme was prepared after a study by Coopers & Lybrand on the status of Telecommunications in Greece. Among other measures it included the significant upgrade of the Attica region's network by installing 200.000 digitally switched lines and 320 km of optical fibre creating a high capacity fault-tolerant backbone network serving the region (Attica Ring).

4.4.1.1.2 PSTN Network comparison data

As we can see from the following table a considerable part of the network is still based on analog switched lines. The situation, while better for the region of Attica, is still lagging by a large margin behind corresponding EU averages. As can be seen, even the Cohesion average in 1994 was considerably better. The consequence of this fact is that a large part of infrastructure investments in the coming years is expected to go into upgrading the analogue PSTN network at the possible expense of investments in more advanced services.

	Digital Switched	Analogue Switched	Total	Digital vs. Total
Attica Region	985.000	1.201.000	2.186.000	45%
Greece	2.310.000	3.053.000	5.363.000	43%
Attica vs. Greece	43%	39%	41%	
Cohesion Average(i)				61%

Source: OTE data, IS and Cohesion
(i) 1994 data

Table 3: Extent of PSTN Access Line digitalisation

	Attica Region	National Average
installed telephone exchange capacity	2.308.970	5.483.813
PBXs	15,313	28,552
public authorities telephones	24,434	50,909
total number of telephones in operation per 100 inhabitants	69,7	55,5
tariff units per inhabitant	4,780	3,896

(source OTE SA, 1994)

Thus, while the region's population is only the 35,29% of the country, it has the 42,11% of the exchange capacity, the 53,63% of the PBXs, the 48% of public authorities telephones, while telephones per 100 inhabitants is almost 26% higher than the country's average and tariffs per person is almost 23% higher.

On the contrary, teledensity figures show a very high level of penetration which is even better than the EU average (although the EU average refers to '94 data).

	Population	Subscriber Lines	Teledensity
Attica Region	3.600.000	2.308.970	58
Greece	10.583.000	5.483.813	51
Attica vs. Greece	36%	41%	
EU Average			48
Cohesion Average			40

Source: OTE data, IS and Cohesion

Table 4 : Conventional PSTN Line Teledensity comparison (subscriber lines / 100 inhabitants)
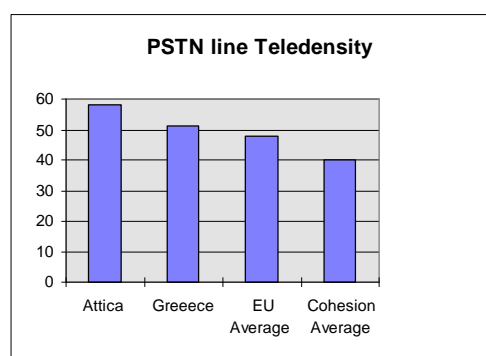
Figure 1 : Teledensity figures
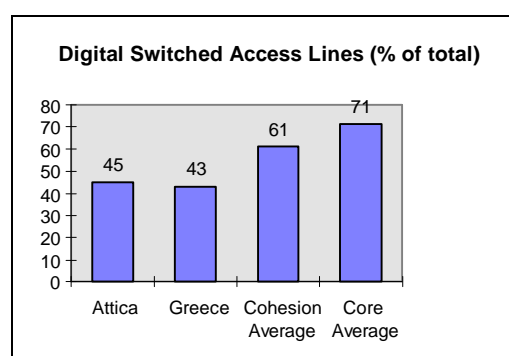
Figure 2 : Digital Switched lines

Looking at traffic volume statistics we can see that although 41% of subscriber lines are located in Attica, the region contributes about 44% of overall tariff units. Similarly, the number of tariff units/person/day is 15% higher than the national average. This percentage is not as high as one would expect given the population and level of business conducted in the region. This is partly attributed to the large volume of international traffic generated in regions with high levels of tourism.

Units/day (Million)	National	International	Total	International vs. National
Attica Region	N/A	N/A	52.5	
Greece	96.6	22.5	119.1	19%
Attica vs. Greece			44%	

Based on OTE '97 figures

Table 5 : Traffic Volume (in tariff units)

Units/person/day	National	International	Total
Attica Region	N/A	N/A	13.8
Greece	9.1	2.1	11.2
Attica vs. Greece			115%

Table 6 : Usage Statistics

In the following tables we provide some price comparison data for common services. Pricing data for PSTN telephony services from OTE is compared with figures for British Telecom, Portugal, the Cohesion region average and Core average respectively. Unfortunately, similar figures were not available for common data services where only OTE tariffs are shown.

PSTN lines

Prices in ECU (1996 data)	OTE	British Telecom	Portugal	Cohesion Average(I)	Core Average(I)
Residential Installation Cost	189	138	77	142	107
Bi-monthly Subscription	12	20	19	18	22
Local calls Peak hours (10mins)	0,15	0,47	0,23	0.32	0.44
Long Distance Calls Peak hours (10 min)	3,86	1,16	3,91		
International Calls within EU Peak hours (10 min)	5,41	4,31	7,70		

(I)   1994 data

Table 7 : Telephony Service cost Comparison

Data Service	Approx. Prices in ECU (1997 data)	OTE
Hellaspac (X.25, X.28)	Installation Cost (19.2Kb/s)	83
	Monthly Charge	83
HellasCom(Leased Lines)	Installation Cost per termination point (64Kb/s)	550
	Monthly Charge	167
	Installation Cost per termination point (2Mb/s)	800
	Monthly Charge	420
ISDN	Installation Cost (2xBRI)	167
	Monthly Charge	33
	Usage Charge (Local Call /hr)	0,9

Table 8 : Data Service Costs

4.4.1.1.3 Paging Services

Paging was introduced as a service after 1991. The service is now facing diminishing demand because a) the system in operation is outdated b) the introduction of GSM Mobile telephony in 1993 which offers superior services. There are plans to introduce the European standard ERMES paging system which offers continental coverage and has increased capabilities (transmission of short alphanumeric messages).

There are currently (May 1997) 18.394 paging receivers in operation in the Attica region compared to 26.240 in the whole of Greece. This translates to 70% of receivers operating in Attica.

Paging Receivers in Operation	Active Receivers	Yearly Trend
Attica	18.400	-5%
Greece	26.240	-7%
Attica vs. Greece	58%	

Table 9 : Paging Service Penetration

4.4.1.1.4 Mobile Telephony

Mobile telephony has emerged as one the fastest growing and more lucrative markets in Greece in the almost 5 years that have passed since its introduction. Currently, there are only two service providers for GSM mobile cellular telephony services which own one of the two available GSM licences. These two companies (Stet Hellas and Panafon) share an almost equal share of the Greek GSM cellular phone subscriber base. In 1996 they reached an annual turnover of more than 170 MECU. Growth has been spectacular with subscribers almost doubling every year for the past 3 years. The following charts show the increase in number of subscribers and the penetration in terms of percentage against the total population of Greece. It is expected that the number of subscribers will reach 1.5 Million by the year 2000. However even these numbers can be considered conservative, since the demand for this type of service is very high and the actual market depends very much on the affordability of the service. Whereas, for fixed telephony service market saturation is assumed at around 60% penetration (irrespective of cost) it is expected that for mobile personal communications services this saturation point is much higher (around 75-80%). In October 1997 there were about 710.000 subscribers nation-wide. The reported annual growth rate was an impressive 80%.
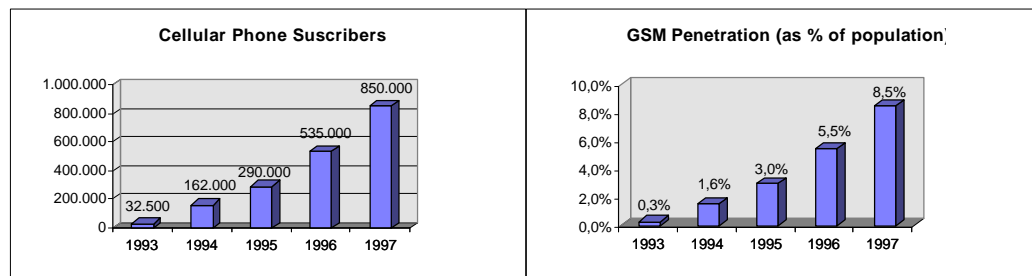
97 figures are end of year estimates

Figure 3 : Cellular phone users in Greece

By the start of 1998, a new entrant in the mobile cellular telephony operator market is expected to appear. Cosmote a subsidiary of OTE has obtained a license for building and operating a DCS1800 cellular phone network and expects to have 200.000 subscribers by the second year of operation.

The intense activity in this market area and the accompanying figures are a testament to the potential and capacity of mobile telephony services in Greece. Naturally, the majority of the user base is

concentrated in the large cities where most of the business activity takes place. Whereas Athens and the greater Attica region where a lot of light industry is located has the lion's share of the mobile telephony user base, there are no concrete figures for the number of subscribers located in the region. One can however safely deduce that the corresponding percentage of users situated in the region is higher than the relevant figure for fixed telephony services.

4.4.1.2 Data Communications

4.4.1.2.1 ISDN

Integrated Services Digital Network (ISDN) availability is generally regarded as key technology which will enable widespread home access to information services. ISDN is expected to support the emergence of innovative applications by permitting substantial improvements in Information delivery. However, because it is requires a fully digital network as well as some additional network intelligence ISDN is likely to be available only in major urban centres in countries with underdeveloped networks. Even in countries with extensive ISDN deployment like Germany (8.0 million lines expected in 1998) and France (3.2 million lines by 1998) ISDN is likely to be affordable only by large businesses that can justify the expense.

 The introduction of ISDN services in Greece was delayed by approximately 5 years with respect to the European core countries. The main reason for this was the delay of conversion to digital switching technology which is a prerequisite for ISDN services. The following table shows the OTE planned ISDN infrastructure for 1998.

N-ISDN Access Lines	BRA	PRA
Attica	3820	270
Greece	8720	580
Attica vs. Greece	44%	47%

Table 10 : OTE 1998 (planned) ISDN infrastructure

4.4.1.2.2 Digital Leased Lines (Hellascom)

OTE has been until 1997 the sole provider of both analogue and digital leased line services in Greece. Digital leased line data services are offered by Hellascom, an OTE subsidary. Hellascom offers point-to-point data link services with bandwidths ranging from 64Kbit/s to 2Mb/s serving the requirements for wide area interconnections. Bandwidths higher than 2 Mbit/s are expected to be offered by 1998. The number of occupied Hellascom access ports for the Athens region is 1.825 ports compared to 2.955 ports for the whole of Greece. This translates to 62% of the occupied ports are located in the Athens region. With the explosive growth of Internet popularity and the requirement for LAN interconnection demand has remained high and above current network capacity.

The market is now undergoing liberalisation, and alternative providers are expected to appear to cater to the demands of business internetworking and professional information services.

4.4.1.2.3 Packet Data Services

Public Packet Switched Data Network services (PSPDN) have been offered by OTE through the Hellaspac I and Hellaspac II networks. Hellaspac I was introduced in 1990 and offered fixed and dialup X.25 services with national and international coverage. Hellaspac II was introduced in 1995 and offered a much higher capacity, higher access speeds, as well as frame relay capability.

The development of national packet based networks for Internet service provision has provided additional alternatives for packet based wide-area interconnection. Large Internet Service Providers are now able to offer Virtual Private Network connectivity to selected customers through their Internet backbones.

4.4.1.2.4 Satellite Services

O.T.E. so far has been the sole authorised provider for satellite services offered by Intelsat, Eutelsat and Inmarsat organisations. Through Maritel it offers land-to-sea satellite based telephony and telegraphy services for marine communication purposes. In addition is able to offer international point-to-point leased line circuits which are routed via satellite. VSAT based services are also expected to be available in the near future by OTE and/or alternative service providers.

4.4.1.2.5 Broadband Services

Currently, there does not exist a public network for broadband (>2Mbit/s) services. OTE is speculating both ATM service provisioning as well as cable based network services. Pilot cable networks have been installed in two areas in Athens as an effort to reduce the environmental impact of television reception antennas. A high speed ATM network backbone is also under development to serve the needs of the Academic community.

4.4.2 Internet

The Internet and the World-Wide-Web (WWW) is one of the more pronounced examples where the multimedia, communication and computing technologies converge to provide a feature rich service platform with global reach. The comparatively low investment cost for deployment of Internet Services coupled with the ever-decreasing cost of personal computing platforms has permitted rapid and widespread introduction of Internet Service Providers even in less developed countries. Lead by the pioneering efforts of the academic community Internet access has diffused into the business and consumer market sectors creating a solid foundation for commercial exploitation. Internet access and use however remains a service targeted to specialised groups of users, a fact which inherently limits the potential for expansion.

4.4.2.1 Service Providers

The major Internet service providers in Greece have already been presented in the section on alternative providers. The following charts demonstrate the allocation of Internet Hosts (computers with direct access to the Internet) with respect to Internet carriers (providers of backbone networks) and organisations. (Source: March 1997 eexi internet survey)
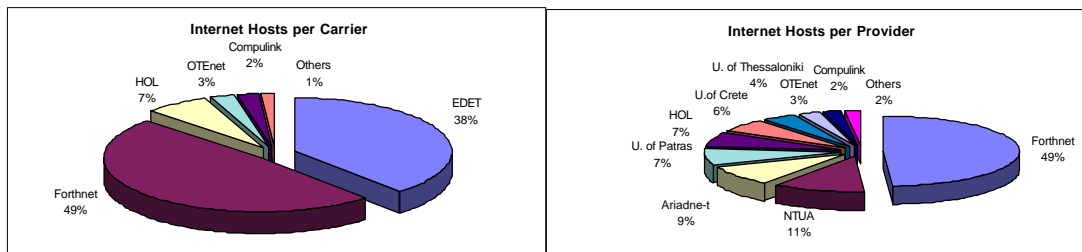
Figure 4 : Internet Hosts per Carrier   Figure 5 : Internet Hosts per Provider

4.4.2.2 Statistical Data

In this section we try to provide statistical and survey data which hope to reveal the current status of Internet services in Greece and the region of Attica in particular. It must be appreciated that regional data for these of services is very hard to obtain. However, since the vast majority of the customer base resides in the Attica region nation-wide data are in essence representative of the situation existing in Attica.

The following table provides estimates for the number of PCs, the number of computers with direct Internet access and the number of WWW servers in Greece. Where available data for the EU and World totals are also given.

	Greece	EU	World
PCs	~500.000		
WWW Servers	650		~1,5 Million
Internet Hosts	25.000	3,65 Million	20 Million

Comparison of relative data (with respect to population) with the corresponding EU averages reveals some interesting data. PC density is about 3 times lower than the EU average. The number of Internet hosts is about 6 times lower while the ratio of PCs to Internet host is two times worse than the EU average.

per 1000 inhabitants	Greece	EU
PCs	~50,0	160,0
Internet Hosts	2,5	15,6
Ratio	20 to 1	10 to 1

The following figure shows Internet Host density figures for the EU. It is evident that there is are large deviations among different countries which must be attributed to local characteristics.
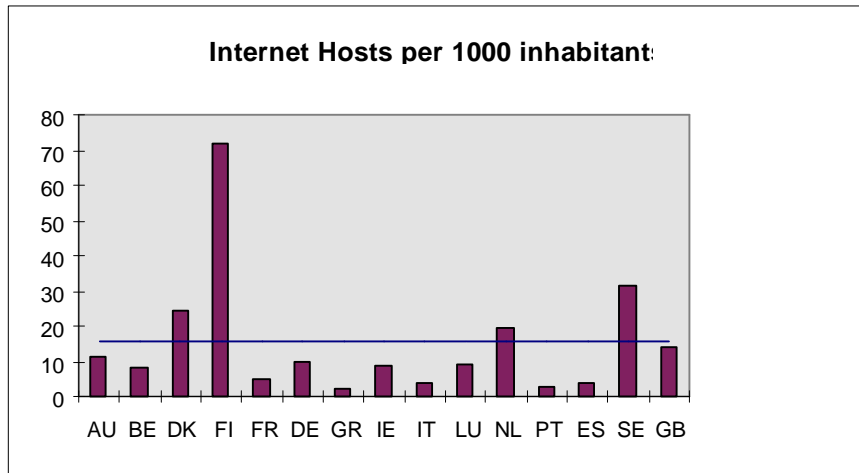
Table 11 : Internet host density

Regarding the situation in Greece, a recent survey by FOCUS (excerpts taken from the '96 IT Year book) revealed that :
- 69.2% of Internet subscribers in Greece are men
- More than 52% cover belong to a spectrum between 25 and 34 years of age
- Ages 18 to 24 represent another 20% of subscribers
- Almost 59% have received University education
- 70% of subscribers reside in Athens, almost 15% in Thessaloniki and 15% in other major urban centres.

4.5 User Base

4.5.1 Public Sector

In Greece the contribution of the Public Sector in the economy is the largest in terms of personnel, exchanged information volume and complexity. It encompasses the Central Government, the Ministries, the Local Authorities, and many other departments, institutes, utilities and companies.

The current state of the Greek Public Sector requires significant effort in order to be able to deal with important roles and issues that concern the evolution of the Greek state and the Greek society in the emerging European Union and emerging Monetary Union.

The Greek Public Administration, at all levels, is characterised by lack of organisation, low productivity and inadequate efficiency. In addition to these problems, the Greek Public Sector suffers from problems related to the payroll levels, overlapping of jurisdictions, inadequacy of appropriate infrastructure and moral motivation, as well as more serious problems, such as the lack of meritocracy, the recognition of effort, etc. With regards the Information Technology culture, the basic problems in the evolution and the rationalisation of the Greek Public Sector are:

- Inadequate deployment of modern Computer Science and Telecommunications technology means.

- Poor training and lack of knowledge base of the personnel in the Public Sector, either directly related to the tasks and processes it performs, or in combination to its inability to attract highly skilled professionals and business specialists.

For the last 20 years, the introduction and application of Computer Science technologies has been used internationally as an fundamental means of Public Sector modernisation. From the beginning of this procedure, Electronic Data Processing (EDP) and the computerisation of various departments of the Public Administration attracted the interest of the central administration. Nowadays, point of interest has been shifted from hardware to software, specialised applications and the creation and use of fundamental databases.In Greece, only recently, this task has been taken seriously. Thanks to the Community Structural Funds, an effort is now under way to alleviate through modern EDP techniques of some of the more accute problems of the Administration.

4.5.1.1 Greek Public Administration

In terms of progress, the Greek Public Administration is on the first phase of computerisation. Moreover, the rates of this progress are relatively lower than those expected, as various difficulties were encountered.

So far, the need to establish a bi-directional relationship between the training and education processes of the personnel in the Greek Public Sector, in order to enhance the modernisation of the functional mechanisms and to improve the efficiency of the public services, have triggered significant activities, but the goals have not been achieved yet. There is an evident lack of appropriate mechanisms that will attract properly educated personnel and guarantee the consistent education of them throughout their employment lifetime. Even more, there aren't any means appropriate to the education process required to achieve these goals, such as infrastructure, education programs, hardware, libraries. etc. The importance of these drawbacks and the urgent need to take appropriate actions becomes even higher bearing in mind that governmental policies take time to produce effects.

4.5.1.1.1 Known Problems

The most characteristic problems of the Greek Public Administration are particularly evident in the Attica region:

The large centralisation encountered throughout the decision-making process. More than half of the personnel employed at various departments of the Public Sector, resides in the Attica region. Furthermore, the policy-shaping and the decision-making processes on most issues are the responsibility of the Central Administration.

The lack of rational design of the workflow process, as well as the lack of organisational and functional effectiveness. In most cases, there is a significant amount of confusion and overlap about the roles and authorities of the various central and regional bodies which inevitably results in task complexities and malfunctioned processes. This situation is surcharged by the inadequate deployment of modern Computer Science and Telecommunications technology and especially by the low penetration percentage of Integrated Information Systems.

The arduous communication which is often observed between several departments of the Public Administration, bodies, and citizens too. The typical organisational structure (vetrical segmentation) which has been followed in the organisation the Public Administration, often prevents or blocks the efficient deployment of public services, the co-ordination and co-operation among departments, creating delays in critical action projects and solving process in complex problems e.t.c.

The lack of functional efficiency of the regional services as compared to that of the central region. The regional services face the problem of centralisation throughout the decision-making process and the lack of highly skilled professionals and business specialists in their personnel.

4.5.1.1.2 Actions & Trends

The modernisation effort that takes place in the Public Administration focuses on the following issues:

- In the development of applications and integrated systems for the use of organisations and modernisation of services, mainly in the domains related to the Public Revenue collection (taxation, customs duties, social securities etc.)

- The adoption and deployment of methodologies which deal in a systematic way with all the design and development stages of Integrated Information Systems as well as an integrated and global methodology of prescription, information, analysis and evaluation in the hardware and software supplies in the Public Sector.

- The development of proper actions to introduce a educational and training program for the personnel in the Public Sector .

4.5.1.2 The Greek Ministries

All the Greek ministries are housed in Central Athens, except for the Ministry of Mercantile Marine, which resides in Piraeus, the Ministry for Aegean which resides in Mitilini and the Ministry for Macedonia & Thrace which resides in Thessaloniki.

4.5.1.2.1 Constitutional Overview

The Public Sector and especially the ministries constitute the key-players for Informatics and telematic related projects in the Greek society. Like in other European Countries, it is part of the ministries' roles to provide the fertile ground and secure framework suitable for the evolution of the Greek information society.

4.5.1.2.2 The Ministry of Interior, Public Administration and Decentralisation.

The Ministry of Interior, Public Administration and Decentralisation is the highest in rank among all ministries. Its main task is the implementation and deployment of the governmental policy for issues related to the organisation, function and human resources of the Public Administration as well as the efficient deployment of Informatics within that scope. Through its services, the Ministry co-ordinates and audits the organisation and function of all the public sector bodies with the continuous improvement of all publicly available services and goods as its goal.

The Ministry of Interior, Public Administration and Decentralisation is an executive Ministry with broad authorities that allow it to interpose in the three basic axes that concern the whole of the Public Administration functions.

4.5.1.2.2.1 *The Organisational Structure and Function of the Whole Public Sector*

- The structure of services

- The decentralisation of the administration system

- The conditions and the organisation of work in the public sector

- The increase in productivity

- The coding of legal information

- The simplification of procedures

- The improvement of the citizen to state relations

- The control for the orderly function of the public administration

4.5.1.2.2.2 *The Management of Human Resources*

- The employment status of personnel

- Engagements

- Education and training of personnel staff

4.5.1.2.2.3 *The Introduction and Use of Informatics Throughout the Public Sector*

- The creation of regulations, standards and processes for the introduction, development and use of Informatics in the public sector.

- The co-ordination for the development of large information databases, management information systems and communication networks to support inter-Ministry needs and functionality.

- The final approval for various large projects and the supply of equipment related to the deployment of Informatics in the public sector.

- The transfer of know-how to public bodies for the implementation needs of projects related to Informatics.

4.5.1.2.2.4 Informatics Institutional Framework

The main bodies responsible for making decisions about Informatics are:

1. *The Government Council Of Informatics (The Technical Council Of Informatics)*

2. *Co-ordination group for Information Technology*

3. *Development Service Of Informatics*

4. *The Department of Informatics and Electronics (General Secretarial forIndustry)*

The *Government Council Of Informatics* is the highest in rank among all the other councils. Its duties include the administration, control, development and implementation of the various Informatics projects at the national level and the determination of the government policy about the information society:

It consists of the following members below:

- The Prime Minister as Chairman.

- The Minister of Interior, Local Administration and Decntralisation.

- The Minister of National Defence

- The Minister of National Education and Religious Affairs

- The Minister of Finances.

- The Minister or the deputy Minister of Communications and Transport.

- The Minister or the deputy Minister of Industry, Power and Technology.

The *Technical Council Of Informatics* (TCI - TESYP in Greek) has the scientific support of the Government in issues related to consulting, proposals and consulting services.

Recent modifications in the constitutional framework regarding projects for the information society performed by the minister's council lead to creation of a new body with broad authorities and as a key player in replacement of the *Government Council Of Informatics* and the *Technical Council Of Informatics.* Although no specific title has been assigned to it yet, it is described as *Executive Council for the Information Society.* Each Ministry has the obligation to present an action plan which concerns the information society and the initiatives that it has the intention to integrate. From this plan a global action plan will be constructed for the government activities in this sector. The prime minister has determined 4 main bodies of the government actions.

1. The development of the suitable technical and material infrastructure, that allows access to the global network to as many citizens and business enterprises of the Greek country as possible.

2. The modernisation of the public sector with the assistance of the new technology, so that it will provide to the citizens the most appropriate services and the private sector also will service faster at his demands.

3. The protection of citizen rights in the information society.

4. The creation of a critical mass of Informatics users in order to assist the spread of the new technology throughout all the layers of the Greek population.

The members of the minister's council have approved for the following activities which are on going project:

1. The precipitation of the modernisation of the national telecommunication network of the Greek country that concerns the Hellenic Telecommunications (O.T.E.).

2. Each Ministry will submit (has already been done) an action plan for the information society with regard to its field of interest.

3. The constitution of a mixed group with members from the Ministry of Interior, Public Administration and Decentralisation, the Ministry of Development and participants from the Ìinistry of National Economy, the private sector and the European Committee. The target of this group is the precipitation of the Informatics projects in the public sector.

This team will propose measures and actions of legal and administrative nature and will establish general behavioural and executive regulations for projects, while focusing on the protection of the public interest and the acceleration of procedures as a global goal.

The *Co-ordinating Group of Informatics* (CGI - SOP in Greek)**.** In all of the ministries there has been established a co-ordinate group of Informatics with the following objectives as its main tasks:

- The Definition of the main guidelines and priorities for issues related to Computer Science and Informatics projects.

- The proposal of the necessary measures for the exploitation of the computer science in the corresponding Ministry and its implementation.

- The co-ordination of the Ministry with the political government in issues related to the information society and the computer science.

The SOP contributes a lot in the following issues:

- Strategy scheduling about computer projects in all the ministries.

- Observation of the progress related to computer projects.

- Improvement of the communication between the ministries and the Ministry of the Interior.

The *Development Service Of Informatics* (DSI - YAP in Greek) belongs to the Ministry of Interior. Responsibility of YAP is the implementation of the government's policy about the penetration, development and implementation of Informatics and Computer Technology in the public sector as well as the development of specific applications and the co-ordination of the relatives bodies in the public sector. The YAP consists of two administrations and one department:

- Scheduling and Implementation Administration.

- Functional Infrastructure Administration.

- Secretarial Support Department.

The *Department of Industrial Informatics and Electronics of the General Secretarial of Industry* responsible for auditing and analysing all the financial parameters and technical information regarding the articulation and the activities as well as the evolution and prospects in Greece and abroad of enterprises in the Informatics and Electronic products branch, in which the following business categories classify:

- The production of telecommunications components and electronic audio devices.

- The production of means and methods for collecting, storing, processing and distribution of information.

- The production of advanced electronic components and industrial electronic products.

It is the responsibility of this Department to take measures for the improvement of the product quality, the full time employment of the productive labour basis, the increment of the domestic added value, the improvement of competitiveness and the increase in productivity for enterprises in the branch.

The main objective of this co-ordinating authority is the best possible exploitation of Informatics technology in the Public Administration, the improvement of effectiveness, the reduction in the corresponding functional cost and the improvement of communication between the various bodies and levels in the Public Administration. The basic tools deployed to accomplish this goal are:

- The provision of consulting services by the central co-ordination body to the various Public Bodies.

- The promotion of Information technology planning procedures in the various Public Bodies.

- The creation of regulations and standards for the most rational and economical use of Informatics technology.

The deployment of audit procedures regarding the above procedures, regulations and standards.

4.5.1.2.3 Ministry Of Finance

The tasks assigned to the Ministry Of Finance are connected closely with the collection of taxes and other revenue of the state, fields of serious backwardness. Instrumental role in the rationalisation of this task is going to play a set of Integrated Systems covering all Greece and providing state-of-the-art electronic data processing facilities. The projects for integrated information systems for the tax system (TAXIS), the customs system and the treasury department that are currently showing significant progress under the funds provided by the «Kleisthenis» operational program, are essential elements for the tasks under the responsibility of the Ministry.

Therefore, the information infrastructures of the Ministry are currently being enriched with «extrovert» characteristics provided by modern network technologies such as the Internet, electronic document exchange network, value-added networks and EDI.

The Ministry of Finance is developing its information infrastructures in a systematic way through Integrated Information Systems and novel actions designed specifically for this task, whilst ensuring a smooth transition and productive function in this new context.

Realising the importance of the issues mentioned above, the Government has enacted the General Secretarial of Information Systems in the Ministry, which is the body responsible for the successful completion of all the information projects under development.

The information systems projects under progress in the Ministry are:

- The *Integrated Information System for the tax information system (TAXIS)* supports the whole of the tax-related functions and the exercise of tax control, thus providing an important contribution to the effort for the reduction of tax evasion and to the improvement of the citizen services. The budget for the TAXIS project is 15.5 billion drachmas, of which 7.8 billion have already been absorbed. The equipment required by the project has already been installed, while the majority of the special applications required by the project are at or near

the installation phase, too. Furthermore, the training process required for the almost 4.000 affected employees is currently under progress. In every sense, TAXIS was one of the biggest informatics projects in Europe in recent years. An important spin off effect, is a much clearer picture of individual taxing status, which shall be enabled for individuals or companies, making thus TAXIS a truly Information Age application.

- The *Integrated Information Systems for the Custom* forms the basic infrastructure for the interconnection of all the custom services in Greece. The project will support all the tasks and procedures related to custom work through the use of information systems and will provide significant assistance to the effort for the reduction of duties evasion, the protection of merchant and public health and the convergence towards European Union standards (Customs 2000). The budget for this project is currently 4 billion drachmas.

- The *Integrated Information System for Treasury-National Budget* will support with information technology the audit of public accounting, the control of public sector, and the constitution of the National budget. The Project budget ranges at 4 billion drachmas. The project is currently at the invitation for tenders state.

  In addition to Integrated Information System that will constitute the critical information of the Ministry of Finance, it promote the development of a set of *Information Systems for a special Case* that will support the critical functions of Ministry of Finance and the organisations that the Ministry supervises. More specifically :

- The Organisation Of Administrative Materials.

- Civil Servants Cooperative Fund.

- General National Chemical.

- Personnel-Payroll and Pension payments

- Public Fixed Assets

- Legal Information Databases.

4.5.1.2.4 Key-Public Utilities (DEKO)

The most important public utilities located in the Attica region (however with national importance) are the Public Power Corporation (DEH), the Greek Rail (OSE), the state airlines (Olympic Airways), however there are numerous others with various missions. As far as the penetration of the information technology in these companies is concerned, we feel obliged to describe the main problems that they face.

At the current moment (18/12/1997) none of the public companies mentioned above has initiated any supply agreements about information technology equipment supply. The main reason for this distressing situation is the inability to accurately project the related costs in current frame work that dictates the whole equipment supply process in the Greek Public Sector. In this context it is apparent that a new viable framework must be established that will enable the information technology supplies whilst minimising the technology ageing factor which is inherent in the information technology world.

There is absolutely no coherent strategy in coordinating effort and investment in these companies with regards information technology and related resources. As a result there is a terrible waste of precious resources (mostly human) without significant returns. In several domains related to Information Technology, there is a significant potential for economies of scale (given the size of the country and of its resources).

A notable example is the infrastructure for Geographical Systems, (which have an enormous dta content). Several organisations of the state have acquired identical systems, without having manpower and knowhow to operate them properly, resulting in becoming obsolete even before they start operations. In other member states, the centre for geographic information is unique, disseminating simply data for special uses by other departments. Moreover systems and data of that sort, have a huge potential for additional revenue by producing commercial products (e.g. maps). This potential is almost completely unexploited.

It becomes evident, that the proper introduction of ITC technologies, is directly related with the public sector reorganisation and restructuring. Without sharper definitions of jurisdictions, responsibilities and accountabilities, *taking into account the power provided by modern methods of management and of ICT,* any hopes invested in ITC, will be futile or at least with very diminished results.

4.5.2 Local Authorities

The state organisation in Greece is organised in accordance to the decentralisation principle. The administrative division of the country is formed on the basis of social, transport and financial conditions.

Local authorities deal with issues and problems that reside or focus at a local level. The local authorities are self-sufficient in terms of administration. The state supervises the local authorities in such a way that it does not inhibit their initiative and free action. Furthermore, it provides for the resources required in order that the local authorities proceed in the accomplishment of their goals.

4.5.2.1 Local Authorities Current State

There are 72 Local Authorities in the Attica Basin. Prominent role play the Municipalities of Athens and Piraeus, which are among the largest public organisations in Greece. The rest are authorities with jurisdictions around these two cities.

In short, the role of the information technology in the various local authorities within the Attika region varies. The overall picture regarding the deployment and use of information technology is depicted in the feedback of a questionnaire addressed to all the local authorities of the region.

The results of this questionnaire show that 45% of the local authorities in the Attika region conform to an internal standard or process of some kind regarding Informatics. Furthermore, 75% of those local authorities provide for internal administrations that deal exclusively with Informatics.

As far the professional level and educational expertise are concerned, the results of the questionnaire reveal that only 37% of those dealing with Informatics as their primary occupation posses a technological education in the field of Computer Science. Of all personnel dealing with Informatics issues, 24% possesses a higher education (university graduates), while the rest 76% are high school graduates.

In terms of activities involved, the results of the questionnaire depict that 38% deals with supporting software of various vendors, 28% deal with training and education issues within the local authority scope, 25% deals with maintenance and support of hardware, 20% is involved in the development of new applications and 10% deals with various development projects.

In terms of education and training, 50% of all local authorities responded that the related personnel has undergone an additional education or training of some kind, while 12% responded that it has not. Of those local authorities that responded affirmatively to the issue of education, 93% responded that the training received had to do with various applications, 60% with general aspects and 53% with application development software suites.

The results of the questionnaire are rather disappointing when it comes to issues related with the hardware infrastructure in the local authorities. Obviously, 56% of the local authorities that responded use or possess equipment that is obsolete and no longer supported by the vendor or the manufacturer. As far as the use of the existing equipment is concerned, in most cases, personal computers are used as standalone workstations for applications such as word processing and spreadsheets or as terminals for UNIX and Novel networks. Furthermore, in 23% of all responses the personal computers were solely used as standalone workstations.

As far as infrastructure funding issues are concerned, 47% of local authorities that responded to the questionnaire state that the funds they used to purchase their equipment originated solely from local resources.

In issues related to the support and maintenance of existing equipment, 48% of all local authorities that responded to the questionnaire state that they either no longer possess or maintain an agreement or contract of some kind regarding equipment support and maintenance or they possess such an agreement regarding only the equipment that is still under the vendor or manufacturer guarantee.

The following table lists the most chracteristic problems in relation to the deployment of Informatics projects reported by the Local Authorities that participated in the relative survey.

1   Lack of Informatics's specialist and insufficient executives in the field of Informatics

2   Lack of training, without any sort of schedule and organisation for the end-users

3   Lack of central policy for subjects that concern Informatics and novel technologies

4   Lack of Bonus or other motives for the personnel involved.

5   Insufficient support from the suppliers

6   Lack of financial resources.

7   Insufficient software or equipment with problems

8   Technical and infrastructure Problems (e.g. power supply)

9   Hesitation of the computerisation from the personnel

10 Co-operation between the local authorities and the tax office

11 Co-ordination and Administrative Problems

4.5.3 The views of the Association of the Greek Information Technology Companies (SEPE)

The Association of the Greek Information Technology Companies (SEPE) represent the private sector and its voice is heard in various aspects related to the public sector rationalisation process. In addition, SEPE has initiated several important activities, including awareness creation for the Year 2000 problem, specific topics related to real time systems, banking systems etc and has also a permanent committee and working groups for the Information Society.

With regards the issue of the Public Sector, which in many aspects inhibits the progress of the country as a whole, its views (as recorded in publicly disseminated documents) are as follows :

The current model of Public Information technology related procurements, is more or less widely known. Its main characteristic is its inherently complex nature, the large amount of time required until successful completion (in terms of Information Technology evolution rate), the existence of

imponderable factors, the various cross-dependencies, the involvement of different services, the amount of time that the project remains suspended (e.g. for approvals, the delay due to specifications, competitions, evaluations, contract, realisation. At every link of this long chain (linear model of realisation) the project either stucks temporarily or permanently or proceeds with very slow pace.

This chain of procedures results in near zero probability of success for the overall procedure. It is clear that it is the exception, not the rule, when a project is done.

The current linear model with the involvement of so many services and departments, the lack of global responsibility, the lack of efficiency control and various other problems is a model of failure. The reason is that this model gives the «opportunity» to many individuals and bodies which are not directly involved to stop or even cancel the project. If this model remains then the public project of information society should be forgotten. The public Informatics project concern the greatest part of the national Finance and the Informatics market. This market in Greece develops in absence of the public sector.

Greece classifies last among the European countries in terms of Informatics project implementation. The reason for this peculiar phenomenon, is that the existence of the required resources, technological infrastructure and specialists but lack of efficient deployment of Information Technology in the Public Sector, springs from the overall insufficiency (technical and administrative) of the public administration, the ineffective structure, the inappropriate legislative status-quo, the lack of motivation, as well as the refusal of employing skilled personnel for the administration of projects.

This weakness of the Public Administration is quite difficult to solve in the near future. Therefore the only viable solution is the for Public to exploit the resources found in the private sector for the achievement of the Informatics projects Sector (as is done in all the other European Countries).In other words, the short to medium terms solution, is the outsourcing of deployment and operation to the Private Sector, after the model employed in the UK. The enormous success of maybe the single case where this model was followed (operation of the public lottery systems) is a good indicator that the solution can be generalised.

4.5.4 Health Services

The Information Technology is used or can be used in different ways in the Health Service environment. For Greece, Information and Communication Technology in Health Care, apart from rationalisation of services, as in most other industrialised countries, can have an important effect with national consequences. This effect is the rendering of some medical and health care services in remote areas of the Attica basin and most important, to other regions of the country, in particular the islandic and mountainous parts of the country.

As depicted earlier in this document, most medical services (almost 50% of the national potential) are located within the city of Athens and are concentrated along two axis (Mesogeion Ave and Vas. Sofias Ave.). The bad distribution means that patients with severe problems, have to transferred from all over the country to Athens for specialised care, with enormous financial and terrible social implications. Given the nature of the country (thousands of islands, mostly with few hundred inhabitants and mountainous regions having access difficulties).

In order to register users demands there is a suggestion for the use of a questionnaire namely FEST (Framework for European Services in Telemedicine Question Set/ FEST QS) which has been formatted during the period 1992-1994 of the Work Plan FEST with the finance of the European Community. There is also a Greek version of the questionnaire. This questionnaire is used in the Work Plans VSAT and HERMES (Greek Telemedicine Systems), for the organization of Telemedicine Services and specifically for the creation of a European platform of Telemedicine Services.

The main objectives of Information Technology in the Health Service environment concern the patient, the healthy population and the executives in the Health Services. Particularly:

1. *With regard to the patient*. The rendering of reliable and at the proper time diagnostic and therapeutic help in order to avoid unnecessary displacements towards the big cities due to the need of a specific doctor.
2. *With regard to the healthy population*. Decrease of the feeling of isolation and increase of trust to the medical treatment provided by the local community. Education of the healthy population, through health care programs.
3. *With regard to the executives in the Health Services (Doctors, nurses etc.)* Continuous Lifelong Learning and better information on medical issues, in order to upgrade the rendering health services.

Information Technology in the Health Service environment is concerned with the delivery and provision of health care and consultative services to individual patients and the transmission of information related to care, over distance, using telecommunications technologies, and, incorporating the following activities:

1. Direct clinical, preventive, diagnostic, and therapeutic services and treatment, including procedures where a provider may be present with the patient, and clinical training and consultative clinical Grand Rounds, if used for decision making regarding the clinical care of a specific patient.
2. Consultative and follow-up services.
3. Remote monitoring, including the remote reading and interpretation of results of patient's procedures.
4. Rehabilitative services.
5. Patient education provided in context of delivering health care to individuals.

4.5.5 Small & Medium Enterprises

The Greek economy, is to a very far extent, an economy of Small & Medium Enterprises (SMEs). If we apply the definition of the European Commission (a Small Enterprise has at most 40mECUs of turnover, less than 250 employees and assets no more than 27 mECUs), then practically, more than 95% of all Greek enterprises fall within this category.

In Attica region, we observe a somehow different picture, since from here operate, almost the entirety of big corporations and branches of multinationals and most State utilities. However, the picture remains almost the same : the very backbone of the economy of the region are the SMEs.

Although there are considerable differences from sector to sector, in general, the Greek businesses are relatively backward with regards the use of advanced IT & communication means. The commercial and industrial and sectors are the most well equipped. A hefty majority employs some sort of IT - mostly office automation facilities, accounting packages and payroll systems. More complex systems (such as CAD/CAM) are used but not extensible. Advanced industrial systems (such as MRP, stock control facilities etc) are almost absent from this category. Needless to say, advanced techniques, such as "just-in-time" practices, requiring complex interconnection of systems and data, are completely unknown.

Greek SMEs lack three fundamental assets in order to compete in open environments and abroad : capital, know-how and access to markets. In recent years, with the liberalisation of markets and the removal of non-tariff barriers (such as the liberation of the real estate market for professional use), SMEs face dire times. Whole sectors have been invaded by major corporations, driving thousands of SMEs out of business, or buying them out. The food sector, the retail sector and tourism are now dominated by a handful of large corporations, with no sign to reverse the trend. Although IT by itself is obviously not the answer, it can offer some relieve from the pressure. It can offer better bookkeeping, better quality of service, less assets locked in stocks and so forth. However, there is no significant sign of modernisation, implying complete lack of knowledge and investment muscle.

A significant development will be the commencement of operations of the TAXIS (Tax Information System), early in 1998, by the EDP Centre of the Ministry of Finance. The said system, designed mainly for curbing the widespread tax evasion practice, demands considerable processing from the private sector, which cannot be met with paper- and manual-based systems. It is expected, than the introduction of (at least) accounting, stock management and payroll systems will be generalised across the industry. By doing so, the businesses will get accustomed better to IT and it is likely that they will explore more the capabilities offered by software, communications and systems in general.

4.5.6 Education

Admission to Higher Education Institution is only permitted to persons that have successfully finished their secondary education studies. A short description of the Greek system for secondary education is described in order to provide the necessary information. Secondary education in Greece comprises the Gymnasia and Lykeia. The Gymnasium (first cycle of secondary education) lasts three years and is compulsory for all Greeks. The students graduated from the six-year primary education system enter Gymnasia without entrance examinations. On graduation, the students are awarded the Graduation Certificate.

Lykeia constitute the second cycle of secondary education. The holders of the Gymnasium Graduation Certificate may enter Lykeia without taking further examinations. This cycle lasts three years and is non-compulsory. The following types of Lykeia generally exist:

a) Genika Lykeia (General Lyceum)

 All students are taught the same subjects during the first two years. The third-year students follow a core programme of general education lasting 10 hours per week and receive 20 hours of specialised instruction in one of the four "Desmes Proparaskevastikon Mathimaton" (streams of preparatory subjects) designated as streams A, B, C and D. Upon successful completion of their written examinations, they may gain entry into the relevant faculty or department at an   institution of higher education. The following subjects are included in each of these four streams:

   Stream (Desmi) A: Essay, Mathematics, Physics, Chemistry

   Stream (Desmi) B: Essay, Physics, Chemistry, Biology

   Stream (Desmi) C: Essay, Ancient Greek, History, Latin

   Stream (Desmi) D: Essay, Mathematics, History, Economics

b) Technika - Epaggelmatika Lykeia- TEL (Technical - Vocational Lyceum)

The studies at the TEL last three years for day-time students and four years for students attending evening courses at Evening Lyceum. Each TEL may consist of a number of specialised departments. These technical vocational Lyceum combine a general education together with professional training. After their second year, the students may select to continue for obtaining either the Ptychio Idicotitas (specialised qualification) which will enable them to be employed immediately or the Apolitirio which will enable them to a continuation of their studies at the level of Higher Education. Streams A, B and D are offered at the TEL and holders of the Apolitirio may continue their studies at Institutions of Higher Education (Universities and TEI).

c) Eniaia Polikladika Lykeia-EPL (Unified Multi-disciplinary Lyceum)

The EPL were introduced under the provisions of Act 1566/85 and stipulate a three year course of studies. They provide a unified general education and technical-vocational training and offer all students the possibility of a balanced development of their potential and the cultivation of their interests and skills so that they can participate in the   production process and the economic development of the country. In the first year, all students are taught the same subjects, although they

are free to follow elective courses in their spare time. In the second year, an EPL is split into kyclous (study cycles) and in the third year it is split into kladous (branches). All students are taught core subjects during these two years, along with the corresponding cycle and branch subjects.

The cycles lay the foundations and provide a preparatory instruction for higher education. The branches enable the students to: continue their studies at institutions of higher education (AEI and TEI) by including the preparatory subjects corresponding to each stream in their curriculum being followed.
exercise their profession (via kladi Proepagelmatikis Ekpaedefsis-prevocational training branches) obtain a specialised diploma after studying for one extra year in a specialised department open to graduates of these schools. The graduates of all branches are awarded the Apolitirio Lykeiou (Lyceum Leaving Certificate). The stream branches A, B and D at the EPL particularly reflect Greece's need to promote research and knowledge in both the scientific and technological sectors.

d) Klassika Lykeia (Classical Lyceum)

There exist a few classical Lyceum which aim to promote studies of the classics.

e) Special Types of Lyceum

A number of specialised Lyceum also exist such as the Ecclisiastika Lykeia (Lyceum for Religious studies) that operate under the provisions of a Presidential Decree, Lyceum for Athletics and Music. These Lyceum may be introduced in several cities in the country and cover the educational needs of persons living in a wider geographical area.

In Greece, a quota (numeric clause) policy is applied in all Higher Education Institutions for admission purposes. Those wishing to enter higher education in Greece sit general examinations which are held each year in the second half of June. Students who have received the Graduation Certificate from Gymnasium or an equivalent High School Leaving Certificate abroad or an European Baccalaureate have the right to participate into these general examinations.

These examinations are called General Panhellenic Examinations, and are common to all UNIVERSITIES and TEI (technical higher education institutes) of the country .

Candidates' entry into higher education institutions is made-up to fulfilment of the respective quotas and it is decided on the basis of their marks obtained and their stated preference with regard to the faculties in which they wish to enrol. Their overall grades (marks) are based on the sum of their marks obtained after examinations in four general subjects. Three of these subject carry an equal weight 0.95 in the grading process and one 1.15 which is the more important subject for each course of study (i e. for medicine sector the subject of Biology, for Computer studies the subject of Mathematics etc).

The paper for each subject examined is considered by two independent examiners. The grade given to each paper has a scale between 0-80. The final mark of the candidate for each subject is the sum of the marks given by the two examiners.

The examination subjects vary according to the four streams of studies followed in the respective program at Lyceum which permit the admittance of students to the respective faculties of the higher education institutes. Each candidate is obliged to select all the subjects of one of the four streams described previously.

In several departments, besides the basic examinations in general subjects, the candidate is also examined in specific subjects. Thus, for example for Tourism Business departments, foreign language examination is necessary (English or French or Italian or German).

In addition to the quota entrants, each department accepts a number of foreign students, Greeks living abroad, scholarship recipients, etc. The respective candidates sit different general examinations, which are held each year in September. A numerous clausus policy is also applied with various

percentage quotas while the examination procedure and the contents of courses examined are identical to that of the normal general examinations. The actual number of candidates admitted in each department of AEI's and TEI's for all the above mentioned categories are decided each year by the Ministry of National Education and Religious Affairs.

4.6 The Human Factor

4.6.1 The Information Technology Related Education

4.6.1.1 The IT Education in Greece

The education in information technology has many peculiar characteristics in relation with the education in other sectors. First, there is not a rule concerning the right age to begin the education in information technology. Second, a serious infrastructure is essential and third it is a lifelong procedure since the development of the information technology is rapid and continuous.

Because all of the above the training may start at a very early age, continue during the school years, be more concrete and complete during the academic years and be updated the following years.

In Greece the education in information technology covers all of the above mentioned periods:

- For younger children (pre – elementary and elementary age) there are educational centers which provide special programs designed for this age. Also some private and public elementary schools offer courses in information technology.
- In High school there are obligatory courses in information technology
- In Technical and Multi-field Lyceums there are orientation for specialization in informatics
- For Lyceum graduates there are public and private IEKs (Vocational Training Institutes) and Centers of Liberal Studies which offer specialization programs in information technology.
- There are 6 TEIs (Technical Educational Institutions) that offer IT related degrees, 2 of which reside in the Attica region
- There are 14 Universities (AEI, Highest Educational Institutions) in Greece that offer IT related degrees, 4 of which reside in the Attica region.
- Finally, there are many private educational centers which offer IT related seminars to employed people who wish to expand their knowledge.

4.6.1.1.1 Primary and Secondary Education

The Ministry of National Education and Religious Affairs makes serious efforts for the introduction of new technologies to Primary and Secondary Education. In collaboration with the Hellenic Pedagogical Institute runs several projects, under the "Odysseia" programme which aim to the development and exploitation of Information and Telecommunication Technologies for Primary and Secondary educational purposes.

4.6.1.1.2 Pre - elementary and Elementary IT related education

The duration of studies in the Greek elementary school is six years and is obligatory for all Greek citizens. In the standard official program of the Greek elementary school there is not a special course concerning the Information Technology. However in the majority of the private schools and in many public schools the children have their first contact with the information technology through seminars and laboratory work. All these efforts are based on the private initiative. A pilot program for the introduction of an IT related course has started early this year (1997).

On the other hand, private educational centers specialized in offering introductory courses in information technology, to children of pre-elementary and elementary age are established mainly in the Attica region (Computer Explorers, Future Kids, ExploreKids, Technokids etc.).

4.6.1.1.3 IT related education in High Schools (Gymnasiums)

The duration of studies in the Greek high school (Gymnasiums) is three years and is obligatory for all the Greek citizens. During these three years the students have their first contact with the information technology. The students are taught the basics of the information technology and the principles of programming (logo, basic programming languages). Computer laboratory facilities are available.

4.6.1.1.4 IT related education in Technical and Multi-field Lyceums

4.6.1.1.4.1 Technical Lyceums

The duration of studies in the technical Lyceums is three years. In the second year the students choose their specialization. One of the specialization offered is the "Specialization in Programming". The IT related courses are the followings:

2nd Grade
- Introduction to Information Technologies
- Introduction to the Basic Programming Language

3rd Grade
- Cobol
- Pascal
- Spreadsheets, Processing and Databases
- Operation Systems

4.6.1.1.4.2 Multi-field Lyceums

The duration of studies in the multi-field Lyceum is three years. In order to acquire a Specialisation in Programming an extra year is required ("specialisation year").

In the second grade the course "Introduction to Information Technology" is offered to all the students. In the third year the students choose an orientation. An orientation in Information Technology is offered. The IT related courses for the 3rd grade are:
- Basic
- Data Processing
- Introduction to Information Technology
- Business Software Applications
- Mathematics Applications

If the graduates of the third day don't succeed to enter a Higher or Highest Educational Institution they can continue their study ("specialisation year") in order to acquire a Secondary Education Programmer Diploma. The courses offered during the specialisation year are the followings:
- Pascal
- Cobol
- Office Automation Software Applications
- Operation systems
- Systems Analysis

4.6.1.2 The Centers of Liberal Studies

In Attica region are established numerous (over 100) private Centres of Liberal Studies (CLS). These centres offer education to Lyceum or Gymnasium graduates in a wide range of fields, IT included. The CLS have not a standard programme approved by the Ministry of Education and as a consequence the diploma they offered does not provide any vocational rights. Some CLS in collaboration with major companies offer seminars to their staff and others offer foundation courses for the British Universities.

4.6.1.2.1 Private and Public Vocational Training Institutes

IEKs, public and private, have as their scope to provide the knowledge and expertness necessary to young people in order to meet successfully the challenges and the hard competition in the European Union.

At IEKs, the students, during their courses, become familiar with new methods and techniques and acquire the skills needed in order to find their way in the very hard and demanding job market. Upon the completion of their studies the students acquire the "Diploma of Professional Training" which is recognised in Greece and in EU, as well. All the graduate of Lyceum can attend the courses offered by the IEKs.

Information about the Admission Criteria and the duration of studies can be found in Annex I.

4.6.1.3 Specialisation in Information Technology

The private and public IEKs offer a wide range of specialisation that have a direct or indirect relation with the IT technology. These are the followings:
- Information Technology Applications Specialist
- Multimedia applications Specialist
- Geographical Information Systems (GIS) Specialist
- Computerised Account Department Specialist
- DTP Specialist
- Computer and Office Machines Technician
- Telecommunication Systems Technician
- Designer Computer Aided

In the Attica Region reside about 37 IEK, 8 public and 29 private. Not all from 37 IEKs offer the above mentioned IT relate courses. In the Annex are listed all the IEKs, private and public, of the Attica region.

4.6.1.4 Conclusions

The IEKs, public and private, offer training in a wide range of specialities to many students. Some of these specialities are directly related to the IT and other make use of the IT infrastructure and as a consequence some knowledge of the IT field is required.

The knowledge offered to the students is adequate in order to find a job in the private or public sector as technical or assistant staff, or to start a job on their own. However, in order to make a career and to survive in a very competitive environment as the IT market, the IEK graduates have to try very hard because they have to compete with better trained personnel which hold university degrees.

As a consequence the role of an IEK graduate in company is secondary.

4.6.1.5 The Institutions of Higher Education

4.6.1.5.1 General Information

The Institutions of Higher Education are legal establishments which operate under Public Law and they are fully self-governed. Under the terms of article 16, par. 5 of the Constitution of Greeks, higher education is provided exclusively by State Institutions. The operation of private Higher Education Institutions is not permitted in Greece.

The Ministry of National Education and Religious Affairs is responsible for definition of the educational policies and providing all the financial support to all institutions. The Institutions are divided into two types, the Universities (AEI) and the Technological Educational Institutions (TEI).

4.6.1.5.2 IT related departments in Technological Educational Institutions (TEIs)

The Technological Educational Institutions were established under in 1983 and they form part of higher education just like the universities. The T.E.I. clearly differ from the A.E.I. (University institutions of higher education) as regards both their role and orientation which is clearly technological. They provide sufficient theoretical and practical training to enable the application of scientific, technological, artistic and other knowledge and skills to the professions concerned.

There are 6 TEIs (Technical Educational Institutions) that offer IT related degrees, 2 of which reside in the Attica region.These are the TEI of Athens, Department of Information Technology and the TEI of Piraeus, Department of Computational systems. Both departments, are very popular among students and it must be noted that their necessary for admission cumulative exams grade is higher than that required for many University departments in Greece.

The Department of Information technology is part of the School of Technological Applications of the T.E.I. of Athens. It was founded in 1983 and its first graduates graduated in 1987. Current enrolment is 800 undergraduate students and the department intakes about 160 students every year.

The Department of Information technology is part of the School of Applied Technology of the T.E.I. of Piraeus. It was founded also in 1983 and its first graduates graduated in 1987. Current enrolment is 930. More information about the duration of studies, the admission criteria, the courses and the syllabus for both departments can be found in the Annex.

4.6.1.6 IT related departments in Universities (AEIs, Highest Educational Institutions)

Introduction - IT related Higher Education

In the last decade, which is characterised by the rapid IT evolution, new IT related departments were established in Greece. These new departments along with the old ones which started to offer more systematically IT related education cover the educational needs in the IT sector.

Today, in Greece and Cyprus , there are 14 IT related departments belonging to different Universities and Polytechnics, 4 of which reside in the Attica Basin. Each of these departments have a different syllabus and in most of the cases a different orientation, in order to cover the wide range of Information Technology.
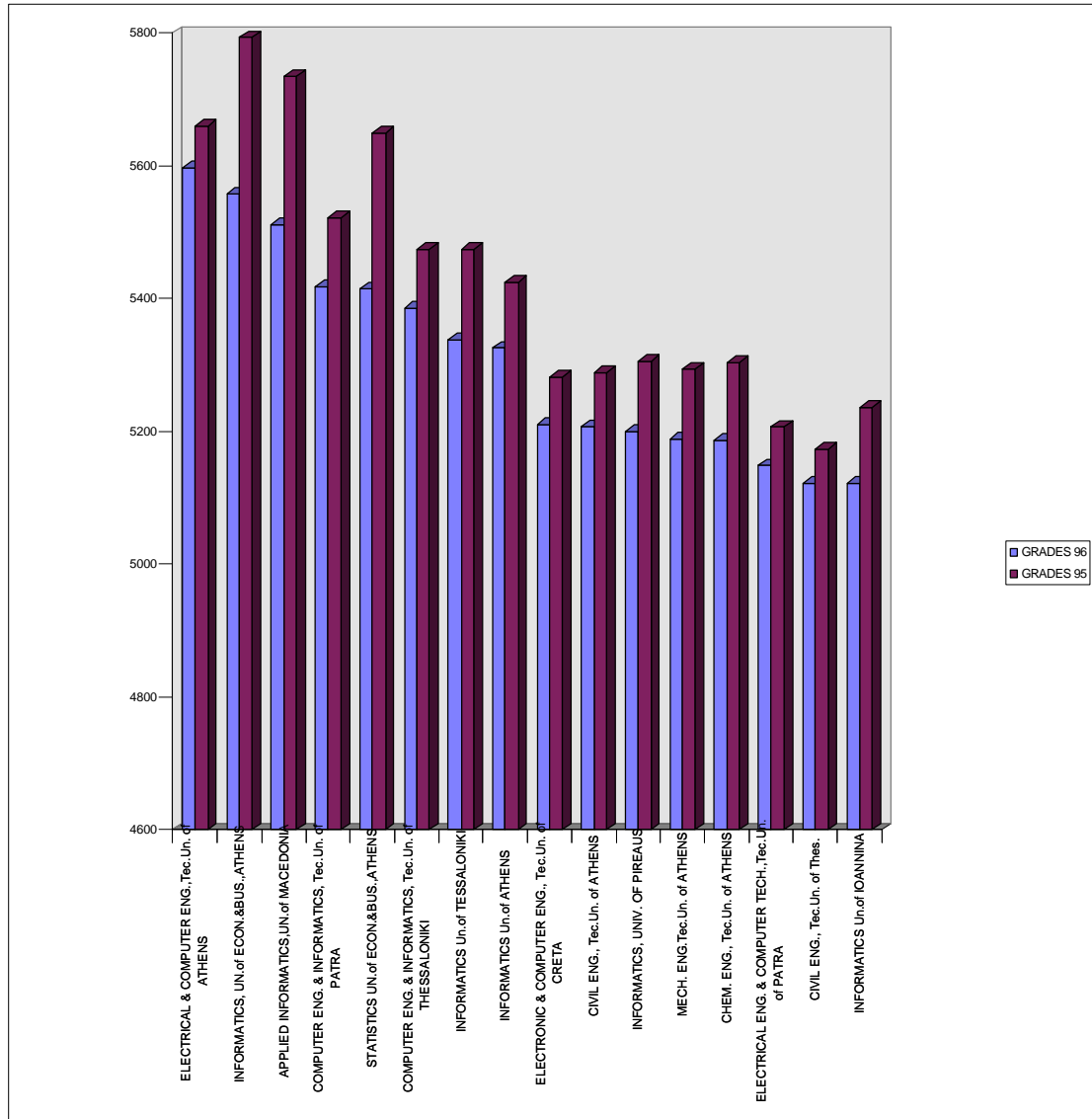
Table 12. The departments which required the higher grades

The IT related departments in take every year about 1220 students. The departments of the Attica region intake about 420 students. These departments are very popular among the students and as a consequence high grades in the National Examinations - conducted by the Ministry of Education - are essential in order to be admitted in one of them.

The table 1 presents the science and engineering departments which required the higher grades from their candidates in order to admit them. From the 16 departments presented, 11 are IT related. The table 2 presents the normalized minimum sum of grades that students must take in the National Examinations department (1996, 1997, Ministry of Education) in order to be admitted in an IT related department (normalized by the highest minimum sum met in the science and engineering departments). The department which requires the higher grades is the "Electrical and Computer Engineering Department of the National Technical University of Athens". The other IT related departments require also high grades as we can deduce from the table 2. In table 3 are presented the IT related departments in Attica Region

From the above we can conclude that the IT departments are the first choices of the candidates. This tendency reveals the importance of the Information Technology in modern society and the will of the students to participate effectively in the "Information Society".

IT Related DEPARTMENTS	1997	1996
Electrical & Computer Eng., National Technical .U. of ATHENS	1	1
Informatics, UN.of ECON.&BUS.,ATHENS	0,998194	0,993031
Applied Informatics, UN.of MACEDONIA	0,992416	0,984989
Computer Eng. & Informatics, Tec.Un. of PATRA	0,968942	0,967477
Computer Eng. & Informatics, Tec.Un. of THESSALONIKI	0,966233	0,962116
Informatics Un.of ATHENS	0,954135	0,951573
Informatics Un.of TESSALONIKI	0,953413	0,953896
Electronic & Computer Eng., Tec.Un. of CRETA	0,938245	0,930129
Informatics Un.of PIREAUS	0,931564	0,929235
Electrical Eng. & Computer Tech.,Tec.Un. of PATRA	0,925785	0,919764
Informatics Un.of IOANNINA	0,916396	0,915118
Computer Science UN. of CRETA	0,906645	0,914582
Electrical Eng. & Computer Tech.,Tec.Un. of THRACE	0,904478	0,897427
Informatics, Un of CYPRUS	0,883532	0,888313

Table 13. Minimum Total Grades (Normalized Values) for the IT related University Departments

The IT related departments in Attica Region are :

- Electrical & Computer Eng.,at the National Technical University Of Athens
- Informatics, at the University of Economics and Business of Athens
- Informatics, at the University of Athens
- Informatics, University .of Piraeus

The 17 per cent of the students which chose science and engineering departments succeed in IT departments (figure 1). The IT departments are the 11 per cent of the total number of science and engineering departments.
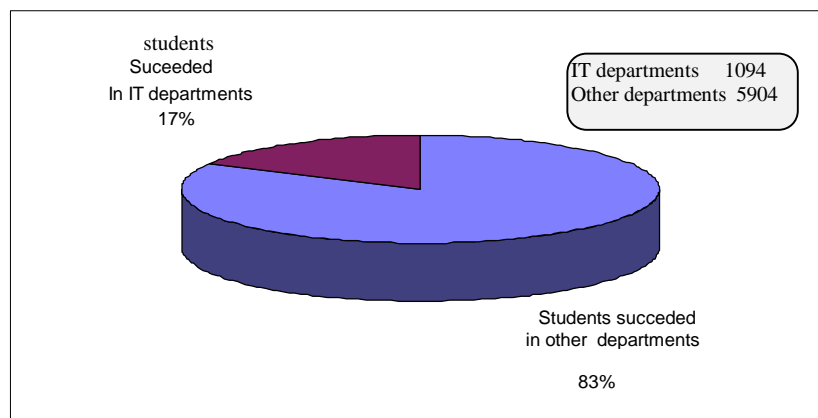
Figure 6. The number of students succeeded in IT departments in relation with the number of students succeeded in other students
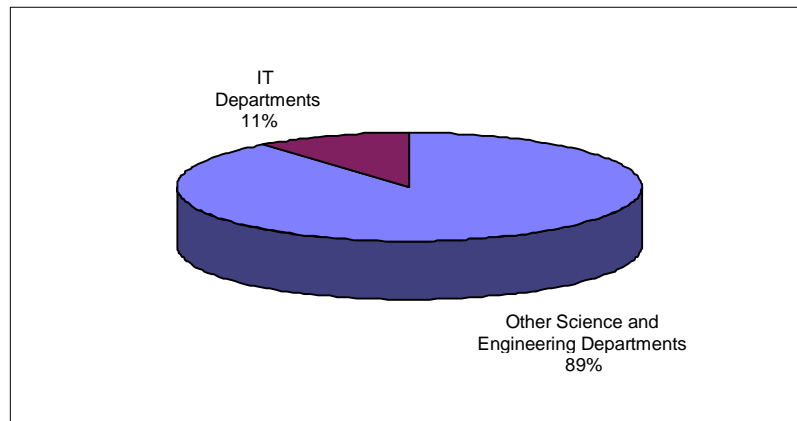
Figure 7. The number of IT departments in comparison with other science and engineering departments

The fact that the IT related departments are the most numerous departments in the science and engineering field (figure 3), indicates the importance of the IT education for the academic community. (The title **Informatics** includes the IT related departments in Greek Universities and Polytechnics)
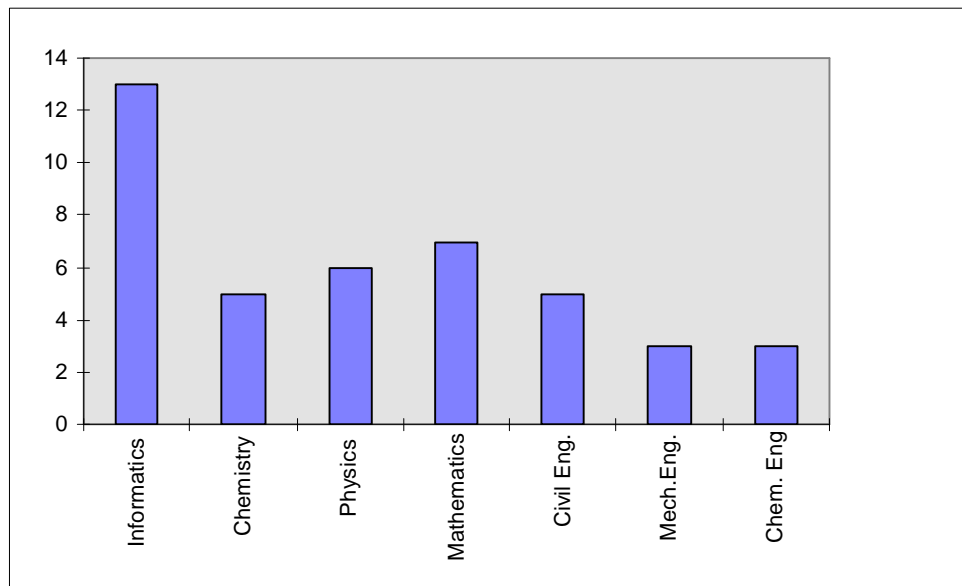
Figure 8. The number of IT departments in comparison with the other science and engineering departments

In conclusion, both the academic community and the candidates for the Greek universities and technical universities are aware of the leading role of the Information Technology in modern society and state their preference the former by establishing IT related departments, and the latter by choosing mainly these departments for their studies.

However, the market demand for skilled computer professionals is quite accute. This means that the output of the various schools, private and public, at the University level or lower, cannot meet the demands of today, and presumably even less in the near future. Therefore a better alignment of public educational policies is urgently required in this direction, perhaps to the expense of other knowledge domains, where there is considerable saturation of the market demand. The latter is evident by the high degree of unemployed AEI & TEI graduates in certain, more "traditional" fields.

4.6.2 The Information Technology Resources

In building the Information Society, the role of the Information Technology resources and of the users, is evidently instrumental. Their skills, expertise and capabilities are going to lead the effort, in particular, during the early stages.

There is no sector in Greek economy which presents such a centralisation (on the offer side) in Attica, as that of IT. More than 90 % of the businesses of the sector (in terms of turnover) are located and operating in the Attica region. Characteristically, among the top 50 companies, only one has not its headquarters in Attica. Therefore, the IT market in Greece, is practically the Attica Basin market.

4.6.2.1 The Greek User - Characteristics

The last years, the Information technology market showed a fairly robust increase, at a pace between 12-15% annually, a token of a health sector. Today (Source IDC 1995) the market is in the area of 130 billion drachmas (about 430 mECUs). It seems that Information Technology is amongst the fastest growing sectors in Greece. The favour macroeconomics environment, which encouraged investments in technology as well as the improvement of the productivity of the private sector, are amongst the principal reason which formed the Greek Information Technology market.

The Increase of the Greek IT Market and the Consumer Index (CI), 1992-1997
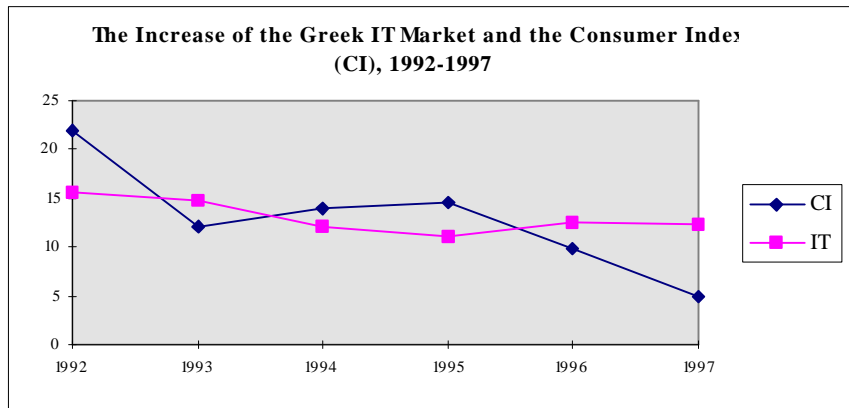
However, due to the small size of the average Greek company, Greece has the smallest budgets for Informatics among all EU and OECD countries.

Information Technology Investments as part of the GNP (%)

Information Technology Investments per Capita (USD), 1995
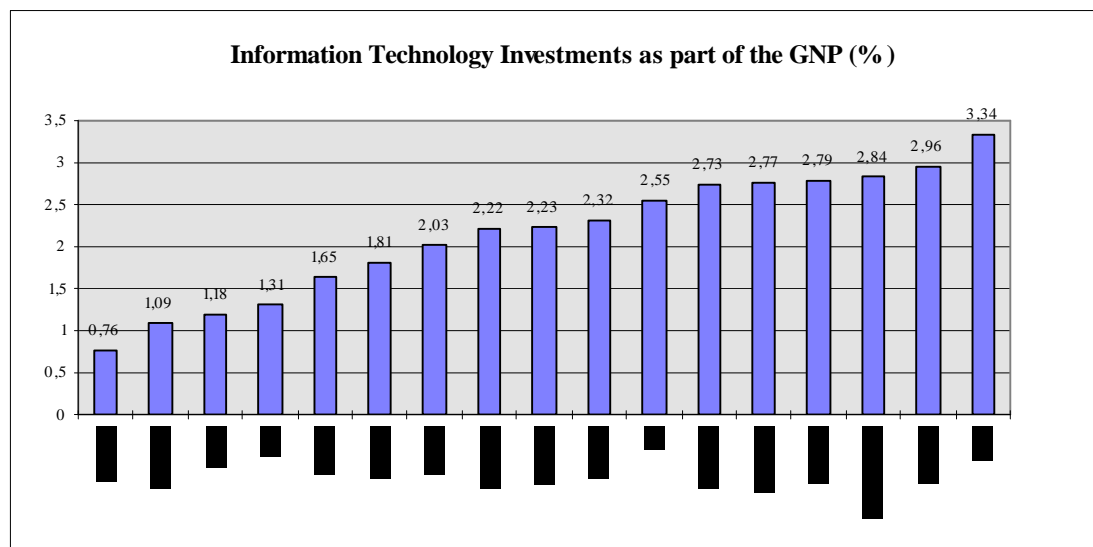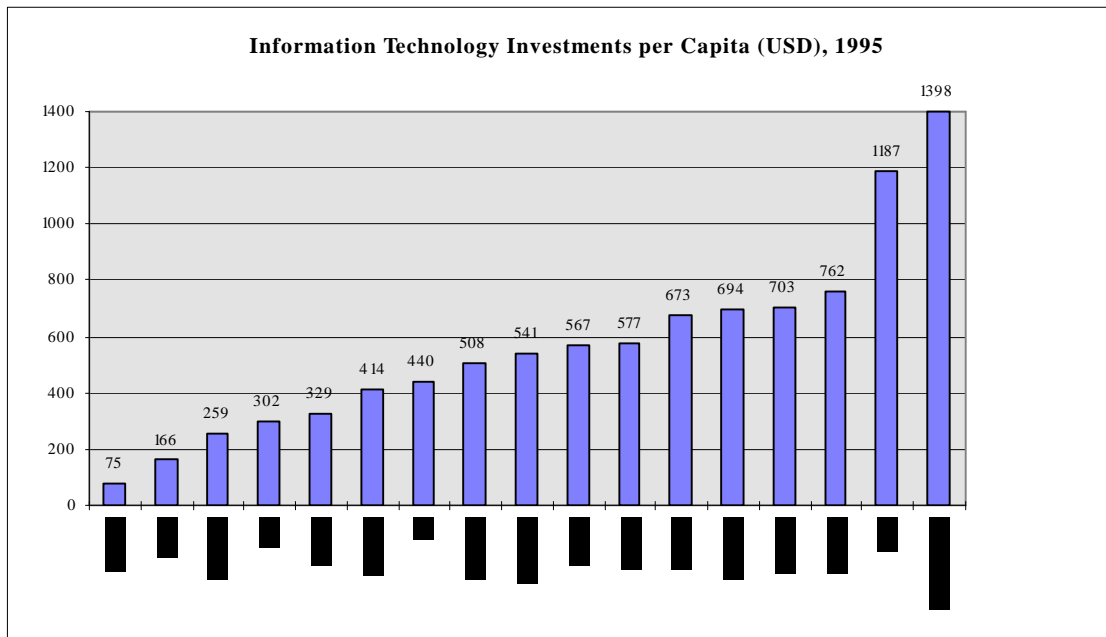
The percentage of the Greek investments in IT per urban capita, shows also a marginal funds allocation. In contrast, in some Scandinavian countries, the USA and the Switzerland, approached on the average the amount of the 1000 USD for each urban dweller. With regards hardware, this amount indicates that each citizen owns a PC !.

It is evident that the process of familiarisation with the impact of the IT has not been implemented in Greece, to a degree similar with the other EU states. The average Greek company does not respond to the invitation to change with similar speed with peer organisations elsewhere in the Union. The Greek manager has not understand that the concept of "Information Society" is something more than a futuristic project, with doubtful benefits. The link between IT and "productivity" are "competitive advantage" has not been made up to now.

The public sector, which is the principal buyer and user, contributes substantially to the situation. Major IT investments have been delayed for years with terrible problems in the public sector productivity, funds consumption and quality of services to the citizens.

On the other hand the infrastructure of communications in Greece showed a considerable improvement. In 1994 in Greece, 48 main lines existed per 100 citizens, placing the teledensity figure close to the average EU figure. As a comparison, France and some Scandinavian counties have a teledensity close to 55, while Germany is in a par with Greece, about 48. Teledensity has a strong relationship with the presence of vertical markets which require telecommunications. On the contrary, the level of investment in communications, which varies from state to state, has no relation with teledensity or financial robustness. Greece shows a a high level of telecommunications, regardless of its low GNP and population.

**Teledensity - The Euro Markets of Telecommunications Services as % of the GNP
1995**
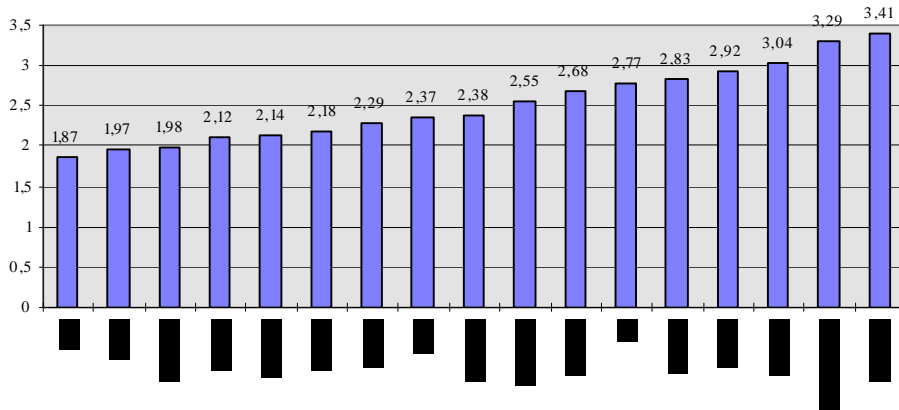
**Forecast for the Average Increase of the Euro Market in Telecommunication
Services (1994-97)**
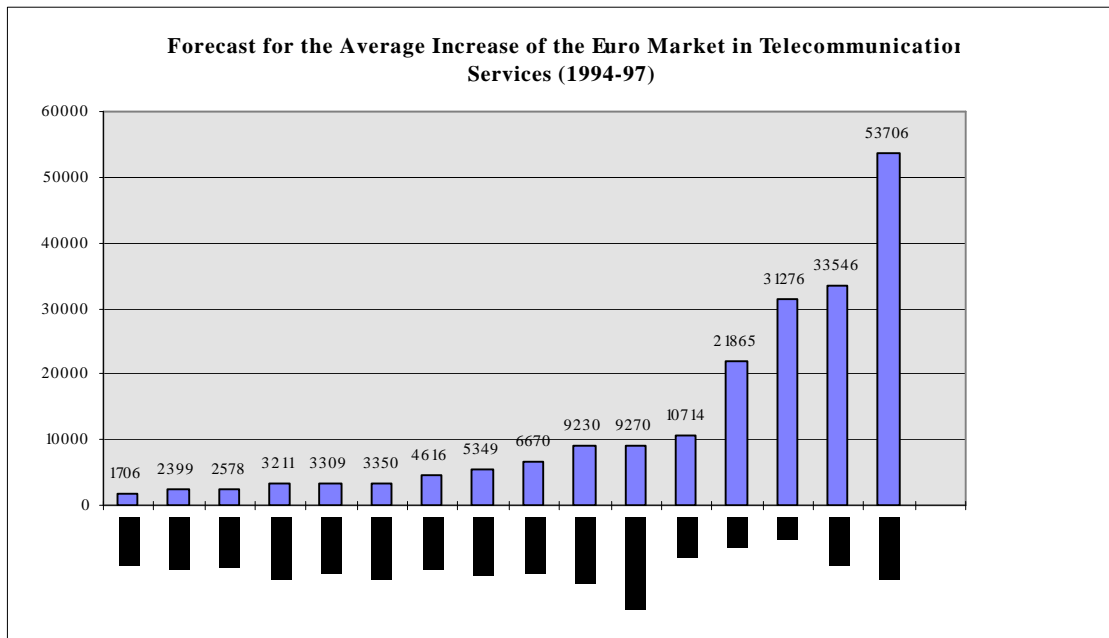
4.6.2.2 Hardware Vendors

All major international hardware vendors, have Greek operations. In addition, 3 Greek owned groups, play a major role in the distribution of PCs and related peripherals and software, by controlling an astonishing 60% of the market.

The hardware market shows consistently increase tendencies above the Consumer Index, indicating thus real growth. The PC segment and in particular the home market, is the strongest, while other systems shows slowdown in their growth rates. The segmentation of the hardware market (computers) in 1996 was as follows :

The Greek Systems Market (1996)

Small Systems
15%

Middleware
13%

Large Systems
7%

Workstations
6%

PCs
59%

**The Greek IT Market (Hardware Categories),
1996**

Data
Communications
9%

Small Systems
11%

Middleware
9%

Large Systems
4%

Stand Alone
Systems & Home
Market
67%
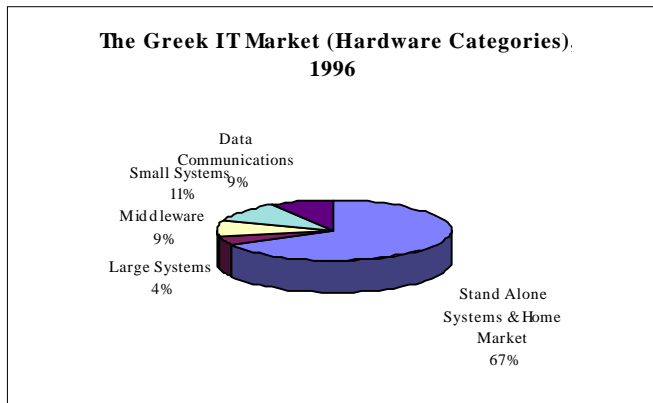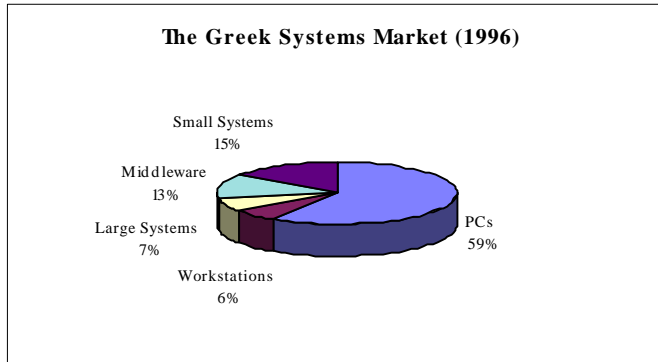
There is a very strong tendency during the last years., that the hardware market (PCs and peripherals) undergoes a major shake out, with several small businesses leaving the market, as they cannot compete with the major players who can have economies of scale in assembly, stocking, financing and distribution. It is expected that by year 2000, four or five groups will control about 85% of the market.

4.6.2.3 Software Vendors

The software market is characterised by stable growth with low rates. In 1995, the growth was in the area of 13,7% while in 1996 around 18%. The additional growth in 1996 was due mainly to the introduction of the Greek versions of Microsoft Windows and tools which boosted the market performance. In general, the software market is quite low with comparison to other EU states, confining itself in packaged solutions (operating systems, tools, packaged applications for companies etc).

**The Greek Software Market
(in millions of Drs)**

	1995	1996
System Software		
Tools		
Applications		

The Greek Software Application Market

Other
32%

Word
processing
5%

CAD/CAM
9%

Accounting
54%
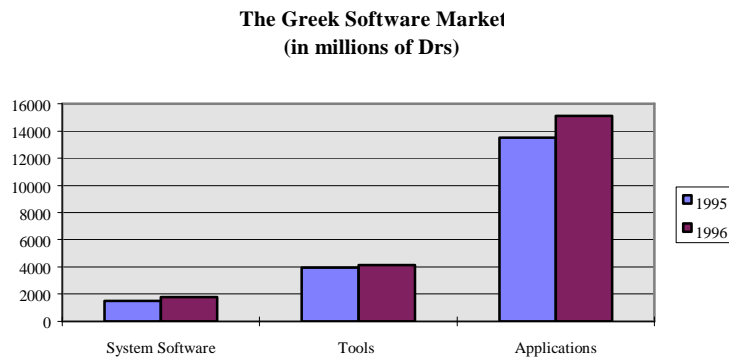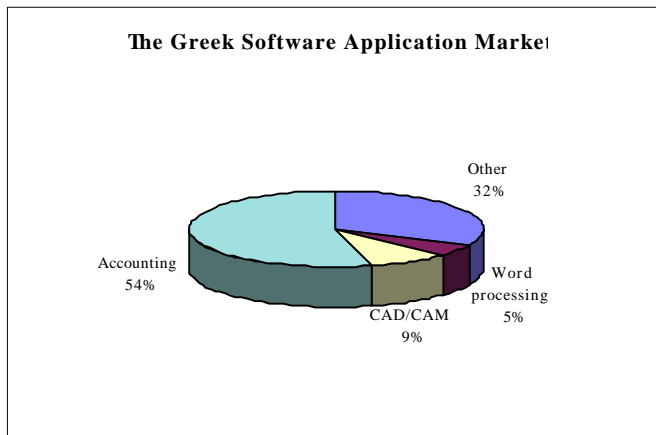
Given these figures it turns out that there are quite few resources capable of developing major systems which are supposedly required by the Information Society. The software market is characterised by emphasis to the basic processing needs of the (small) Greek businesses (as the segment for accounting applications indicates) and the public sector.

4.6.2.4 Telecom Service Companies

Telecom in Greece, until very recently, where simply OTE, the national PTT. Today, the situation is different, as non telephony services are free to competition, as well as GSM communications. In addition, the level of investments by OTE is such (for Greek standards) that there is a flourishing market for manufacturing Telecom products (such as cables, switches and other digitisation products, normally under licence from major international manufacturers).

Special mention should be made to mobile telephony which represent some of the most important private investments for many decades. Mobile telephony is one of the fastest growing markets in Europe, having up to now (fall 1997) about 700.000 subscribers, a figure which is expected to double by year 2000, as a third operator (a joint venture of OTE and a foreigner investor) is entering the market early in 1998.

Greek telecom Market Segments

Private
Telephone
Equipment
6%

Public
Telephone
Equipment
12%

Mobile
Telephony
11%

PSTN
Connection and
Line Rental
18%

Others
4%

PSTN Call
revenue
49%
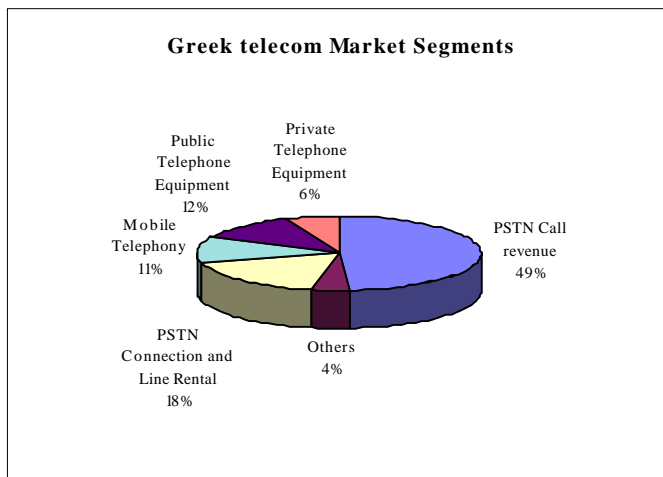
4.7 Applications

This chapter makes a brief survey of certain systems which being large enough, may be characterised as belonging to the Information Age. Being accurate, they represent large software and systems projects, involving telecommunications as key components. The reason for inclusion here, is that they represent an unprecedented case for Greece (albeit in other industrialised states, similar undertakings have a long history) and therefore they constitute the foremost of the Greek Information Technology experience.

The list is by no means exhaustive. Some of the applications of this type have been reported elsewhere in this document (e.g. recent developments in Public Sector). The authors have selected cases where the technology may offer quite valuable services to the community, such as the knowledge and collective memory industry (e.g. libraries, museums) and the health sector.

4.7.1 The Knowledge Industry

4.7.1.1 The Greek Museums

In 1995, the web server "Ulysses" of the Ministry of Culture was launch on the Internet (www.culture.gr). The server provides complete and detailed information about Greek culture. It contains information about the Departments («Ephorates») of Antiquities, Museums, Culture organisations and Universities.

The server includes all the museums of Greece (over 124, each one with its one page), with sort descriptions and photos of the main exhibits, and all the important sites and monuments(over 570, each one with its one page). In the Attica region there are about 38 museums (35% of the Greek Museums) and 42 main historical sites and monuments. All are included and described in the web pages of "Ulysses".

Few museums have their one web pages (such as Hellenic Maritime Museum, Museum of Cycladic Art, Benaki Museum, Theatre Museums) but information about the Greek art (Prehistoric, Ancient, Byzantine, Recent) and the Greek Museums can be found easily in the web. The New Media Group of the National Technical University offers through his site (http://www.medialab.ntua.gr/) a Virtual Visit of Acropolis. In addition, some museums have published special editions on CD-ROMs about their exhibits.

As far as the information systems of the museums are concerned, there are some efforts but the majority of the museums has not yet taken full advantage of the possibilities to create and maintain computerised inventories for collections management, to build documentation standards and authority files and to support computer-based cataloguing undertaken by collections staff.

Several Greek companies and organisations participate in EU programs concerning the new way of access to the museums and to world's cultural heritage in general (Raphael, G7-Heritage etc.). In the near future the introduction of Infokiosks (multimedia public access points) in the museums and nearby the historical sites and monuments will be the next step towards the information society for the museums.

4.7.1.2 Conclusion

The automation rate of the museums is low. Few use modern information systems and even fewer provide to visitors new ways of access through Infokiosks (public access points) and remote access to the museum's exhibits through the Internet. On the other hand, some museums, such as the National Gallery, have produced multimedia editions on CD ROMs about their exhibits.

In order to modernise the museums services critical investments are needed in the following sections:

· *Development of information technology systems for the management of museums*

· *Development of communication infrastructure of museums in order to permit remote access to the public*

· *Development of new graphic and interactive user interface in order to offer a new access experience to the visitors of the virtual or real museum*

· *Training of the museum staff*

4.7.1.3 Libraries – Current Status in Attica Region

Public libraries in Greece had 680 service points in 1990, 24 per cent of which (about 142) in the Attica region. Higher Education libraries had 70 service points in 1990, 50 per cent of which (about 36) in the Attica region.

With the exception of few major libraries (such as National Library, Eugenides Foundation Library, Panteion University, National research Centre «Demokritos» Library), all the other libraries have restricted number of books. The rate of automation is very low. The majority of the libraries rely on simple software in order to perform simple tasks. Few libraries permit on line access and even fewer have a web site (mainly university and research libraries).

The libraries of the University of Athens (www.uoa.gr), of the Athens Business and Economic University (www.aeub.gr), of the National Technical University of Athens (www.ntua.gr) and of Panteion University permit on line access and maintain web site.

4.7.1.3.1 Policy Issues - Plans

The last years, two entities the "National Documentation Centre", NDC (EKT, www.ekt.org.gr) and the "National Book Centre" (NBC, book.culture.gr), a new public welfare legal entity under the supervision of the Ministry of Culture have contributed to the development of the Greek libraries.

In addition the Ministry of Education runs two special projects with funds from EU, one for the development of school libraries and the other for the modernisation of the university libraries. With funds from the latter program the University of Athens develops the interconnection of the all the small libraries of its departments and the National Technical University of Athens (NTUA) plans the interconnection of all the University libraries. The NTUA is to establish a research scheme where projects related to image library and full text bibliographic database on NTUA publications (reports, theses, conference proceedings, etc) will be developed in collaboration with University Departments and other academic libraries

The NDC

The NDC have developed a simple Librarian DOS program with few capabilities and limited OPAC (open public access catalogue) features and offers it free to all the Greek Libraries. The NDC is also responsible for the National Science and Technology Libraries Network, which is described in detail below.

4.7.1.4 National Science and Technology Libraries Network

General

Since 1984, EKT (National Documentation Centre, NDC) in collaboration with 200 Greek Libraries develops and updates the online database of the Union Catalogue Periodical (UPC) of the Greek Science and Technology Libraries.

Union Catalogue Periodical and Hermes (a service provider which is comprised of several Greek Databases) are the base the development of the National Science and Technology Libraries Network.

4.7.1.4.1 The benefits of the libraries

The Network offers to its Libraries – members the capability to:

- Connect on line with Hermes which is comprised of a number of Greek Science and technology related databases
- Be informed about the collection of the other libraries of the Network
- Trace the Greek libraries that have in their collection the Periodicals that a member of the library may want
- Order online photocopies of specific articles they need from any other library of the network

The network gives to its members the possibility to access fast all the Periodicals of the network, no matter where the Library – member is sited. In this way the libraries – members expand the services they offer and as a consequence their contribution to the technological development of Greece.

The network not only expands the narrow limits of a typical library but also gives to remote users the opportunity to access the national collection of Periodicals. The system is a first step towards a truly virtual library and extends the access rights of the users of each library.

4.7.1.4.2 The advantages of the Network usage

The usage of the system haw many advantages such as:
- Saving currency and man-hours
- Exploitation of the existing material
- Expansion of the number of users of each library
- Reduction of the expenses for Periodicals
- Rational usage of the budget of the libraries in order to acquire new scientific Periodicals

4.7.1.4.3 Statistics

The following table presents the development of the network since December 1994.

Year	UPC Libraries	UPC Periodical Titles	UPC Subscriptions	Networked Libraries	On Line Orders (since the beginning)
DEC-94	133	20400	48057	6	905
JAN-95	140	20587	48498	41	1200
NOV-95	167	21600	49000	57	5189
AUG-96	181	23034	53119	71	12105
JAN-97	195	23034	55009	83	16247

From the 83 networked libraries – members 38 reside to the Attica region.

4.7.1.4.4 Financial Benefits

According to a research conducted by NDC (INFOlibrary convention, GRAPHICS '95):

1. The annual Minimum Expected Financial Benefit that can result from the rational reorganisation of the libraries – members of the network is about 2,737 billion drachmas. The Minimum Expected Financial Benefit is the amount of money that can be saved if one of the common subscriptions of the libraries of the network is replaced. For example if one of the 676 titles which are repeated in five different libraries of the networked is cut down in only one of these libraries will have an annual financial benefit about 97 million drachmas. These savings could be use for the subscription in other titles that are not included in the national collection.
2. The annual that can result from the rational reorganisation of the libraries – members of the network is about 3,744 billion drachmas. The Maximum Expected Financial Benefit is the amount of money that can be saved if only one of the repeated subscriptions is held. For example if only one from the five different libraries that have 676 common titles continue to be subscriber and the other four stop, will be saved 386million drachmas per year.

The NBC

The NBC is a new entity, which is responsible for the development of books and libraries in Greece. Two are its main targets. First, the interconnection, in co-operation with the National Library, of all the main Greek libraries and second the creation of a bibliographical library and documentation centre with a collection including links to electronic material and thus offering the possibility of access by means of networking to material outside the collection.

The NBC is creating its own web page on the Internet, in collaboration with the Ministry of Culture's "Odysseus" site. It will be an informative source and a centre of communication, information and promotion for all those involved or interested in the book industry. Thus, the public will have access to the NBC's programs, activities, the Bibliological Library, publications, surveys, "Recommended Reading", and its files on writers, translators, publishers, bookstores, etc. This computerised book site can facilitate the collective promotion of all factors involved in the book sector, with the eventual prospect of functioning as a National Bibliographic computer bank. As it is constantly enriched and expanded, it will have the possibility of linking with other sites related to books -- both in Greece and abroad -- so that, all together, they will constitute an information network for books and culture.
.
Problems – proposals

Two are the main problems of the Greek Libraries in Attica Region and in Greece in general:
- The libraries are scattered in the Attica Region. There are many specialised (e.g. Ornithology Society Library) or small libraries (under 7000 books) spread over the Attica region.
- The libraries have a very low rate of automation. The majority uses simple software and does not permit on line access.

There are two solutions for the above problems:
Establish a new National Central Library. Gather all the minor libraries in a central building and create a new modern library.
Interconnect the existing scattered small libraries. Create a modern multimedia network, which will interconnect all the libraries in Attica Region (and in Greece) and allow the electronic exchange of the libraries material.

The first solution is probably impossible. It takes a lot of money to establish and maintain a central library like the National Library of France and the Greek economy cannot respond to such a demand.

The second solution is more feasible. The first steps have been already made, with the two special projects run by the Ministry of Education with funds from EU and the plans of NBC, for the school and university libraries. In future, further progress in access networks will allow the realisation of this solution with a reasonable cost.

In addition, the role of the libraries will change significantly (see Annex II). The most important and prestigious services of the libraries will be:
- **Knowledge Management** The library will be transformed to an "Information Resources Management Centre" (IRMC). The IRMC will be the administrator of the information resources

and is responsible for the transfer and the distribution of the content. New emerging technologies will facilitate this role (optical networks, push technologies, new broadband services)

- **Research.** The IRMC will contribute actively to the research by covering the specific information needs of research teams.
- **Education - Training.** The IRMC will be responsible for the training of the end users in order to use successfully the systems.

The future of the Librarians

From the previous described role of the libraries it is obvious that in the near future, the librarian will be an Information Technology specialist with significant contribution to the research. The below table presents the evolution of the roles and the responsibilities of the library staff.

Old Role	New Role
Gives *information* about the material	Gives *critical knowledge* about the content
Develops material *collections*	Develops *multimedia databases*
Uses *computers*	Manages *computer networks*
Organise *physical libraries*	Organise *virtual libraries*
	Researcher
Supports on demand during *opening hours*	*24-hour support by using information systems and communication tools*

Conclusions

In order to develop the new role of the libraries as a Information Resource Management Center, investments are needed in the following sectors:

- *Development of information technology systems and of new graphic and interactive user interface.*
- *Training of the library staff*
- *Interconnection and Co-operation with other libraries.*

4.7.2 The Health Sector - Telemedicine in Attica and Greece

In Greece, information of medical content are usually found spread in various shapes such as in Information Hospital Systems, in brochures etc. In order the doctor to be able to have access to all these information, that although they may have different shapes they can also be in different locations, he has to a waste a lot of time and material as well as resources,. Moreover, we can say that too many difficulties raise in the management and update of these information. Adequately, there are some problems in the collection of all the required data, which cause problems in the scheduling and management in the Hospital domain. All these problems are becoming more serious because of the non-uniform geographical features of Greece (islands, mountains, valleys) and the non-uniform population distribution.

The continuously growing need for more efficient Health Services as well as other factors such as the nowadays technological developments, the formulation and the restrictions in the available resources, are leading us towards the development of well-established Health Service Information Systems (HSIS).

Including the technological developments of Computer Science and Telecommunications in Health Services, the doctor has the capability to obtain easy and quick access to medical data files and also broaden the use of medical equipment. As a result to all of these, we have a huge raise to the Quality Of Services.

But in order to implement the use of Telemedicine there are involved various kinds of new technologies together with high demands in the quality and reliability of systems. So, the demands of these project are only satisfied by the use of the modern technologies.

The use of HSIS (Health Service Information Systems) will solve many problems that arise from the increase of population that has been concentrated in ATTICA region and more specifically in the Capital City of Greece, Athens. As you can see from the charts below the number of beds in the hospitals of Athens is

extremely large, and that happens due to the increase of the number of residents in Athens city. In Athens city the number of beds is more than half comparing to the rest areas in ATTICA region.

TOTAL NUMBER OF BEDS IN ATTICA REGION

WEST ATTICA
19%

EAST ATTICA
17%

PERAEUS
13%

ATHENS
51%
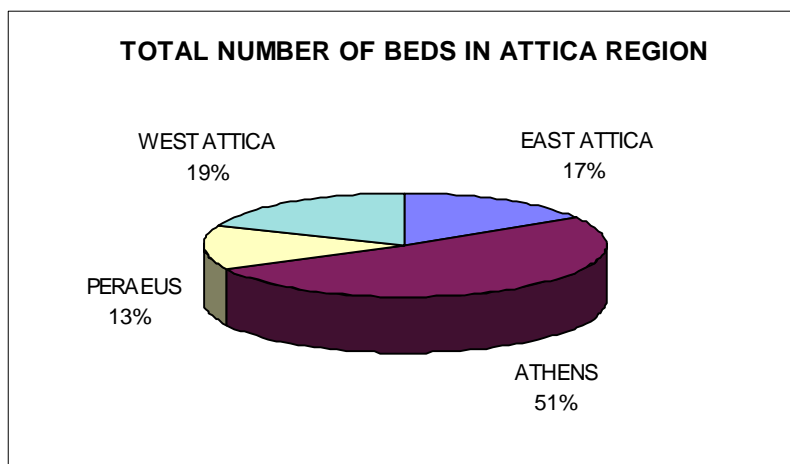
Figure 9 Number of Beds in ATTICAS' Hospitals.

Below we give some statistics from the ``Social Welfare and Health Statistics'' department. It refers to the capacity (doctors, nursing staff and beds) and to the movement of hospitals in the country for the year 1993. General data are also included concerning social welfare for the same period.

Data on hospitalisation movement are collected by means of a monthly survey regularly conducted ever since 1962. This survey, together with the annual survey on the capacity of the hospitals, is conducted by the Statistical Service of the Ministry of Health, Welfare and Social Insurance on the basis of a special questionnaire compiled by the NSSG, in co-operation with the competent Divisions of the above Ministry.

The completed questionnaires are further subjected to a consistency control, to coding and electronic data processing and the data are finally tabulated. We refer to the number and the capacity of hospitals, at the end of 1993 (Dec. 31) there were 368 hospitals operating, with 52.144 beds, 140 hospitals thereof, with 36.780 beds, are public (State or Legal Entities of Public Law) and 228 hospitals, with 15.364 beds, are private (Legal Entities of Private Law and Clinics).

The medical personnel engaged in the same period amounted to 18.492 doctors, while the nursing personnel to 37.211 namely 1.916 midwives and 35.295 nurses.

4.7.2.1 Organisation and Management of hospitals with Informational Systems

Basically what we need to have is a well structured environment where everybody knows his responsibilities and does his work through well established and specific procedures. All these information are important ones. When we've finished with the first stage, the next step is the assessment of the case to some company with experts, in order to develop the Hospital Information System (HIS).

A sort definition of the HIS - Hospital Information System- is the following.
HIS is the co-operation of :
- Programs (SOFTWARE)
- Computers (HARDWARE)
- Humans (PEOPLEWARE)

which all together fill in the hospitals' needs.

A good HIS has all the potential it needs in order to continually extend and refresh it's performance, always based on the developments in Informatics and Medicine.

4.7.2.2 Pilot Programs

In the early 80's there has been approved of financial standing a pilot program for the introduction and development of Informatics in 15 big Hospitals in ATTICA Region.

The idea was to develop not only an Information System for Management - Economic issues, but a system which will be offered in the context of a National Health Care System (NHCS).

The Hospital Information System is divided as mentioned above in two interconnected and co-operative subsystems:

- Management-Economic Hospital Information System (Management HIS)
- Medical Hospital Information System (Medical HIS)

All programs are running locally in microcomputers (workstations) and communicate with the main database. All the applications will be established in the clinical department and the laboratories of the hospitals .

4.7.2.3 Intra-hospital Information Systems

The biomedical equipment of a modern hospital has various kinds of heterogenous equipment which can be classified in general categories with respect to their functioning. From each category the data produced are non-uniform (images, waveforms, numeric data etc.). The equipment from each category can be connected to each other within a network.

4.7.2.3.1 Automated Hospital Systems

Below we list a number of representative systems for collection and processing of data:

- **Picture Archiving and Communication System (PACS).**
  It's a system for the collection of images (from CT, MRI, ultrasound systems) storage and retrieval and includes depiction systems and image management, connected with storage systems.
- **Pharmacy Information System (PIS).**
  This system automates the pharmacy procedures in a hospital (prescription processing, maintenance of medicine databases etc.)
- **Material Management Information System (MMIS).**
  This system is used for the management and control of different kind of procedures concerning material supplies (buying, classification, inventory etc.)
- **Anaesthesia Information Management System (AIMS).**
  This system collects data, concerning following in anaesthesia department, from different sources and analyses them giving a variety of reference types.
- **Laboratory Information System (LIS).**
  Is used for the collection of all the necessary information coming from different kinds of equipment (Clinical Chemistry Analysers, Blood Culture Analysers etc.). It used also for the storage of clinical data, the verification of the precision of tests, the creation and update of patient files.
- **Radiology Information System (RIS).**
  It's a system which collects and stores data coming from radiology equipment.
- **Hospital Information System (HIS).**

It's the main system of a hospital and collects data out of all the systems. It also permits access to the rest of the hospitals' procedures giving the ability for the overall control and management of the hospital.

Networking of the devices of one category, when they don't agree to some kind of a standard, usually demands special kinds of interfaces (hardware and/or software) and protocol converters. This problem, networking of devices coming from different suppliers, is handled by the use of communication standards, (For instance, PACS systems use DICOM 3.0), which ensure the exchange of data between different types of devices. Furthermore, the necessity for networking all devices which constitute HIS, needs a standard in order the exchange of data between all these heterogeneous systems to be possible. Such a standard is Electronic Data Interchange Health Level 7 (HL7). HL7 permits exchange services of clinical data between all heterogeneous hospital systems, admission/discharge/transfer (ADT) etc.

4.7.2.4 Clinical Care Protocols

The procedure followed by doctors while handling a case may be summarised as follows:

Collection of Data

Data may drawn from various sources:
- Patient History (History of the presenting complaint, personal history, family history)
- Systems' review
- Physical Examination
- Laboratory Tests, Paraclinical Examinations, etc.

Creation of a list of possible diagnoses

- The list of possible diagnoses is built according to the data that have been gathered at each stage (i.e. during history taking, physical examination, etc.).
- The list can be reduced as more data are gathered, as the diagnostic advances (differential diagnosis).

Establishment of a diagnosis

- A diagnosis is established when enough data have been gathered to support it as well as exclude the other diagnosis included in the differential diagnosis.
- The possibility of establishing a diagnosis depends on the level of the Health Care unit where the case is handled (Primary, Secondary, Tertiary).

Treatment

The treatment is specific for the diagnosis established. The actions performed by the doctor at this stage depend on the level of the Health Care unit where the case is handled.

The description according to the above model, of the complete procedure followed when handling a patient presenting with a specific complaint is called a *Clinical Care Protocol. Each Clinical Care Protocol* is, conventionally, named after the presenting complaint it is related to.

A *Clinical Care Protocol* may therefore de described as:

1. A protocol followed in order to handle a case presenting with a specific symptom
2. A list of the data required in order to establish a diagnosis and treat a patient. An implication of this statement on Telemedicine, is that Clinical Care Protocols may be seen as guidelines that, if followed by the local doctor, assure that all the required actions have been taken and all the data required by the consulting doctor in order to provide an opinion have been gathered.

3. An analytical tool used to identify and study the various quality aspects of the services provided. The latter refers both to Medical Services provided locally and Telemedicine Services.
4. The educational tool, for Primary Care doctors.

A *Telemedicine Event* is the sequence of actions implementing Telemedicine procedures, used by the local doctor to support him while following a Clinical Care Protocol.

In other words, a *Telemedicine Event* consists of all those actions related to Telemedicine that are used by the local doctor as an aid in one or more steps of a Clinical Care Protocol. A *Telemedicine Event* may, for example, include acquiring data about the personal and family history of a patient, by downloading his/her *Electronic Healthcare Record (EHR)*. It may also include direct interaction with an expert, in order to decide the most appropriate treatment for the specific patient

What types of interest (benefits) are inherent in establishing/using a HSIS and whose values have to be considered.

We have to admit that there is a huge number of benefits arising by the use of HSIS. So, in other words we may say that we have clinical benefits. Clinical benefits are the one to primary medical workers stems mainly from the direct, effective, timely and secure access to specialist knowledge and advise. Benefits to the supporting staff is mainly social/human and indirectly by becoming known to a wider medical worker and patient/population audience. The concept of hospital without walls can effectively be implemented, resulting in better services.

We also have technological benefits, which means some sort of quality control is automatically provided resulting in improved diagnostic means at the primary sites thus avoiding unnecessary risks. Wider possibilities for research are becoming available and should be exploited.

Organisational type of interest provides new schemes and better means for cases handling particularly if a patient follow-up can be arranged. Patients can be scheduled to be admitted to the most suitable hospital if need arises and their cases will be known in advance, thus avoiding unnecessary duplication of diagnostic procedures. Best results will be obtained whenever patients are admitted to the hospital of support but this might not always possible; the supporting hospitals should arrange for hospital beds to be available for patients supported initially via Telemedicine. The availability of beds at the supporting hospital must in this event must be related to the realities of the HSIS.

No new ethical rules are deemed necessary but the interaction of the primary medical units' staff with the supporting hospital experts is enforcing the existing ones.

Patients will be offered the same quality of services provided to those accessing directly the hospital of support, enforcing consequently the concept of equity to access. In many instances patient comfort will be increased and social and financial cost to the patient and its relatives can be reduced.

There are also economical benefits; design of cost/effectiveness studies should be worked out. In the mean time the HSIS should be provided for covering emergency situations and problem solving for the benefit of primary medical workers.

The provision of HSIS from distance opens up new business opportunities for industry (equipment, maintenance, updating software, new services etc.). They also provide a high technology in primary/isolated or undeserved sites, which can further be exploited.

There are new business opportunities for those offering medical services. As a consequence private networks (diagnostic or other) operated for profit have also appeared in the market.

4.7.2.5 Current Situation of Telemedical Systems in GREECE

The first pilot attempt for interconnection of Health Service Units with a Telemedicine System, was made in 1989 in the framework of the Greek Telemedicine Programme for pilot applications by the Medical Physics Laboratory (MPL) of the University of Athens and Sysmanoglio Hospital. Forward we give more details.

In November 1987, was established the Medical Advice Centre of the Hellenic Red Cross (M.A.C-H.R.C). The M.A.C. - H.R.C. answers to emergency medical calls 24 hours per day, and gives first aid instructions people how to handle medical emergencies and common medical problems on board. One part of M.A.C. gives since 1990 tele-cardiology services in 22 remote islands and areas.

In 1995, Onassis Cardiac Surgery Centre was connected with seven Aegean islands in order to handle with cardiology cases. Two more islands are about to be connected with the Onassis Cardiac Surgery Centre. The application, albeit simple, has a huge social benefit, since it is clearly a life saver.

Universities from all over the country, with main subjects Information Technology, Telecommunications, Medical and Biomedical Technology, are developing various kinds of programmes. Some of them are among the following:

- Programmes TRATA and MERMAID
- Programmes NIKA, AMBULANCE, NIVEMES and EUROMED.
- Programme BEAM II.
- Programmes STRIDE-Upgrade and expansion of services for the Greek Telemedical System, HERMES and VSAT.
- Programmes AIM-TELEMEDICINE, ET-ASSIST, HECTOR and STAR.

We have to admit that the private sector initiative is remarkable and necessary. Private companies are developing their own applications which are very useful. So, some remarkable efforts were made by Teleheart and Cardio Express.

In Greece we have a successful operation of a few Telemedicine systems in Athens, one in Crete island and one in Thessaloniki. In Athens the oldest one is Sismanoglios' (1992) and Onassis Cardiac Surgery Centre (1995) for Cardiology Cases.

Since 1992 we have a Telemedicine Network in the National Health Care System (N.H.S). This is a wide enough network with one Central Unit installed in Sismanoglio Hospital and which serves 12 Health Centres. Nowadays, there are connected to the network three Hospitals, ten Health Centres and one Regional Community Clinic. In a short time, three more new Regional Units will be connected to the network.

The purpose of the N.H.S. Telemedicine Network was in the first place the rendering of diagnostic and therapeutic information, to the connected Health Care Centres. Afterwards, the supplement of the network has been expanded to precautionary medicine, treatment and health advancement.
In Crete island, there is a system which serves the connected Health Care Centres with the University Hospital. In Thessaloniki, the system receives messages from ships.

5. The Attica Region With Regards the Information Society - A SWOT Analysis

This section of the Options Paper is discussing the situation in Attica region, based on the description which was proceeded.

5.1 Strengths

1. <u>A strong presence of the IT resources of the country in the region.</u> Most of IT companies are in the Attica region as well as the administration of the governmental services and utilities. Besides that the existing Telecom infrastructure is very favorable for initiating Information Society related activities.
2. <u>Concentration of most of the education facilities (both of public and private sectors) in the region.</u> The main public educational institutes as well as almost all of the big private ones are located in this area. This is a very important advantage for the diffusion of IT results all over Greece, through the University's network.
3. <u>Good telecom infrastructure with high degree of digitalization.</u> The teledensity in Attica reaches 58 lines/100 inhabitants whereas the EU average is 48 and for the whole Greece is 38. The digitalization is 45% and according to the policy adopted by the Government and the OTE the target is 90%. These figures are very favorable for providing IT services with good penetration.
4. <u>Concentration of the principal users including almost the entirety of the Central Administration.</u> The public sector is the major carrier of most important of the economic and social activities in Attica (and Greece). This is crucial for the establishment of the Information Society in Attica since any initiative must be first of all adopted by the public sector and the local authorities. Until now no leading force has take the responsibility of guiding the Information Society's activities perhaps except of some kind of awareness (stemming from the EU) in a high level.
5. <u>There is some awareness created at the top Government levels.</u> There is some kind of awareness, which resulted in the formation of the Information Society Council to foster developments towards this direction. This Council is under the auspices of the Prime Minister.
6. <u>Participation of Greece in the European Union.</u> This fact enables the country to take advantage of common initiatives about the Information Society (like IRISI, RISI etc.) and of considerable resources allocated by the Community Structural Funds.
7. <u>In the context of the Information Society, there is strong likelihood, that Greeks abroad can provide invaluable expertise.</u> A lot of Greeks live outside Greece and many of them are experts in the fields covered by the Information Society. This work force can be valuable for the provision of expertise in this area.
8. <u>The example of Attica can act as a guiding example for the whole country.</u> Attica is approximately half of Greece and has a leading role for the whole country. Any successful initiative can drive the country towards the new Information Society era. Besides the fact that the Mayor of Athens is the president of the Local Authorities Organization of Greece, Athens and Piraeus are the metropolises for both the central and south continental and island region of Greece.

5.2 Weaknesses

1. <u>Low level for IT investments and awareness.</u> Only half of SMEs have an average IT technology infrustructure and the investments on this area are not in first priority. According to the Piraeus example which includes 77% of the SMEs and almost all (90%) of the large enterprises, only the 13% of industries have permanent research personnel. For big companies this percentage rises to 30% but for SMEs this is even smaller (about 11%). Very few companies are willing to take advantage of the IT technologies and to adopt them in the business processes since short-time profit is one the leading driving force for new investments. Even those who are understanding the potential benefits, have very limited capital to invest, as profits are diminishing under the intense pressure of competition of major corporations.

2. <u>Large fragmentation of most business sectors (Very small businesses).</u> The Greek economy is, to a substantial extent, an economy of Small & Medium Enterprises (SMEs). If we apply here the definition of the European Commission (a Small Enterprise has at most 40mECUs of turnover, less than 250 employees and assets no more than 27 mECUs), then practically, more than 95% of all Greek enterprises fall within this category According to the National Economic Census, the largest part of the enterprises located in the Attica region can be characterized as SMEs since the 80% of the total work force is employed by enterprises with less then 5 employees. The percentage of enterprises with less than 10 employees is about 50% and the enterprises with less than 50 employees are the 70% of the total. This results from the fact that 47% (1993 information) of the employed persons are employers, self-employed and family workers. Taking into account that the big enterprises are public utilities or state-owned companies, it is obvious that the awareness of Information Society in these enterprises is a key factor.

3. <u>Focus of IT to traditional data processing needs</u>. The use of IT is focused on performing traditional needs like inventory management and document processing rather than accessing information and doing business using IT. Although there are considerable differences from sector to sector, in general, the greek businesses are relatively regressive with respect to the use of advanced IT & communication means. The commercial and industrial sectors are the most well equipped. A hefty majority employs some sort of IT - mostly office automation facilities, integrating accounting packages, payroll systems and inventory management. More complex systems (such as CAD/CAM) are used but not extensibly. Advanced industrial systems (such as MRP, stock control facilities etc.) are almost absent from this category. Needless to say, advanced techniques, such as "just-in-time" practices, requiring complex interconnection of systems and data, are completely unknown.

4. <u>Very regressive public sector</u> (=central government, local authorities, most of the utilities). The public sector dominates over most of the economic and social activities. Taking into account that due to bureaucratic problems, many initiatives are blocked or poorly managed. The public sector, which is the principal bearer and user of the IT, contributes substantially to the poor situation of IT investments. Major investments have been delayed for years causing accumulative problems in areas such as the public sector productivity, funds consumption and quality of services to the citizens. In the other hands, many applications that can be in favor of the Information Society and can be developed by the Government (like telemedicine, teleducation, etc.) have been delayed. These kind of application except of their practical benefits, can be very helpful for the awareness of the people on the advantages of the Information Society.

5. <u>Limited expertise in operating complex systems.</u> Because of the backwardness of the Public Sector and the fragmentation of the Private Sector, the operational capabilities which underlie complex ITC systems is very limited or non existent. As plans for bigger and more complex telematic or other systems go ahead, this inexperience will become more evident.

6. <u>Lack of legal and organizational framework in order to accommodate major Information Society applications.</u> As has been already explained, there isn't any legal or administrative framework for the establishment of major Information Society application (such as a telemedicine or teleducation networks). These activities, in most cases, are guided by the EU, institutes and/or individuals.

7. <u>Educational output is below the market demand.</u> Although IT studies are among the most attractive ones and most Universities and Technical Institutions offer such syllabus, complemented by a small but active private sector, skilled workers are missing from the market. On the other hand, Universities still produce graduates in other fields who have extreme difficulties in finding suitable jobs (or jobs at all) in their domains.

8. <u>Lack of homogeneity among the different sector of the Attica basin.</u> The areas of the Attica basin are characterized by the lack of homogeneity since there are many differences in the economic and social levels, as well as in the infrastructure.

9. <u>Cultural and Educational differences among the social groups.</u>

5.3 Opportunities

1. <u>The Electronic Commerce</u> Information Society framework can provide Greek businesses to compete in far away markets through the means of electronic commerce and similar applications. The emerging technology of the E-commerce, provides an excellent opportunity of SMEs to slash costs of storage, marketing and distribution, thus competing in a more equal basis to large corporations. For the case of Greece and Attica in particular, this might become a life and jobs saver.

2. <u>Business Efficiency</u>. Information Society Applications and network computing may create far more efficient businesses. As Greek businesses are losing grounds in competing in domestic and overseas markets, due to the austerity policies of the Government (in turn due to the large public deficits), they are attempting to establish leaner operations by cutting down costs. It became apparent to managers that IT offers a considerable opportunity to manage better their business. Economic sectors with major importance (e.g. shipping business) can become more competitive.

3. <u>Administration can become much more efficient,</u> enabling simultaneously a higher level of control and better quality of services, by achieving economies of scale or by slashing operating costs. Just as private businesses, ITC can facilitate considerably information flow, accountability and control, productivity increase and eventually transparency of Administration to the citizens. The Central Government, has set priorities and for the time being has focused on the collection of public revenues and to some other critical application domains. Although the argument for deploying ITC systems as means for productivity increase is self evident, the success of these undertakings will boost the effort to other state affairs, to the benefit of the economy and eventually all Greeks.

4. <u>Public Sector services can be packaged in "one stop shops"</u> providing better services to the citizens. Greek Administration traditionally provides bad services to the citizens due to the organizational confusion, jurisdiction overlapping and heavy bureaucracy. The organizational restructuring and simplification (which is under way in some administrative domains), opens the way for implementation of projects which would «package» series of administrative actions and present them to the citizen. A simple example, is that, following the implementation of the Tax Information System (TAXIS), companies or individuals could file their tax statements using the Internet, avoiding thus the notoriously cumbersome and time consuming procedure of handing them manually. Or, the planned computerization of Local Authorities and Courts (including their interconnection) implies that citizens residing in parts of the country other than those where they are registered, will avoid traveling or other ways for getting simple certificates or other documents, since the task will be made in an interdepartmental way, hiding the bureaucracy from the citizen.

Such things represent enormous steps forward and can be stimulus for further development of an Information Age culture in the society.

5. <u>Information Society applications can become a vehicle for servicing other regions of the country</u>, in remote, mountainous or islandic parts, by providing expertise and information (e.g. telemedicine) from the center.

6. <u>There is a considerable opportunity for attracting investors</u>, if the Government contracts Information Age systems operations to the private sector. There is a preceded in that since the liberalization of state monopolies in the recent past (notably, TV broadcasting and GSM operations) resulted in some of the most important private investments for decades, creating a net 20.000 jobs.

7. <u>Protection of national identity and culture</u>. Greece, much like other small, not English speaking nations, face a tremendous threat in the very heart of its national identity. A good preparation (legal, policy related etc.) can make Information Society a tool for defending and preserving the Greek language and promoting its culture. Facilitation of distributing educational and cultural products all over the world, will preserve the Greek language among the 7 millions citizens of Greek origins living in 140 countries, who undergo a pressure for complete assimilation to their living environment.

8. <u>The 2004 Olympic Games, scheduled to take place in Athens.</u> This event will require an approximately 4 billions USD in infrastructures and organizational preparations for hosting the Games. A substantial amount will go to Information Technology and Communications projects, boosting thus awareness of the potential of such investments.

5.4 Threats

The development of the Information Society with steadily increasing speed, justifiably, create an anxiety to the society and a quest for answers concerning possible threats which might be born by this process. Their content can be summarized in two directions as follows :

The first one has to do with **employment**.

1.1. The introduction of new technologies in the operations of the private and public sectors does not lead automatically to the to the improvement of production. Inability to understand this principle will have as result, the failure to develop a consistent policy which will combine the introduction of ITC with organizational and institutional reforms and the development of human resources, with easy to understand consequences.

1.2. Introduction of ITC and consequently of new forms of production and workforce organization , might have as a result, reduction of the work security and of the quality of labor. According to a study conducted in 1996 with regards to the introduction of IT to various companies in Greece, the following workforce changes were observed :

- 45% was transferred to other services
- 23% was retrained
- 10% was resigned
- 10% was laid - off

In particular, the problem is pressing labor force with low specialization level and women in general. Moreover, there is a significant risk for medium level workers, mainly in developed regions, since ITC can enable relocation of operations to other countries and regions, exploiting these lower wages. It should be said that slow rationalization has prevented up to now the full impact of restructuring to hit the labor market, as in other

European countries. This is about to happen and Greek welfare is much less prepared to face it than elsewhere in the Union.

1.3. Workers and unions underline the necessity of securing respect and working rights protection, focusing to issues concerning working relation, such as increase of working day duration, implementation of flexible work schedule, part-time and contingent work. It is necessary that the adjustment process to the requirements and pressure of the Information Society, to be combined with workers participation in the planning technology selection and implementation as well as in institutional reform.

1.4. ITC gives enormous capabilities for collection and processing of data concerning personal behavior, activities and attributes. Since the current legal framework is not sufficient, there is considerable risk for the citizens' privacy and human rights.

1.5. Amongst high priority issues which should be tackled, are the negative consequences of ITC for the health and safety at work, which is increased stress and bad ergonomy resulting in muscular and structural aberrations.

1.6. Another risk which may become the most important is related to whether the substantial and creative elements of work, are reinforced using ITC technology. On the basis of objective terms using ITC, robotics etc., there are activities which loose their creative content, do not require from the individual any intellectual or psychological effort. The gap between the working process and its result and the anonymity of this result, create tendencies of human isolation. The development of the Information Society should not damage the human activity and his quest for self-improvement and acquiring more professional skills. There is a need for public policy regarding education as well as measures for professional training which will take into account the particularities of work with IT, the users psychology, the individual skills and intellectual perception. In this fashion, the synergy between advanced "technical intelligence" and developed human knowledge may load to a new quality of intellectual development.

1.7. The continuous restructuring of the economy and introduction of IT, in combination with slow adjustment of educational and training output, have created a skill gap which is observed, in a lesser or larger degree, to all European economies. This skill gap is a serious and exploding problem, leading to further income polarization, a problem particular important in Attica.

1.8. ITC give enormous capabilities for improvement of access to knowledge and knowledge production process in general. However, there are concerns for the quality standards, for the potential consequences for the learning process in "virtual" environments as well as the securing of the role of the learning process with regards social and cultural development of citizens.

The second threat has to do with the **democratic fabric of the society and equality**

2.1 It is given that participation in the Information Society of all EU states, will not come into effect automatically and simultaneously, but also new important differences may arise. In order to reduce these risks, in particular for Greece, it is needed to develop specific initiatives in directions such as investment attraction in telecoms, growth for demand in information services, experience transfer and "best practice" knowledge which been developed in other regions.

2.2 Special attention must be given in order to avoid the risk that the information society may lead to the accruement of divisions and confrontations that already exist in the society of "haves" and "have nots" information. The balance will go towards a participative society or an isolationist society depending on how successfully issues such as availability, accessibility to infrastructure, applications and services as well as their affordability, shall be tackled. If there are not public policy measures, oriented towards these directions, in

particular in countries like Greece where the role of the state is important, the risk of discrimination against specific groups (unemployed, low income layers, immigrants etc.) or regions (islandic and rural areas), creating barrier which inhibit access, remains strong. A basic level of access for all, to services and applications for those which are offered by the Information Society, is required to be assured for all Greeks.

2.3   The citizens must need to acquire consciousness of the capabilities offered by the information society. Evidence exist that the citizens (in particular women, unemployed, contingent workers and the elderly), have minimal knowledge of technology usage. If there are not public measures for ITC literacy in the educational system and in particular to secondary schools, as well as the creation of a lifelong learning culture, the gaps and inequalities will deepen.

2.4   The Information Society, apart from the opportunities, impose risks with regards equality in opportunities in life and work between sexes. Today the number of woman , which follow studies in technical sciences remains small, and therefore women have lesser possibilities for exploiting the benefits for employment which will result from ITC.

2.5   The consequences of ITC use in health care are important. However the following risks should be managed :
- the personal contact between patient and physician might be diminished
- the partial protection of medical data and adhesion of the code of conduct

2.6   Of particular importance is the transmission of obsenities using direct services, the Internet, as well as the protection of minors. Policy measures for these threats, today are either non existent or absolutely ineffective.

2.7   It is of imperative necessity of understanding forms of social action, participation and policies which will come up, as the Internet, Information Technology and the mass media converge. Equally important is the understanding of influence which will have all these developments, in basic social and political institutions such as the democracy, economic and political freedom and control of authorities.

6. Requirements To Be Met

6.1 Realising The Economic & Social Benefits - The ATHINA Project Vision

The Information Society promises great economic and social benefits to Greeks, but only for those who can seize its opportunities. It is not enough simply to build a Greek Information Society; it is equally important to make sure that Greeks use this new tool to their own advantage.

Therefore, the central government must bring forward measures to ensure that the Information Society contributes to economic growth, job creation and a positive workplace environment in every sector of the economy. Similarly, the Information Society must strengthen the social fabric that underlies a healthy economy and the quality of all our lives together.

These statements are consistent with the European Union policies "people 1st" as well as with national policies.

Before all Greeks can benefit fully from the Information Society, certain conditions must be met.

> 1. First and foremost, they must have access.
> 2. Second, Greeks must feel confident their privacy will be protected in this new electronic environment.

6.1.1 Realising the Economic Benefits

> This action plan calls for measures to ensure that economic growth and job creation, flow from both the building and the use of Greece's Information Society in general, of its subsection in Attica in particular. In other words, Greeks must benefit economically not only from the investment and innovation required to build the Information Society, but also from its powerful enabling effects.

Some of the most important of these enabling effects derive from the increase in the speed of transactions, the responsiveness to customers and the access to distant markets that will become possible once electronic commerce is widespread. In the next years, the government must provide a sound legal and technical foundation for electronic commerce in Greece. Furthermore, it must accelerate the institutional reform and the deployment of infrastructures required in order to conduct its own business electronically. By doing so, it will play a leading role in the process, giving the example.

Other enabling effects derive from the growing importance of technology, knowledge and information as factors for success to companies throughout the economy. Between 1986 and 1991, high knowledge intensity characterised nine of the 12 industries that experienced the most growth and the greatest increase in jobs in G7 countries.

6.1.2 Creating a solid foundation for electronic commerce

For people and companies that make their artistic creations, information, knowledge and consumer catalogues available on the Information Society, electronic commerce represents an excellent way to ensure a return on their investment.

The spread of electronic commerce will be one of the key benefits from building Greece's Information Society. Attica will naturally be the first region to ripe its fruits.

For consumers, it provides a way to shop electronically from home or office. For manufacturers, it constitutes a way to explore foreign markets and even to cement an export deal electronically. For small and medium-sized enterprises (SMEs) far from large economic centres, it can eliminate distance and geography as barriers to business success.

At present, financial transactions are secure only on private or closed user-group banking networks. Transactions on the Internet are neither straightforward nor completely secure. The identity of the person with whom one is dealing at a remote location is not always clear. Given the public nature of the Internet, security is imperfect, with no guarantees that messages may not be surreptitiously monitored or modified or credit card numbers copied into some third party's database. The legality of electronic transactions is also open to doubt, given that Greek law may not recognise the validity of signatures in digital form.

> The Government of Greece is in a unique position to address these issues. It must accelerate the conversion to electronic commerce as the preferred means for the government to conduct its business, internally and with external clients. The Act for Public Procurements, which assigns the Ministry of Development as the single point for issuing Call for Tenders, facilitates such motion.
>
> In addition Local and Regional Authorities (Dimos, Nomarchia) may decrease considerably overheads associated with Call for Tenders, by establishing a similar mechanism for conducting electronically their business.

This strategy must involve working closely with industry to develop and harmonise systems for security and for authenticating the identity of parties to an electronic transaction. Equally important will be the development of standards and protocols to create a seamless Greek electronic commerce system that can transact business with the world.

It should be noted that similar initiatives have already a history of some years in other countries. Therefore, it is feasible to look into their technical and operational experiences for setting such mechanisms.

The government must consult closely with organisations and other governments abroad on the legislative reforms needed to provide a sound and consistent legal basis for electronic transactions. New laws or amendments to existing legislation may be necessary to address such issues as the legal status of digital signatures, the authentication of parties to a transaction, the need for non-repudiation of such a transaction, the admissibility of electronic documents as evidence in judicial proceedings, and the integrity of messages and transaction records.

6.1.3 Preparing Greek companies for the information age

Greek firms must start taking advantage of the infrastructure now in place to find new markets and expand their businesses.

> Even greater economic benefits will flow when Greek companies make full use of the Information Society to increase their knowledge intensity. A way to that, is by making R&D results centrally available to the private sector, enabling it to make better use of publicly available knowledge.

Making centrally sponsored research more available: A central focus of the government's Science and Technology Strategy is ensuring that government laboratories work in closer partnership with the private sector on R&D. The National Foundation for Research and its National Documentation Centre are the obvious mechanisms for such ends.

The strategy also calls on government laboratories to use Greece's Information Society to:

- provide relevant, timely information services to encourage innovation, particularly at the community level
- collect and disseminate intelligence on international science and technology
- promote a stronger science culture.

6.1.4 Employment and the workplace

The new industries that spring up around the Information Society will generate many thousands of new jobs in Greece. They will also demand new kinds of skills and different types of working arrangements. Inevitably, there will be job losses in some areas and job gains in others.

> The Government of Greece will carefully track these impacts on employment and ensure that labour standards continue to provide appropriate protection for Greek workers as new working arrangements evolve. The Government must analyse the impact of information technology on employment, workers and the workplace, with a view to ensuring that the Greece Labour Code continues to provide Greek workers, both men and women, with appropriate protection.

A critical concern here is to ensure that protection for "contingent workers" applies to the growing numbers of part-time employees, contractual workers and people working electronically from their homes.

6.1.5 Realising the Social Benefits

The Information Society presents a significant opportunity to strengthen the social fabric of Greek life and help Greeks adjust to a changing workplace. Nowhere is this more evident than in learning, where the Information Society itself provides a powerful new means of delivering learning opportunities to Greeks. The Information Society will also allow us to improve both the effectiveness and the efficiency of Greece's health system. This action plan is designed to ensure that Greeks can seize both these opportunities.

6.1.6 Lifelong learning and the Information Society

In the information society, the knowledge and skills needed for employment and competitiveness in an economy that is becoming ever more globalized are continually changing. It has been estimated that, by the turn of the century, every job and profession will require some form of skills upgrading or training. A flexible, efficient means of developing our human resources will therefore lie at the core of Greece's efforts to ensure economic growth, economic development and job creation.

The Information Society can provide the means to give every Greek access to the learning opportunities so critical to success, both individual and collective.

Already, new learning technologies such as distance learning and computer courseware can provide a richer learning experience for today's students, equipping them to compete for jobs in the emerging knowledge society. As the Information Society develops, these learning opportunities must expand as students at all levels gain access to a world of knowledge and learning resources. In the very near future, rather than thinking of learning as an educational experience completed early in life, Greeks will view it as an enriching lifelong process vital to their continuing employment and success. In this way, Greece will move adopt a culture of lifelong learning as an integral part of its evolution to an information society.

Building a lifelong learning culture: The Minister of Education, must facilitate and foster close collaboration among government, learning institutions, sectoral councils, the private sector, business

associations, labour organisations, associations for learning technology professionals, women's groups, community groups and other non-governmental organisations.

In order to facilitate and enable access to knowledge and to promote the learning culture, it is necessary to establish a proper infrastructure, which should guarantee meeting of this objective. We should emphasise current plans and implementation of the national network linking Universities and technical institutions ("GUNET").

In this line of thinking, a network linking libraries should be of major importance and an appropriate first step towards establishing a learning culture. A specific strategy should be drawn in order to enable Library Institutions with both national and local range, to have access to a common and distributed repository of the knowledge production. This strategy urges the Association of the Local Authorities of the Attica region to move towards this direction.

6.1.7 Health and the Information Society

Greeks regard health care as a fundamental right and its provision through Medicare as a defining feature of our national community. The Information Society provides a unique opportunity for more efficient delivery of quality care and improved access to health information, in particular with regards islandic and mountainous parts of the country which experience substantial difficulties in accessing medical care, occasionally even elementary.

Judicious use of information technology has the potential to improve the quality of care and the cost-effectiveness of its delivery. For example, it will make possible the timely electronic provision of essential health services and medical expertise in remote areas, an issue of the utmost importance for Greece, perhaps more than any other EU country. It will encourage more efficient and effective management of patient services by hospitals, individual physicians and community . It will make possible improved surveillance of emerging diseases by public health authorities at the municipal, national and international levels. It will facilitate the creation of health information databases that, under appropriate safeguards for confidentiality, can be used by researchers, health practitioners and policy makers to improve all aspects of health care.

A critical consideration in the development of such services will be the need to protect the privacy and confidentiality of personal information while ensuring that health information systems are fully interconnected and interoperable.

6.2 Conditions for Success

The economic and social promise of the Information Society is conditional. For this potential to become real, **all Greeks must have affordable access to the Information Society**They must also feel confident that their privacy will be protected and that their children won't encounter offensive content there.

6.2.1 Affordable access for all

The aspiration of the ATHINA project members, believe that Attica's Information Society services should be at least as accessible and relevant to Greeks as telephones and televisions are today. The growing market for information products and services should work to ensure affordable access to essential Information Society services in a competitive environment.

Where market forces fail to provide this level of access, the government must be prepared to step in to ensure affordable access to essential Information Society services for all Greeks, regardless of their income or geographic location.

Furthermore, access should be governed by 4 principles :

- universal, affordable and equitable access
- consumer choice and diversity of information
- the need for citizens' participation and competency in the technology
- the importance of open and interactive networks.

A fundamental question to be addressed will be the definition and delivery of essential services on the Information Society.

Measures to permit use of the Information Society by people without private means to do so will also be critical. This is likely to require the establishment of public access points in libraries, community centres, schools, shopping malls and other public buildings. Municipal governments can play a leading role towards this direction.

6.2.2 Protecting information

Concerns about the protection of personal data on the Information Society may well prevent Greek firms and individuals from taking advantage of electronic commerce or even using the Information Society for their own benefit.

Key issues include the following concerns:

1. consumers must be informed and should consent to any use of their personal information
2. the purpose to which such information is put must be clearly identified
3. consumers should be able to examine the accuracy of information held about them and challenge its accuracy
4. no information should be collected beyond what is needed
5. information should be held with appropriate security and not be disclosed except for authorised purposes
6. there should be openness about policies and procedures with respect to the management of personal information
7. organisations must be held responsible for information in their control and designate persons to be accountable with respect to that information.

6.3 Access, Affordability And Universal Service On The Information Society

The Information Society is the advanced information and communications infrastructure that is essential for Greece's growing information economy. This "network of networks" will link Greek homes, businesses, governments and institutions to a wide range of interactive services -- from entertainment, educational and cultural products to social services, data banks, computers and electronic commerce. It is these services that will constitute the "raison d'etre" and sustaining force of the Information Society.

   The ATHINA Project, in its attempt to assist the government in developing and implementing a strategy for the Information Society, will examine the following:

1. How can an advanced information infrastructure improve the growth and competitiveness of Attica's businesses?
2. How can we ensure universal, affordable access to essential services for all citizens in the region and all Greeks in general ?
3. How can we develop an appropriate balance between competition and regulation?
4. How can we promote the development and distribution of Greek culture and content?

This chapter was prepared at the Project 's request to promote public awareness about the issues of access, affordability and universal service on the Information Society and to encourage public comment.

To answer these questions, some key policy issues need to be resolved:

1. <u>Access</u>:
   - What kinds of physical access connections to networks and content will we need to ensure that all Greeks have the opportunity to exploit the economic, social and cultural benefits of the Information Society?
   - How do we ensure that there is viable and sustainable competition offering access and universal and affordable services to Greek households?
   - How do we provide open and equitable access to all service and content providers while still securing a prominent place in the new system for Greek content and service providers?
   - How do we ensure that Greeks with special needs as well as Greeks in rural and remote communities have access to Information Society services?
2. <u>Affordability</u>:
   - How do we ensure that all Greeks can afford to use the Information Society?
3. <u>Universal service</u>:
   - What kinds of information and services should be available to every Greek?
   - How should our definition of essential services evolve over time to reflect changing needs and service options made possible by new technologies?
   - And how should we pay for these services?

Extending electronic network services to the broadest possible range of Greeks will make commercial, government and other public information services more viable. Greece as a whole will suffer if there are many Greeks who are unable to participate fully in the Information Society. On the other hand, we may miss key economic, cultural and social opportunities and fall permanently behind if progress in making network services available lags behind that of other countries.

No one today knows exactly how the Information Society will evolve, what services will be popular or what technologies will be most successful. The Project 's task is not to predict the future, but to provide advice to the government that will allow Greeks to take advantage of advanced technologies and services as rapidly as possible.

6.3.1 Access

Access to the Information Society really involves two aspects:

- physical access -- connection to communications networks
- access to information -- the content and services communicated through the network.

These are different things, but they are related. Without physical access, there is no access to content. And if no content is available, there is no point in having physical access.

Access is a critical issue for both consumers and information providers. Individuals need access to the information and services of their choice. Providers need open access to networks so that they can reach and be reached by their customers. This applies equally to commercial service providers, public information providers and individual users who create information.

6.3.1.1 Physical Connection

Physical access to communications networks is necessary in order to have access to the information and content services on the network. It can and will include both wired and wireless technologies.

The nature of the physical connection can limit the kinds of services which can be used. For example, telephone party lines are not suitable for fax or data transmission, and users with rotary dial telephones cannot use information services which require touch-tone signalling. Over-the-air or wireless broadcast distribution can provide very high transmission capacity to extremely large areas on an instantaneous basis. However, signals generally flow in one direction only -- outward.

In Greece, over-the-air radio and television broadcasting systems already have the capacity to reach the public with one-way information and entertainment services. Over 99 percent of Greeks have access to national broadcast signals via local terrestrial transmitters. The capacity of all of these broadcasting facilities will increase dramatically as current services are converted to digital transmission.

Telephone is today's most commonly used wired electronic network. This infrastructure reach the vast majority of Greeks and will play a critical role in making sure that all Greeks have widespread access to and choice of networks that offer a range of affordable services. Nearly 95 percent of Greek households are connected to the telephone network.. To provide a full range of Information Society services, however, it will require substantial upgrades since most local telephone lines cannot readily transmit the signals required for video and high-capacity data services; they were designed for two-way voice communication. Therefore, the Public Telephone company (OTE) should consider adding coaxial or fibre optic cable connections to homes and businesses, to provide more capacity or bandwidth for multimedia files.

It should be mentioned here, that no cable television infrastructure currently exists in Greece, although there are some plans for installing such a network.

How do we ensure that there is viable and sustainable competition offering access and universal and affordable services to Greek households?

In addition to -- or instead of -- the telephone networks, the Information Society will likely use other access technologies. For example, most observers expect great expansion of wireless access services in the near future. Over 0.7 million Greeks already have cellular phones, and a new operator entering this year in the market, is planning to double this population.

Personal communications service (PCS) is a next-generation cellular telephone technology that promises to deliver the "anyone, anywhere, anytime" flexibility increasingly seen as essential to business and consumers. The new PCS can be useful in extending coverage, at low cost, to various rural and remote areas currently not served by wireline services. In urban areas, PCS provides a first step toward a competitive local telephone service. It is also the forerunner of a personal telephone system based on a personal telephone number which the subscriber takes along wherever he or she goes.

Interconnecting the different networks nationally and internationally will require the development of standards to ensure full interoperability. In this regard, standards play an important role in the advancement of public policy objectives such as universal access, economic growth in the domestic market, and the capability to compete internationally.

This is the "network of networks" vision. Most of Greece's telephone and wireless carriers and broadcasters say that this vision is achievable, and they are willing to work toward it. In practice, it may take years to accomplish, and vestiges of parallel and independent access systems will be with us for some time.

6.3.1.2 Access to Information/Content Services

Some aspects of Greeks' right to information are defined in the " Relations of State and the Citizen Act (Law 1599)" and by government policies about access to and the dissemination public information. These deal primarily with individuals' legal rights to information about themselves, and to various kinds of government information.

It is important to think more broadly than this, however, when speaking of individuals' and organizations' access to content and services on the Information Society. In Greece, the exchange and dissemination of information is considered essential for full participation in democratic society. The ability to communicate with whom we wish and to share ideas and information is a basic freedom of expression guaranteed by the Greek Constitution.

In an information-based economy where information is increasingly treated as a commodity that is bought and sold, how do we ensure the availability of socially and politically useful information for all Greeks? When should such information be provided free of charge, and when should users have to pay? Should Greece ensure that some kinds of information – for example, information held by libraries, museums, national archives and other not-for-profit organizations -- are available to everyone? What measures are necessary to reduce disparities between information haves and have-nots?

The Internet, which originated in the United States as a national research and development network, has evolved into a world-wide electronic communications system. It is now a federation of some 45 000 networks linking three million to four million computers and connecting at least 40 million users internationally, including approximately 100,000 in Greece. Access to the Internet is provided via publicly funded networks and commercial service providers; telecommunications carriers are also beginning to provide Internet services. The number of networks and host computers connected to the Internet is estimated to be growing at the rate of 6 percent each month.

In Greece, however, although the Central Government, has recently started using Internet for its own purposes (mainly to communicate announcements to the public), connecting educational institutions and has a history of financing University-run networks based on this technology , there is no official public policy with regards this important communication means.

The popularity of the Internet illustrates some of the interest, excitement and enthusiasm that individuals and organizations share when it comes to communicating and exchanging information with one another. How do we design an advanced information and communications infrastructure that will respond to the diverse individual and social needs of Greeks, as well as their economic and commercial interests?

There are powerful reasons to consider access to information as part of our overall economic infrastructure, many of which complement traditional Greek policy objectives:

1. Regional and rural economies can be strengthened if businesses, organizations and individuals can access the same or similar information services that are available in large urban areas -- or if they can be providers of such services.
2. Access to distance education programs and other opportunities for lifelong learning may allow Greeks, regardless of where they are located, to adjust more quickly to changes in the job market.
3. Children in school today will be productive citizens tomorrow. Greece cannot afford to underequip rural or poor children, or those with disabilities, for the jobs that they will need to fill in the future.
4. The more we can know about our own country, the better citizens we will be. Access to Greek cultural products and access to Greeks from other parts of the country (as well as from all over the world, where 7 out of the 17 million Greeks live permanently) will stimulate interest and awareness of ourselves and each other.

There are also social benefits flowing from greater participation by individuals and communities in electronic networks. Publicly accessible networks, if properly designed, can revitalize greater democratic participation in public decision making, advance a variety of cultural and multicultural objectives by tailoring their services to the needs of specific audiences, and provide more efficient and economical community support mechanisms to individuals and organizations. They pose new opportunities for individual enterprise, community and regional development, and the potential to improve our society and democracy.

6.3.1.3 Access for Service and Content Providers

Access for service and content providers is a federal policy objective. Current telecommunication policy states that no Greek carrier can unjustly discriminate against or give undue preference toward any person in the provision of telecommunications services. The effect of this is that any person or persons can access the networks of any Greek common carrier in order to transmit non-programming content.

Given that the Information Society in all likelihood will lead to a convergence of broadcasting and telecommunications distribution methodologies, questions arise regarding the best way to establish and maintain a balance between the non-discriminatory access provisions that apply to telecommunications and the cultural sovereignty requirements which have been implicitly stated to the society and to the broadcasting sector. Should the Information Society carry all content services, regardless of point of origin and/or content? How can we ensure there is adequate diversity of services? How can we ensure the continued exhibition and distribution of Greek cultural content? Should there be priority carriage of Greek services?

Many service and content providers, including multimedia developers, are concerned about the increasingly high cost of clearing rights or, worse, of not being able to obtain the appropriate rights to various works for use in a digital environment. Will copyright make it more difficult to have Greek content available on the Information Society? How do we provide open and equitable access to all service and content providers while still securing a prominent place in the new system for Greek content and service providers?

6.3.1.4 Access from Rural and Remote Areas of Greece

ATHINA Project deals with the Attica region, i.e. the Athens and Piraeus urban conglomeration where roughly 1/3 of the population lives and where an even larger part of the economic activities take place. Furthermore, most of the technical and operational expertise of the nation can be found there. Evidently, Information Society concepts will commence to be implemented in Attica. However, given the very nature of the Information society, it is not possible not to take into account the requirements of the rest of the country, since in all likelihood, users from remote locations will need to have access to content and service providers operating from the capital.

Modern communications can reduce the negative effects of distance and geography. They can help to revitalize regional economies and reduce dependence on single industries. They can help bring consumers and businesses in Greece's small towns and rural and remote areas into the mainstream of economic and cultural activity. These possibilities are limited, however, if fewer services are available in remote areas or if the cost of using the services is substantially higher.

Cellular telephone service is an access option for some remote users, although cellular usage prices are still significantly higher than wired telephone network rates.

Telecommunications network upgrades -- including digital and high bandwidth access -- are likely to happen first in major cities (and in Attica region in particular), where the cost of upgrades is lower and revenues to carriers will be higher

There is some discussion that the government will assist rural communities to connect to the Information Society. Communities will compete for inclusion, and will be expected to provide the sites, local project management, and financial support and services from local business, community groups and government. The recently announced "Kapodistrias" initiative (for merging clusters of rural communities into administratively and financially strong Municipalities), includes funding for IT and communication infrastructure for Local Authorities, although, it seems that the funds earmarked for this purpose are not sufficient, and planning is still in early stages.

But even if there are economical ways to obtain local access in rural areas, some services may not be available in the local calling area. Long distance charges for out-of-area calling may be a significant barrier for rural and small-town businesses, schools, hospitals and consumers who wish to use information services based in cities.

Greece's long-term interests lie in the ability of regional economies to be self-sustaining. Limitations on access to Information Society services will affect potential job creation as well as social and cultural opportunities. Looking at the issue from the other side, it is to the benefit of the Cities of Athens and Piraeus (notoriously polluted and congested) to enable regions to develop in a sustainable fashion. What mechanisms or safeguards, if any, are necessary to ensure that businesses, organizations and individuals in remote and rural areas can access the same or similar information services available in large, urban areas? Or, if they choose to do so, how can they become providers of these services?

6.3.2 Affordability

Affordable telecommunications and broadcast services are official policy objectives, but affordability is not defined in legislation. Inevitably, it is a relative concept.

Network and service providers need to attract investors and must pay employees with the skills necessary to develop innovative services. They cannot do either if access rates charged to businesses, organizations and individuals do not cover costs and provide an appropriate return on investment. If rates are too low, the incentive to develop and provide services will not exist.

On the other hand, if rates are too high, many Greeks will be excluded from access to Information Society services. This would have negative consequences for the whole economy, as well as for those most affected. Also, if rates are comparatively higher than those of our trading partners, Greeks will be
unable to effectively compete in the global market place.

Paying for the Information Society

It will cost money -- lots of it -- to develop Greece's Information Society and to get Greeks on-line. Electronic equipment in Greek homes (e.g. televisions, video cassette recorders, computers, etc.) represents a substantial investment already made by consumers. This equipment will need to be upgraded to take advantage of the new technologies and to gain access to the new networks. Which services consumers choose is likely to depend on the ability of suppliers to tailor a service or package of services and its price to individual needs.

The basic access unit -- whether it is an "intelligent television," a "black box" connected to the television, or a modem-equipped personal computer -- will require an initial expenditure (if not rented as part of a service package). As a result, upgrading will not only take time, but also require a certain level of disposable income that some Greeks may not be able to meet.

To make sure that all Greeks have the opportunity to exploit the economic, social and cultural benefits of the Information Society, there will be a need for low or no-cost access centres in every community. Affordable community access could be made available in a variety of locations such as schools, libraries, shopping malls, airports or other transportation terminals. Again, the aforementioned "Kapodistrias" project, although currently provides very little (in terms of policy) towards this direction, might be a suitable option.

The question is: Who should pay, and for what? End users, including businesses, institutions and consumers? Information providers? Advertisers? Carriers? Government?

The answer is probably "all of the above":

1. There seems to be a consensus among industry and government that many of the costs of upgrading Greece's networks should be paid for by the carriers and industry, and that the investment risk -- and returns -- should be borne by their investors.
2. Similarly, many types of information and content services will be developed by commercial ventures, who will fund the development wholly or in part, hoping they will recover the investment from eventual users. (a notable example, is the subscriber's TV networks which operate today quite profitably)
3. Clearly, individual and corporate users will also pay, probably through combinations of basic rates and additional fees for optional services.

Arriving at pricing and service philosophies which both suppliers and users are willing to accept will require compromises and flexibility (and, probably, a variety of ways in which services are packaged). Some users will be willing to pay more than others for a higher level of service. Others will accept some inconvenience or reduced level of service if it means that prices are kept low.

Many observers believe that government should provide funding only when investment is needed to further public policy goals and no one else is willing to pay. This could apply to extending service to remote and rural communities or to people with disabilities, for example. Should this funding come from general tax revenues or from special tariffs on the users and providers of Information Society services? If such an approach is adopted, we must decide which policy goals should be furthered, and which ones should take priority if funds are limited.

Historically, the Greek telephone company have subsidized rural and remote service with revenues from urban areas. This is true not only for local service rates, but also for long distance. "Route averaged pricing" keeps the cost per mile of long distance calls constant, whether the route is high density or low density. These urban-to-rural subsidies have been supported by public policy.

In a more competitive environment, however, there is increasing pressure to bring prices in line with the cost of providing services and to reduce or eliminate cross subsidies. This is also a requirement resulting from the European Union "Green Paper on Telecommunications". Consistent with this pro-competitive approach, the Greek telecommunication market has been opened to competition for all non-voice services, while voice telephony will be opened to competition in the beginning of the next century. This moves acknowledges the potential cost benefits to individuals and businesses by allowing other competing technologies to supply a larger share of Greece's communications requirements.

In any case, it is critical to sustainable competition, however, that the Greek regulatory regime provide a level playing field to both established players and new entrants and that any rate rebalancing take into account the particular circumstances of individual companies and the impact on consumers.

6.3.3 Universal Service

The concept of universal service has been applied to both broadcasting and telecommunications services in Greece. There has always been a public policy objective of ensuring universal service in the Greek broadcasting system, stating specifically that a range of broadcasting services shall be extended to all citizens as resources become available." Both the Greek Broadcasting Corporation (ERT) and the private broadcasting sector in Greece have made remarkable progress, with the help of public and private funding, to ensure that virtually all Greeks have access to radio and television services.

Universal access to the telephone network is a legislated policy objective. This policy has been successful. There is a fairly high telephone penetration rate, although lower than the average EU figure. There is general consensus in Greece that telephone service is an essential service and should be universally available.

Viable and sustainable competition by different delivery mechanisms will be of paramount importance to ensure that Greek households have access and choice of networks offering universal and affordable services.

It is not clear that legal and regulatory obligations are necessary to ensure widespread deployment of new network services. Cellular companies, for example, are not required to offer service everywhere. Because there is competition, however, the carriers have found it in their interest to extend service as widely as possible. The Greek case, showed, that although the cellular companies represent a duopoly (up to now, in the near future, a third operator, a subsidiary of the national PTT will commence operations), competition drove them in fast deploying networks, providing services to about 95% of the population.

6.3.4 The Changing Definition of Universal Service

It is one thing to seek universal service. It is quite another to decide what should be universally available. The concept of universal service has evolved over time.

The most notable example is plain telephony. A few decades ago, most Greeks were served by multi-party lines, touch-tone telephone service did not exist, and long distance calls required assistance from an operator. Today, most households are served by single-party lines. Touch-tone service is rapidly becoming the norm, and direct-dial service is almost universally available for domestic and international long distance calls.

The level of service which was considered appropriate for everyone in 1960 would be unacceptable today. We must expect that the definition of "universal service" will continue to change and expand.

Rapid innovation and introduction of new services means that the variety of available services will be constantly changing. It is not possible for the ATHINA project to forecast which group of services will be considered essential in the future, so any redefinition of universal service should be open to evolution and change. For example, "Network computing", a notion (and technology) pushed strongly by major IT companies such as IBM and ORACLE, promise a radically new concept for computing.

What Else Should Be Included in Universal Service?

It has been argued that the concept of universal service should go beyond simply access to a physical network and include access to additional services such as emergency services, Internet access, certain programming and entertainment services, libraries, universities and other cultural institutions, and government and community information services.

 Central government announcements (made recently by no less by the Prime Minister) supports a "network of networks" -- interconnection between networks to allow subscribers on any network to reach information services and subscribers on any other network. An environment of network interoperability could be considered part of today's revised universal service goal, one still to be achieved. Evidently, the role of the national PTT (an ATHINA project partner) is of paramount importance in this direction, no matter what other operators will be active in the near or even, distant future.

Having access to a variety of carriers and information providers, where possible, could also be considered part of the universal service concept. In some cases, several suppliers might compete to offer parts of universal or essential services; in other cases, where no supplier wants to offer a service, some form of government intervention might be required.

Any definition of universal service should be open to change as technology and societal needs evolve. Immature and emerging services should not be prematurely defined as part of a universal service package, though they may eventually achieve widespread penetration and become part of a new standard of essential service.

One step toward a broader form of universal service might be public access terminals located in libraries, schools etc. Such an option is supported by the Greek government educational policy, thanks to the financial support of the Community Structural Funds.

6.3.5 The Roles Of Government, Industry And The Public

It is not possible or desirable for governments or regulators to predict which technologies and providers will be "winners." Instead, government should foster an environment that encourages innovation and a greater reliance on market forces, institute safeguards for the privacy of individuals, and come to terms with the ways in which the Information Society can have a positive impact on public participation and the democratic process.

There are situations, however, where market forces alone will be insufficient, or will work too slowly, to meet the public interest. There will be an ongoing role for government and regulators in setting direction in those instances. Extending service to remote areas may be an example of this.(The term "remote" is also applicable within the Attica basin, which although a densely populated area, has sub-regions which are less well served than others. Sub-urban Piraeus is a notable example).

The complex of industries affected by the Information Society -- carriers, information and service providers, broadcasters, writers, network administrators, application designers and technology developers -- will need to forge ahead to find innovative ways to provide the needed services cost-effectively in a competitive market. This will be a tremendous challenge, and opportunity, for Greece's entrepreneurs and creators.

The public's role -- as individuals, organizations or interest groups -- is to inform government and suppliers of their needs as they perceive them. There are bound to be differences of opinion; that is inevitable, and even desirable.

The public faces a further challenge: to explore the ways in which advanced networks and services -- the Information Society -- can improve their productivity and effectiveness. As the Government, makes nowadays a great stride to upgrade human skills and non-human infrastructure with regards IT, it is a great opportunity to make provisions in their planning, in order to take advantage of the emerging technology and services. In this context, the relatively backwardness of the Greek Public Sector , might be an advantage.

Exploitation by the public of new services capabilities, will have impacts going far beyond the purely technical:

- Schools need to think of retraining teachers, determining their software requirements making hardware investments. How will curriculum be affected? Teaching techniques? Professional training? Administration? Can the technology be used to involve parents more closely? To create multi-school projects?. In this context, the high end private schools (in particular in Athens) is a paradigm to follow.

- Educators and government need to rethink how the distance learning tools and opportunities available on the Information Society can be used to meet the lifelong learning and retraining needs of Greeks. One should remember the difficulties imposed by the geography of the country (islands, mountainous regions, poorly served by the road or rail network etc.).

- Information and content providers will need to find ways to maximize their creative and revenue-generating   potential using new technologies and new distribution methods. They will need to

adapt quickly to the changing needs of their customers and exploit new export opportunities, in particular towards the Balkans, the Black Sea region and the Middle East.

- Libraries, hospitals, and other public institutions need to set priorities and set "substitution strategies" to fund the transition from current modes of operating to more effective methods enabled by networks. They may be able to create new revenues by becoming information providers -- or they may wish to partner or share with other institutions. (One should remember that 9 out of 17 universities of the country are in Athens and Piraeus, as well as most major hospitals, which provide full medical services).

- Individuals in a wide variety of organizations, including but not limited to business organizations, must consider how advanced communications and information technologies can influence their performance. Can these technologies help them to reach their goals and objectives? What priority does implementing these technologies have? What changes will the organization need to make?

6.3.6 Public Comment And Consensus Building

This options paper is a contribution to the discussion on access, affordability and the provision of essential services on the Information Society, as it is anticipated that will evolve in Greece and in Attica in particular. It is written to encourage response, not to offer definitive solutions.

The ATHINA project, is trying to initiate a discussion and commenting process in a number of issues which follow here. It must be reminded here, that the focus of the project is the designing a set of recommendations and a high level action plan in order to minimize the negative impact on the workplace and to maximise the emerging opportunities for new, healthy jobs for the citizens of Athens and Piraeus in particular, and if possible for all Greeks. However, certain topics, technical or other, are unavoidable.

1. Access:
    - What kinds of physical access connections to networks and content will we need to ensure that all the citizens of Athens and Piraeus and eventually all Greeks, have the opportunity to exploit the economic, social and cultural benefits of the Information Society?
    - How do we ensure that there is viable and sustainable competition offering access and universal and affordable services to Greek households?
    - How do we provide open and equitable access to all service and content providers while still securing a prominent place in the new system for Greek content and service providers?
    - How do we ensure that Greeks with special needs as well as Greeks in rural and remote communities have access to Information Society services?
2. Affordability:
    - How do we ensure that all Greeks can afford to use the Information Society?
3. Universal Service:
    - What kinds of information and services should be available to every Greek?
    - How should our definition of essential services evolve over time to reflect changing needs and service options made possible by new technologies?
    - And how should we pay for these services?

6.4 The Impact Of The Information Society On The Workplace of Attica

The members of the ATHINA project recognized that there was a need to improve Greeks' understanding of the economic, social and employment impacts of information technology.

With regards to the impact of the Information Society to the workplace and employment, a central issue for the ATHINA project, the members identified the topics to be discussed and which are:

- the impact of the Information Society on the workplace,
- new approaches to work that utilize information technology, and
- working to ensure worker protection.

This document has been prepared by the Project , in order to carry forward the discussion., and it does present relevant labour and business perspectives on these issues.

The main part of this options paper is composed of information from business and labour perspectives on a number of key topics related to this issue. These cover the subjects of non standard forms of work, such as part time work, contingent or contract work and telework, hours of work and the distribution of work time, self-employment, polarization of income and opportunities, and education, training and skills development. The business and labour sections each conclude with thoughts on what should be
done to ensure that Greeks are equipped to deal with the impact of the Information Society on the workplace.

6.4.1 General

The term Information Society is a metaphor used to describe the vast array of information and communications technologies that are dramatically changing the way Greeks live, play and work.

Parts of the Information Society have been in place, and a part of our lives, even before we began using the term. But it is the exponential increase in computing power over the past 20 years, coupled with dramatic reductions in cost, that have made computerized applications an essential part of the daily lives of Greeks - at home and at work. Digitization has made it possible to exchange information and conduct transactions electronically over great distances. The convergence of information and communications technologies is bringing about radical change in the way we do business and work.
Issues

Issues related to the new technologies brought about by the emerging Information Society are wide ranging and encompass many aspects of our lives. Key issues which have been identified are :

1. Non standard areas of work
   - part time work
   - contingent or contract work
   - telework.
2. Hours of work and distribution of work time
3. Self employment
4. Polarisation of income and opportunities
5. Education, training and skills development.

However it should be noted that even the definitions of the issues may be seen differently by business and labour, given the tradition of labour related discussions in Greece. This underscores the need for further dialogue, amongst the tri-party social partners, i.e. the government, the business and the labour organisations.

6.4.2 Context

6.4.2.1 Employment , Unemployment and Education

According to the study conducted by the Manpower & Employment Organisation of Greece on the Workplace And The Demands For New Skills In Attica For The Years 1998-2003, a main issue with regards unemployment in Greece in general and in Attica region in particular, is its structural nature. accoring to the study, almost half of the roughly 10% of unemployment in the region, can be attributed to structural grounds. Structural unemployment has both a geographic and educational dimensions. The first, is connected with the observation that there are sub-regions where the balance of offer and demand for specific skills is positive while elsewhere is negative. Educational reason are connected with the fact that the skills and dexterity which are produced by the educational system of every level, are severely non-aligned with the rapid technology evolution, economy trends and movement of the workplace. This type of unemployment can be considered as the twin sibling of what is known as technology unemployment. The same phenomenon can be attributed to the mainly theoretic nature of our education, its backwardness and inflexibility, to the poor state of technical and vocational training system and to the complete lack of professional orientation systems.

Education in Greece is producing, in an accelerated speed, unemployed. We are wasting enormous amounts of productive wealth in infrastructures, human effort of teachers and students in order to train young people who are heading straight to the long term unemployment or part time jobs. In parallel, professional orientation and counselling are almost non existent while professional training are in poor state and operate without concrete plans connecting them with the job demand in various regions of the country.

The last years, there is a dominant conception that the number of trainees at all levels of the educational system should increase continuously. There is an argument whether the objective of education in its general form is education itself, or it should be adjusted to the market demands. Without wanting at this point to discuss the issue any further, it is evident that the developments of life itself, require at least a partial realignment of the educational system as a whole, towards producing skills which have a demand and a positive prospect in the workplace. The rapid evolution of the economy and technology enforce this necessity, otherwise there will be no economic basis to enforce the somehow «elite» notion of «education for education». In short we need less graduates of the general purpose high school, doctors, lawyers, chemists, physicists, architects and civil engineers and more of specialised management consultants, tax specialists, electronics engineers, food technicians, nurses, technicians having computer literacy etc.

It is apparent in Greece that there is a high priority for the National Institute of Professional Orientation (Ministry of Education & Religious Affairs) to start operations, the upgrade and rationalisation of the School Professional Orientation Systems and the establishment of a network of centres providing such services. Initiatives like these, will affect the generally accepted perception that studies (in Greece or abroad) in topics such as medicine or architecture (which are extremely expensive for the families), will lead to a successful and secure career, by pointing the saturation of these professions.

In Greece, like in other countries, there is a tendency of substitution of unskilled workers with highly skilled ones possessing special dexterities. For example, while a simple office worker is unlikely that will find easily a job, the opposite holds true for a specialised executive secretary or a simple technician is not wanted, while a technician of the same domain who possess computer or other automation skills is in high demand. At the higher levels of education, graduates of the Technical Institutions (TEI) are in greater demand than their colleagues holding University degrees because they ask for lower wages and have more easily applied skills.

These phenomena shall be even more acute in the emerging Information Age, where the continuous retraining shall be of great importance. The on going discussion about educational reform in Greece, should also take into account these developments.

6.4.2.2 OECD Work on Technology

The Organisation for Economic Co-operation and Development (OECD) has placed major emphasis on member nations understanding and implementing change. It notes that productivity growth and innovation are the keys to sustaining and raising standards of living in OECD member countries. Productivity improvement at the level of the enterprise (public and private) is essential to broad productivity growth in the economy. Research that has been carried out under the OECD activities on technological and organizational change/flexible enterprise indicates that continued productivity growth and improved competitiveness at the level of the enterprise largely depends on wider adoption of new configurations of four independent elements: business strategy, technological innovation, work organisation and human resources management.

Choices made in these four areas will affect outcomes for enterprises, their workers, and will have impacts for social cohesion. The spread of innovation, effective and lasting high productivity workplace practices and the distribution between, and among, employers and employees of the benefits from increased productivity and improved enterprise performance will in part determine the wider distribution of income.

The OECD suggests that we need to emphasise the following:

1. Increase our understanding on how human resource management and organisational practices in the workplace can both increase productivity and contribute to an equitable sharing of productivity gains;
2. Identify impediments to the introduction of innovation and durable workplace practices;
3. Identify mechanisms to encourage more widespread adoption of innovative and durable practices; in so doing, consider what employers and workers - the principal actors in the workplace - might do differently to foster productivity while promoting quality of working life;
4. Propose and consider how public policy can support those changes.

6.4.2.3 A labour perspective on the Information Society and its impact on the workplace

The economic impacts of technology obviously go beyond Greece: levels of unemployment in the OECD countries continue to be high (roughly 35 million) and there is no indication that they are about to go down in the foreseeable future. Moreover, in all these countries, including Greece, there is a weakening link between economic growth and job creation that is closely connected to the effects of new information technologies on how work is done.

When labour priorities are being stated, in any context, the issues that always comes out on the top of the list are job creation and job security. The policy approach that always winds up on the top of the list is job creation. Continuing high levels of unemployment, the inability of many people to find work in the new economy, is the context in which all these issues needs to be seen.

Traditionally, in Greece, job security was linked with the notion of working for the state. A public servant (regardless of whether he/she works for the central government, a state owned utility, local authorities, etc.), is protected by law from loosing his/her job. This has led to considerable distortion in the labour market, since a considerable portion of the working population seeks jobs within the state, with severe, social, financial and quality of public services repercussions. However, the last years, due to fiscal constraints, the state cannot (and should not) accept more employees save for reasons of replacement of those exiting the workforce due to retirement as well as for reasons of recruiting people with special skills.

The issue of whether or not technological change in general and the new information technologies in particular are, in the long run, job killers or job creators is still up for grabs and evidence can be brought to bear on both sides of the argument.

Analysts make a pretty convincing argument that the new information technologies may be different in their impact from other waves of new technology that have swept through the economy. Among the reasons given for this are:

1. the fact that the new technologies are being introduced in a context of very high unemployment and fierce international competition - a context very different from that in which rapid technological change occurred from the 1950s to mid 70s;
2. the rapid pace of change, much more rapid, for instance, than the spread of electricity;
3. the fact that the new technologies are not limited to one industry or one form of commerce but can be adapted to all activities;
4. the fact that the new information technologies affect both demand for and supply of labour by making work more portable and moving it beyond some jurisdictions into others; and
5. the fact that most positive forecasts about the impact of new technologies are based on historical analogies such as the fact that earlier in this century the new manufacturing industries were able to absorb the shrinkage of the agricultural sector, while there is no similar candidate waiting in the wings to serve the same role. In fact, the service sector, the big area of growth in recent years, is itself being affected by the new technologies.

However, whatever one's views are about the long term, there is no doubt about the short term, immediate impact of rapid technological change. They include polarisation of income and opportunities, the deterioration of the work experience for many workers, and a range of social issues that need to be deal with now, not in the long term. Addressing these issues will require the use of the twin levers of collective bargaining through strong unions, and legislative reform through effective governments. Internationally, trade agreements should contain enforceable social clauses that establish minimum labour and social standards in order to contain the downward pressure on these standards as a way to improve competitive advantage. In short, the excesses of market forces need to be constrained.

Discrepancies of the type described above are evident in Greece, both at national level and in the Attica area. Differences in employment, income human skills etc. are evident almost everywhere. While these phenomena do not have the intensity of similar ones in third world countries, they are more severe than in most other EU countries. The reasons are both the demise of traditional activities (e.g. heavy industry and shipbuilding and repairing in Piraeus, once among the main employing industries, now have led to unemployment rates of 17% as a whole, with almost 80% in the shipbuilding and ship-repairing zone (NEZ) of Perama) and of bad or non-existent territorial development planning.

6.4.2.4 Non Standard Areas of Work

With respect to non standard forms of work, there should be little dispute about short term impacts, or the general direction that the technology is taking us. Labour is concerned with the nature of protections that are put in place as these changes occur. These protections should be in the form of legislated minimum standards that apply to all workers, and the removal or modification of some current practices that put people who are moving into non standard forms of work at a disadvantage. And, trade union participation in the process of technological and organisational change, is critical in order to shape changes in the interest of workers.

There are three forms of non standard work around which most discussion takes place:

- part time work as opposed to full time work,
- contingent work as opposed to secure work,
- telework or home work.

Very recently, the government of Greece has initiated a "social dialogue", now in progress, where several issues are discussed among the government, the labour representatives and the employers associations. While this dialogue goes far beyond the scope of the discussion within the ATHINA project, issues pertaining in the part time and contingent work are on the table.

Part Time Work

With respect to part time work, the issue is not whether part time work is inherently superior or inferior to the historically more common full time job. It is clear that part time work is now a major feature of the economy, particularly among women, and its growth is connected to long term trends that go beyond any particular economy. As well, part time work meets the needs of some people better than full time work. However, there are three issues that are important.

1. The first is that a significant proportion of part time workers are involuntarily in this position and would prefer, perhaps need, full time employment. They are, in fact, involuntarily under-unemployed. The statistics on employment often hide this fact, and optimistic descriptions of the attractiveness of part time work in the new economy often underplay the extent to which this is something to which people have been driven rather than something which they choose as a desirable option. This leads to the view that the creation of full time work is still an important issue and needs to continue to be emphasised.
2. Second, part time workers often do not have access to equal pay and employment related benefits such as health care, pensions, and so on, and are often not able to join unions. Completely aside from considerations about whether part time work is desirable or not, it is important to look objectively at the conditions part time workers face and address them, preferably through legislative changes that extend to them the benefits that full time workers have.
3. Third, many part-timers work extremely variable hours.

Addressing the issues related to part time work also means looking at income issues for those who don't have enough work to support themselves. This should be done in relation to the broader issues of poverty and income inequalities, where answers may come in the form of social transfers or the tax system.

Contingent Work

As with part time work, contingent work sometimes meets the needs of people. However, the issue that needs to be emphasised is the extent to which this is not voluntary for many people. As with part time work, the issue here is that people who want secure work and are willing to work are increasingly being forced into contingent situations that do not meet their needs (e.g. short-term contract work and "own account" self employment which now make up a very large percentage of Greek working people).

In particular, we need to think about the income implications of this situation, since for many people a secure full time job with benefits is necessary to meet family responsibilities. Second, we need to think about the implications of contingent work without regular schedules for balancing personal and family responsibilities. This is especially important for lower income people without the options that higher paid contract workers may enjoy.

Contingent and, therefore, insecure work is much more common among women, visible minorities and youth than among others. Since this is an area where market approaches have not been particularly successful in reversing historic differences, government action is important, to ensure that these differences are not allowed to persist from generation to generation and result in large and persistent gaps in income and opportunities. Again, minimum legislated standards should be designed to extend traditional benefits and protections to contingent workers.

Telework

Home work, or telework, is a phenomenon that is being fostered by the new information technologies. Public and private employers are promoting the advantages of telework for workers, business and society in general. However, there are problems with telework becoming a common phenomenon without a number of important built in protections.

To start, let us make a distinction between telecommuting, a phenomenon of skilled professional workers, and telework, which tends to be low status work done under less than ideal circumstances. Most business discussions of telework usually describe it as if it were telecommuting; it is often described as "knowledge work"; the advantages listed for workers include less travel, less on the job stress, more access to the labour market for persons with disabilities and women with children, and so on. And for the community as a whole, a range of advantages such as less road congestion, less fuel consumption, and so on.

The reality is often different for people working in cramped conditions in low status, low paid work, often with child care and family responsibilities. This is especially so if they have few of the protections that on-the-job workers have, such as proper equipment, regular breaks, health and safety protection, not to mention the advantages that visibility provides. They lack access to training. They often have to supply their own equipment.

Evidently, homeworking requires from the state to adopt, implement and periodically review a national policy on homework in consultation with employer and worker organisations. This policy would seek to promote equality of treatment between homeworkers and other workers in areas such as the right to organise, protection against discrimination, remuneration, health and safety, social security and maternity protection, and training.

These are minimum conditions that represent a practical reaction to experience with problems around homework and telework, in both the public and private sectors. The only solution is explicit legislative protection, and enforcement of the legislation.

Hours of Work and Distribution of Work Time

The issues around hours of work and distribution of work time concern mainly the fact that there is a trend to the polarisation of work in our economy resulting in high unemployment, some involuntary part time work which does not meet people's needs and some work with involuntarily long work hours which interfere with personal and family responsibilities. The polarisation is important, as is the fact that in many cases the extent of work hours is involuntary.

For those with unions, collective bargaining can sometimes deal with these issues, but for those without adequate representation, this is a social issue that can only be dealt with by governments. There is no indication that markets, unaided by government measures, can deal with this problem.

Self-Employment

Self-employment is not inherently inferior to salaried work. And for some it meets a need. However, a great deal of self-employment is, in fact, involuntarily precarious work. In Greece, traditionally, self-employment represents the backbone of the economy with about 50% of the workforce belonging to this category. This category, contains every type of workers, from highly skilled and highly paid professionals (e.g. lawyers, engineers, doctors) to underpaid and underprivileged homeworkers (e.g. in the textile industries), mostly women and young.

Business descriptions of self-employment use examples of highly skilled professionals to argue against basic protection for self-employed workers. The problem with this is that it denies access to this protection to large numbers of people whose positions are insecure, whose income is often low and unpredictable, and who are in danger of being exploited for their labour.

What is the answer? It is to ensure that self employed people have access to a number of benefits that are guaranteed to employed people by labour standards legislation and other protective laws. These would include the right to get medical, dental and life insurance coverage at decent rates, access to private pension plans and protection against exploitation by those who would use their precarious position to extract more work or lower wages than are justified.

How to ensure these protections, in practice, is not entirely clear. The reason for this is that "self employed" have never been covered by labour standards legislation, or thought to need it. However, in

the new world of the Information Society and rapid technological change, old categories are being dissolved. The issue is not people's formal legal status, but their need to be protected against exploitation and to have access to regular and stable income - as a right, not a privilege.

6.4.2.5 Polarisation of Income and Opportunities

Rapid technological change, and the training and skills requirement necessary to keep up in a period of rapid technological change, are denying many people access to the kinds of jobs and training that would allow them stable income and interesting work.

One of the major social phenomena of our times is the gradual increase of unemployment to rates that would have been unthinkable even a few years ago. We are gradually creating a society in which a certain proportion of the population no longer have access to the tools to get good, stable jobs with decent incomes, known as the "2/3 Society", where the 1/3 are almost denied the status of the consumer. Increasingly, new information technology allows employers to reduce their workforce in order to lower labour costs; and the smaller number of good jobs which remain often require the kinds of education and training that are only available to a few. The result is a tendency to polarisation between "good jobs" with decent wages and working conditions and stability, and "bad jobs" with few of these.

The long run effect will be a third-world-style polarisation into haves and have nots. If this is only beginning to be evident in recent years, there is no doubt it will be a lot more evident in coming years. To say that this is unconnected with the waves of rapid technological change we have seen in recent years, and the utter lack of adjustment measures to protect people from these rapid changes, is to deny the reality that we see all around us.

Ultimately, polarisation can be countered only if governments are committed to full employment and to a high level of labour and social standards.

Part of the solution to this problem is to make sure that everyone has access to high quality, up-to-date training that will allow them to stay in the labour market as technology changes and existing jobs and skills are replaced by new ones. Left to itself the market will never correct these problems. The answer is committed government action to raise the training effort in our society, through mandatory minimum training rights for all who want them, employer-provided through a payroll based tax, supplemented by ambitious government-funded training programs for those who are not in the work force as "employees".

In a high unemployment society, training is not the only answer, of course. Decent income protection for those whose income and employment possibilities are limited is also important, as well as an explicit commitment to a full employment economy through economic stimulation and job creation programs.

6.4.2.6 Education, Training and Skills Development

With respect to education, training and skills development, there is a general concern that voluntary private sector training has not been adequate as a response to technological change and needs to be supplemented by minimum standards.

With regards to the post secondary education, Greek academic institutions have a traditional problem to satisfy the demands of the youths of Greece, due to low educational capacity. For many decades, those who cannot be accepted in the academic institutions, seek formal education abroad, mainly in some EU countries, the US and in some Eastern European countries, resulting in severe loss of both money, and in many cases, of valuable human resources who never return to the country. The last years saw a rise in private education, in the form of "colleges" which provide education in the most demanded sectors (notably, accounting, business administration and IT). These institutions work

without any control on their curricula, and their considerable success is left to be confirmed by the market forces.

With regards human resource skills development, the Community Structural Funds (for the period 1990 - today) tagged enormous funds for the training of several categories of people throughout the country. It is not the ATHINA project task to comment on the "value-for-money" of these initiatives, however, its success and, what perhaps more important, the continuation following the demise of the Community help, is a strong step towards a knowledge-based society.

6.4.2.7 What Should be Done

Non-market based approaches to dealing with the short-term impacts of technological change are still viable, and in fact necessary. In the short-term, there is no dispute that market-driven solutions to unemployment do not work. They ignore the responsibility of both governments and employers to create jobs. While there may be differences in preferences, there is no doubt that the absence of government measures in the face of rapid technological change results in higher levels of unemployment than otherwise.

The labour preference is for clearly stated labour standards, as part of the regulatory process and enforced as minimum rights. The analogy here is to earlier standards such as hours of work, health and safety, minimum wages, and so on. While the issue of what these minimum standards might be is still up for debate, the question of whether there should be standards is not really a debatable item. Leaving working conditions to the market is not an acceptable approach. There is much greater scope for international co-ordination around labour standards. In the past, the role of unions has been to "take wages out of competition" in many industries in the sense that widely accepted minimum standards, gained through collective bargaining, make it impossible for employers to compete on the basis of driving wages and working conditions down and force them to compete on some other grounds, such as quality, design, and so on. A similar dynamic could take hold in the international economy, but only if governments understand that they cannot leave these issues to market forces.

Fundamental to the labour perspective is a stress on the key role of trade unions in shaping workplace change. Progressive labour laws are needed to facilitate the extension of collective bargaining to "non standard" workers..

Training issues are critical, and the evidence in Greece to date is that voluntary employer-based training has not been an adequate response to rapid change. This is an area where government intervention in the form of legislated standards is important. As well, in an era of change and dislocation, better adjustment and transition mechanisms are needed. The central government could act as a model for other jurisdictions on issues related to technological change. One area where government's role could be applied would be in the area of mandatory employment impact statements, similar to environmental impact statements, to accompany any large economic activity. This would stimulate public debate on priorities, and perhaps bring public pressure to bear on both government and employers to give employment creation a higher priority.

6.4.3 A business perspective on the Information Society and its impact on the workplace

Building the Greek information society is a formidable challenge that will require all stakeholders to put their minds and energies together to harness change for the broadest common good. The options from the business viewpoint are clear: we can embrace change, exploit its opportunities, adjust to it, and mitigate its costs, or we can resist it, try to protect old paradigms, and be overwhelmed by it.

How Greeks respond will be critical. Increasingly, a good technically networked infrastructure is becoming a precondition for market success. The way work is performed in this networked

environment is directly linked to productivity, quality, and the overall competitiveness of the nation. The stakes, therefore, are high if we fail to adjust to the new realities.

Business recognises that the transition to the information society is not smooth. For many, it is a difficult, painful process. Solutions, however, come from a focus on the future, not the past. What is needed is leadership to show Greeks the path to employment security, and the skills they will need to prosper in the workplace of the future.

6.4.3.1 Technology and Employment

Any discussion of the impact of technology on employment should begin with a review of the facts. While some authors fuel the notion that information technology is an overall "job killer", comprehensive studies conducted by the OECD and the EU, do not support this conclusion.

The OECD Jobs Study, released in 1994, considered and rejected technological change as a cause of high and rising unemployment in OECD countries. According to the Jobs Study, forecasts that the next wave of technological change will cause high unemployment have been made repeatedly over the past 200 years. So far, such forecasts have been wrong. The Jobs Study concluded that when technological progress accelerates, so do growth, living standards, and employment. While some unemployment always accompanies the introduction of new technology, in the past the additional jobs created directly
and indirectly have been sufficient to not only replace those lost but to expand employment substantially.

In Greece, studies examining the local experience, indicate that industries that intensively purchase and use IT goods and services have created more jobs than industries that do not and are outperforming these industries in terms of production. All of the major occupational groups in the high IT intensive industries have grown, while most of those in the low IT intensive industries have contracted.

Studies such as these are important for several reasons. First, they reinforce the view that resisting technological change and focusing only on protecting existing jobs is not the right response. Job growth will depend on how we diffuse and exploit the enabling potential of information technologies. Second, they point to a role for government that focuses on creating an environment that supports job creation rather than creating jobs directly. Key to that environment is a flexible regulatory framework that enables both employers and employees to adapt quickly to change, and promotes a broader range of entrepreneurial work arrangements.

The Internet itself has become a platform on which new markets can be built. Just as explosive growth followed the introduction of the mainframe in the 1950's and the PC in the 1980's, the Internet is poised for similar growth in the 21st century. For example, a recent forecast by the International Data Corporation (IDC) suggests the US Web-based training market will expand from $19M in 1995 to $1.750 M in 2000. Our challenge is to anticipate such opportunities, and exploit their benefits for Greeks.

6.4.3.2 Good Jobs versus Bad Jobs

The debate on employment and technology is not just about the number of jobs, but their quality as well. The private sector is often criticized for using technology to replace workers and for using technology-enabled work arrangements to outsource work into lower-wage ghettoes. This is frequently characterized as the "good jobs" - "bad jobs" debate, with calls for political action to force business to maximize both the quantity and quality of their job creation. At the most basic level, we should acknowledge that all jobs are good jobs, and our basic objective as a society should be to create more employment opportunities. At the same time, it's important to recognize that different parts of the private sector contribute to this overall goal in different ways.

In the long run, we all want to see more and better jobs. In the meantime, we must be careful to ensure that any policy levers we use to encourage better quality jobs do not inadvertently hurt our efforts to create jobs in larger quantities, or vice versa. Above all, we must not discourage all forms of job creation by trapping ourselves in outdated definitions that come from the industrial era.

6.4.3.3 Non-Standard Areas of Work

One of the difficulties in addressing "non-standard" forms of work is definitional. The term itself reflects an industrial model where any movement away from a full-time, permanent job with 9 to 5 hours, is viewed negatively. Rather than benchmarking to the past, we should be asking what are the "standard" forms of work that are emerging in the information society. What they will look like is still a matter of speculation, but it is unlikely they will march in lock step with today's paradigm. Rather business sees a move away from the "one size fits all" to a growing diversity of work arrangements.

A review of today's statistics suggest the growth of alternative work arrangements is by no means as dramatic as some have predicted based on anecdotal evidence. There are trends, however, that are worthy of comment.

Part-time Work

Compared to the 1970's, a larger portion of today's part time workforce would prefer to work full time. For many, the primary reason is school attendance. However, young people are also the group most likely to report being employed part time because they cannot find a full time job.

Part time work is reported by employers to be motivated by factors such as a lack of full-time work, cost control, employee preferences and a desire for flexibility. Part time work offers people at various stages of life an opportunity to better balance work with other responsibilities, particularly women who wish to both rear children and keep their skills relevant and up-to-date. One interesting trend is the opportunity leading employers are offering to move from full to part-time employment as a way of retaining workers who require additional flexibility.

Contingent Work

Temporary or contract work is defined as a job with a specified end date. Technology may enable temporary or contract work as it facilitates the transfer of information that allows short-term or contract workers to move easily in and out of organizations working on project, tasks or teams.

Temporary work may be precarious or contingent. It is becoming clear that temporary or contract workers may develop their own careers by moving through jobs or placements, developing increased skills and gaining access to continuous training.

Temporary service firms are an interesting illustration of a growth sector related to temporary and contract workers. Once seen as only providing "low-skill" assignments, temporary-help businesses today include highly qualified professionals. They are becoming outplacement providers and training providers. Such firms are quite successful in other countries in the EU (notably in the UK, probably because of the liberal work regimes) while in Greece, they have been focused in the 1st category, i.e. "low-skill" assignments.

Individuals choose temporary help companies for a wide variety of reasons. They may accommodate the worker's needs for a flexible schedule; they may provide temporary placements for individuals who want to balance school, or child rearing; they may provide opportunities for expanding skills and gaining specific work experience; and they may offer a window into permanent employment for those who prefer a full time position.

Telework

Telework is one of the most outstanding features of new forms of work resulting from information and communication technologies. It revolutionises the traditional concept of work where presence or "face time" was the best way of evaluating productivity. In today's climate, where attaining results is what matters, telework, including new concepts such as desk-top conferencing, allows companies to work closer to the market, respond faster to customer demands, and reduce overheads.

Another important feature of telework is the ability to choose the most optimal place and time to work. With the introduction of laptop computers combined with powerful networks people can work while commuting, travelling abroad, or from home. Home is becoming a popular choice for many employees who find this increased flexibility helps to better balance work/life commitments.

The trend towards employees working at home is not without critics, who see it as a phenomenon that requires legislative intervention.

Hours of Work and Distribution of Work Time

The most notable impact of information and communication technologies is at the level of the workplace. New workplace models are emerging based on networked infrastructures that bear little resemblance to the workplace of the past. Dr. Charles Savage, in his book Fifth Generation Management: Integrating Enterprises Through Human Networking helps to build a vision of what we can expect in the "Knowledge Era".

The workplace Savage outlines is fundamentally different from anything we have experienced before. It is not achieved simply by downsizing or restructuring. It involves real integration and is people dependent. It calls for new principles of management and employee participation that have to be learned...and old ones "unlearned". And it requires developing reward, recognition, and career opportunities for knowledge workers.

There are organisations today that display attributes of Savage's model. They have been labelled "high performance" and involve new management and human resource strategies. However, against the backdrop of anxiety and insecurity that many workers still feel, we have much to learn and much to do before the knowledge model finds its way into most workplaces.

One thing is certain, however. The traditional corporate culture that has served the industrial era well, no longer fits. It becomes critical, therefore, to approach the debate on workplace regulation from a different perspective. It is not a question of whether today's rules are "right" or "wrong". Rather, the questions should be what objective do the regulations achieve, and is it still valid in the changing workplace.

For business, the choice is not just between a rigid regulatory framework or the free reign of the marketplace. There is the option of a flexible regulatory framework, one that provides a common floor of protection yet removes outdated rules and barriers to change.

The debate around telework and hours of work are two excellent examples of old thinking that is out of step with the changing workplace.

The first question to be asked is "Why do we have rules governing hours of work?"

Several reasons have been advanced for such standards: providing a safety net to protect vulnerable workers, and reflecting a community norm. Clearly the safety net approach remains a legitimate justification - but a community norm built around an industrial model, is no longer appropriate. Experience, particularly in Europe, has demonstrated the job creation potential for this approach is limited. It also makes no provision for the difficulties faced by employers in meeting customer requirements. There is ample evidence to suggest that job creation is better served by policy initiatives

that would reduce burdens on the cost of jobs, such as payroll taxes, rather than attempt to mandate redistribution of overtime.

How should rules around hours of work be adapted to knowledge workers? What type of protection is required, and how can flexibility which increasingly meets both employers and employee needs, be introduced?

These are questions that warrant debate as reform of employment standards legislation is considered, particularly for highly-skilled knowledge workers where compensation systems are less oriented to hours worked and more to project and team outcomes.

Self-employment

Statistics verify that self-employment and entrepreneurship are expanding.

Technology clearly facilitates this trend. It has provided new tools which enable the self-employed to engage in business with clients located on the other side of the world. Access to global markets is no longer the domain of large, multinational employers.

6.4.3.4 Polarisation of Income and Opportunities

Income polarisation is also attributed to technology because of the divergence between highly skilled and unskilled workers and the compounding effect of better access to training for those already skilled and employed.

Where technology makes a contribution to the issue of polarisation, it is on the side of enabling the increase of skills and earnings. The appropriate response should be to increase access to training to close the gaps.

6.4.3.5 Education, Training and Skills Development

While there are polarised views among the stakeholders on the impact of technology and regulatory issues, there is more common ground when it comes to education, training and skills development.

Workers who use information and communications technologies require a stronger academic foundation and a broader range of technical and interpersonal skills. In a network-centric business environment, a key requirement for employees increasingly is a basic attitude towards work, the ability to work as part of a team in a positive, proactive ways, and to value the diversity of others. For management, the ability to communicate, to demonstrate leadership, coaching, and listening skills grow in importance.

Moreover, as individuals are more likely to experience changes in jobs or employers, successful careers depend increasingly on the ability to learn new skills and versatility in using them. Learning is not just a phenomenon that occurs early in life in a formal school setting. It becomes lifelong, and critical to success.

The importance of continuous skill development is key not only to individuals who are in employment relationships, but to those who are self-employed and engaged in entrepreneurial activities. Focus on training and learning is now a critical success factor for all organisations, large and small.

Today most of us still judge careers by the "jobs" an individual has with a particular employer or industry. In the future the benchmark will be our ability to sustain a career in a particular occupation or profession, and demonstrate marketable skills. What people do will become increasingly more important than where they work.

The way we develop skills will also change dramatically with the advent of information and communication technologies. The focus shifts from teaching and training - to learning and doing - and unlike teaching which is characteristic of classroom environments, the latter can happen anyplace, anytime, in both formal and informal settings. This has significant implications for how we measure investment in human capital and assess learning outcomes. Counting student days may be an effective measure of training but it has less relevance is assessing the knowledge, skills and abilities people acquire through training or on the job experience. Where new approaches are being developed, they share common characteristics. First, they include an assessment of the skills and knowledge individuals have, compared to a set of skills requirements developed from business and customer requirements. Success is measured by "closing the skills gap" which can be measured both at an individual and an overall firm level. Second, they attempt to build reward and recognition systems around skills development rather than jobs.

Much still needs to be done in the area of defining and evaluating human capital. But until we understand how to do this, we will continue to have difficulty in measuring the costs and benefits of education, training and skills development.

If knowledge is the source of wealth in the information society, then skills and abilities are our source of security. The challenge is to find ways for individuals, organisations, and the nation to focus on and value skills in the same way that we focus on jobs today.

6.4.3.6 What Should be Done

The fundamental changes that the Information Society brings will require responses from all stakeholders: individuals, business, labour, and governments.

Business advocates a course of action that commits Greek workplaces to learn and to change. Working in the information society offers more opportunities, but less job security than we have known in the past. Some will find their way easily in this new environment; others will have difficulty and will need assistance. It's time for all stakeholders to roll up their sleeves and challenge their imaginations to find innovative approaches that meet the dual needs of flexibility and protection for workers.

Below are suggestions from the business perspective on how to take up this challenge:

- Management must lead the transformation to high-performance workplaces, emphasise the strategic role and value of human resources and create environments where employee innovation and creativity flourish;
- Employees must take responsibility for skills and career development; self-reliance is a key survival skill in the information society and forms the basis for lifelong learning ;

- Governments play a particularly central role. If governments' attention is directed solely at protecting current jobs and preserving regulations that maintain current forms of work organisation, the process of adapting to technological change will be more lengthy and more painful; and

- Government must lead in building a culture in Greece that understands the link between skills and employment security and provides incentives for skills development to all stakeholders; in particular, they should help to build stronger links between individuals (both employees and self-employed), employers, and training/education providers.

6.4.4 The way ahead

In these ongoing discussions, it will be important that technology not be seen in isolation. It is as much a part of the environment colouring our world today as fiscal restraint, globalization of trade and investment, and deregulation or re-regulation of industries and business. Looking at technology without consideration of the other relevant factors may not produce the most satisfactory results.

Structural changes to Greek society clearly are under way. It is difficult to label these simply as workplace issues. Issues of employment security and income, balance of work, family and personal responsibilities, access to benefits, and sharing in the gains of productivity are all issues which concern Greek workers - and must be dealt with on a daily basis. In turn, employers must face rapid changes in market demand, quick turnover times in product cycles, and sufficient flexibility and productivity in the work process and workforce. Therefore, examinations and debates related to the Information Society and the workplace will have to consider the larger context as much as possible.

However, there is one area that both business and labour agree is a priority for Greeks. This is learning and skills development. Both groups feel that it is essential that we move forward in building necessary skills. Again, there are differing views as to which is the best approach to take in reaching our training goals.

6.5 Legal Issues, Copyright And The Information Society

Copyright has typically been the preoccupation of creators and a select group of industry players, government officials and academics. As the world information society opens up with the advent of digital technologies, new issues arise and, as a consequence, we find the number of stakeholders included in the circle of the debate grows increasingly larger. As we move ahead to implement components of the Information Society concepts, the debate on the many complex issues surrounding copyright in the digital universe will no doubt continue to be boisterous and widespread.

6.5.1 General

In recognition of the important and complex role of copyright on the Information Society, the ATHINA Project started an attempt to identify the specific issues and make recommendations on the role of copyright and of the Intellectual Property Right in the context of the Information Society. It is apparent that the composition of the ATHINA Project working group is not sufficiently representative in order to tackle such an issue. However, we believe that a creation of an inventory of topics for further discussion by both legal and non-legal people, is a definitive first step, towards the drafting of a comprehensive recommendation to the Hellenic Government for legislative and other action.

The scope and terms of reference of the ATHINA Project were broadly defined. The mandate of the ATHINA Project is: "To make recommendations on the ways in which copyright can be used to enhance the Information Society to the benefit of Greek citizens."

In defining its terms of reference, therefore, the ATHINA Project chose to interpret copyright as meaning more than an examination of legal issues in light of the "IPR & Copyright Act." (Act 2121/1993) Policy and administrative issues and current industry practices were also included within the ambit of the ATHINA Project's terms of reference. Accordingly, the ATHINA Project discussed copyright issues from three perspectives:
1) Legal;
2) Policy
3) Administration.

It should also be noted that the ATHINA Project confined itself to a limited discussion on copyright, that is, the protection of literary, dramatic, musical and artistic works, and does not examine patent and trademark matters.

As a commencement, ATHINA project members assume that a balance should be struck between the needs of creators and users. On the one hand, creators are concerned about the unauthorized use, reproduction and alteration of their works in a digital medium and feel there are currently no effective means by which to ensure fair remuneration and adequate protection of their rights. On the other hand, users should have reasonable access to new products and services in order to ensure that a viable and healthy commercial marketplace continues to exist.

Copyright has played a critical role in the development of healthy indigenous cultural industries. Since the "Copyright Act" came into force, copyright has functioned as an essential economic lever for creators and, as well, has been instrumental to the realisation of Greek cultural sovereignty and identity.

The new technologies, including digitisation and interactivity, have provoked a public debate as to how copyright should be enforced on the Information Society. It should be noted that Greece reacted very lately in issues pertaining to copyright with regards software. Only in 1993, under Act 2121/93, software rights appear in the national legislation. While many have recognised the need to clarify the rules of the road for copyright, precisely what those rules should be has not been clear. The potential for piracy or unauthorised use and reproduction of copyright protected works and its consequent economic repercussions are of key concern to creators and producers. Underlining this concern, is the

recent creation by some of the biggest software vendors, of a organisation defending their rights against piracy, using legal means, arising by the said legislation. However, Greece has the worst records with regards software piracy in all Union states. Therefore, more should be done. On the other hand, the importance of streamlining the procedures for rights clearance and a full understanding of the nature and extent of copyright liability are critical for users, service providers and distributors of protected works on the Information Society.

ATHINA project drew on a number of sources to develop a comprehensive list of issues.

In addition, the ATHINA Project referred to a wide variety of reports and studies, including for example, the U.S. "Green Paper on Intellectual Property" and the "National Information Infrastructure" (the "Lehman" Report) and the "Report of the Japanese Institute on Intellectual Property" and naturally, to the European Commission's "Green paper".

Broadly speaking, the questions that have been raised in a wide variety of forums have included:

- How will existing rights apply to the creation, transmission and use of works in a digital environment?
- How will the moral rights of creators be protected?
- Who should be made liable for copyright infringement?
- How can we track the use and reproduction of protected works for the purposes of enforcement?
- And how can the process of clearing rights, particularly for multimedia works, be streamlined?

Over the course of its deliberations, it became evident to the ATHINA Project that many of the issues presenting the greatest difficulty were not, as some might expect, legal or policy related, but administrative or technical in nature. That is, the enforcement of copyright and the clearance of rights, from a practical perspective, are viewed by the industry as important problems that must be addressed if a truly Information Society and the creation of new products and services in a digital medium are to be realised.

Equally important is the need to educate both users and creators on the role of copyright on the Information Society.

6.5.2 General Recommendations

- Action on copyright reform is critical and the government should move to accelerate the introduction of amendments to the "IPR & Copyright Act." Any amendments should be technology-neutral in order to take into account future technologies.

- The government should review its role as a user of information as well as a holder of intellectual property rights with a view to establishing itself as a model for copyright use.

- Government should take a greater leadership role as an educator of industry and of the creator and user communities on the critical importance of copyright to the economy, to job creation and to cultural sovereignty.

- Greece future copyright reforms should take into account international developments and trends in respect of new technologies and the Information Society. Development in this field, in the US and Canada, Japan and the European Union should be closely monitored.

6.6 Proposal For the Structure of a National Telemedicine Network

The ATHINA consortium has recognised the importance of medical oriented network and applications for Greece. The reasons are many :

1. There are severe difficulties in servicing citizens in remote and islandic regions of Greece, due to geography and difficulty of access. These result not only in wasting of financial resources but also in loss of life in some cases, something which the costs are beyond calculation.
2. The concentration of medical facilities are very uneven not only in favour of Attica versus the rest of the country, but also within Attica, where the vast majority of hospitals are in the centre and north of the centre. A whole area, having almost 1.000.000 people (West Athens) is not served by any hospital.

Therefore, the issue has been explored further more by the consortium. This work resulted in a comprehensive proposal which follows.

6.6.1 Main Objectives

A National Telemedicine Network is an integrated and united information and communication environment on health services in national scale with main objectives to handle with urgent and hard to discern medical cases, the connection of the different health levels and also the continuously training support of medical and other kind of personnel in Health Care Units.

Users in the National Telemedicine Network will be the medical and other kind of personnel in all Health Care Units. As mentioned, with the help of Telemedicine we are able to help not specialised doctors in rural areas by giving them direct and on line access to specialised doctors in various hospitals. With the application of Telemedicine all the offered medical services will be upgraded especially in islands and highland villages.

The National Telemedicine Network will ensure the transfer of medical data of various types (documents, structured elements, images, signals etc.). In order to support the transfer of information, we should use and develop a series of applications and the necessary tele-communication infrastructure. Some of these applications may have local range, while others will have broaden range in a National and European context.

More specifically, the National Telemedicine Network aims to the following:

- Establishment of a contemporary telematic network with extension features which will be used by the health care units.
- Development of an integrated information system for the first aid units.
- Establishing and usage of an electronic medical software file system.
- Access to all network sites, to medical and informational databases (Greek and Foreign).
- Usage of a contemporary telecommunication equipment (with international standards) for tele-conference and parallel data transfer.
- Usage of the network in rural areas for continuously training medical and nurse personnel.
- Management and insurance of quality.
- Adjustment of international standards (DICOM, ISO-EN etc.).

In order to develop the National Telemedicine Network we need resources, funds and technological infrastructure. Because of that, the implementation will be in stages. In the first stage we must set up the National Telemedical Services Centre and in the second stage to carry out telemedical works in national scale.

6.6.2 Settlement of the National Telemedical Services Centre

The National Telemedical Services Centre (NTSC) will be the pioneer of the National Telemedicine Network. The establishment of the NTSC could be done in University hospitals or University institutes or by a scientific organisation; of course there will be a number of people co-operating such as doctors, electrical engineers and computer engineers specialised in Biomedical Technology, Telecommunications and Information Technology.
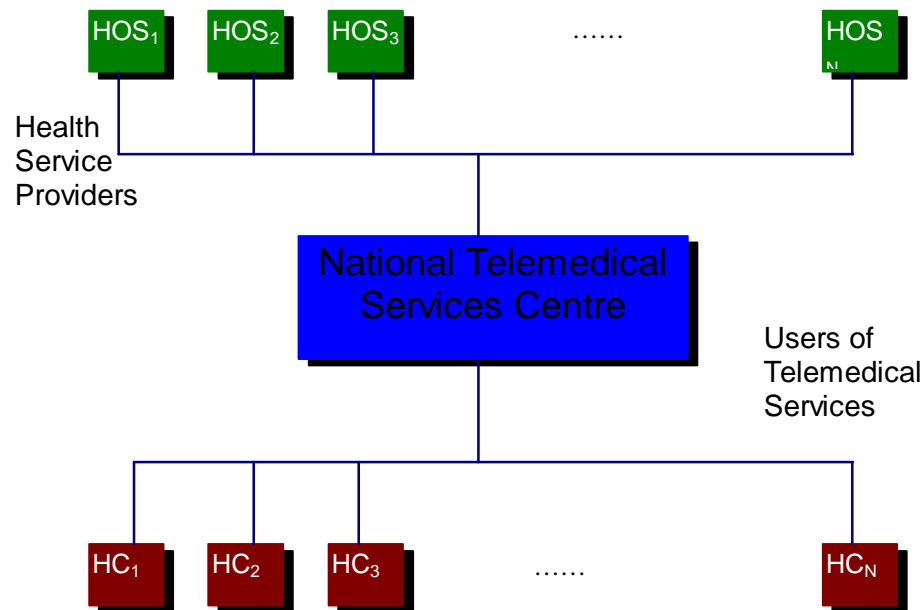
Figure 10 An Open Architecture Model for the Structure of a National Telemedical Services Centre.

Main objective of NTSC is the development of a National Telemedicine Network. NTSC will determine the legal and organisational framework operation of telemedicine network and suggest the financial terms for the usage of its' services. Moreover, the issues that NTSC will have to handle and resolve are among the following:

- Telemedical necessities in all levels of health service units.
- Architectures and Prescriptions of telematique infrastructure for Telemedicine services.
- Design and organisation of Telemedicine services.
- Measures and evaluation procedures of Telemedicine services.
- Design of Tele-conference and Tele-consulting services.
- Electronic mail medical service.
- Templates, design of representative applications and pilot implementation of medical EDI application.
- Design and implementation of a Tele-medicine terminal communication system.
- Integration of Tele-medical terminal with medical records.
- Organisation, management and technical support of Tele-medicine services.
- Educational and informative activities.
- Evaluation procedures and results of offered Tele-medicine services.
- Strategic exploitation and networks extension.

- Procedural manuals and application rules of Tele-medicine services.

6.6.3 Telemedical Applications

The number of different telemedical applications is rapidly increasing, and one can put the word Tele- in front of almost any medical discipline, and find that work is going on to explore the possibilities and define a service in that field. A complete overview or even a listing of all applications is therefore of limited value. We will rather focus on the main applications that have different technical solutions and/or different bandwidth requirements and usage patterns. Main application areas to consider might be:

- telepathology

- teleradiology

- teleendoscopy

- clinical conferences

- remote teaching

- medical information networks

- home supervision of patients and/or elderly people

Each of these fields is however not necessarily represented by single applications or even homogeneous application areas. This may be illustrated by a closer look at pathology, where a number of different telemedical activities are carried out.

Telepathology

Pathology is the science of diseases in tissues and organs, and the pathologists have traditionally provided a diagnosis based on microscopically examinations of cell and tissue sections. Hence, telepathology is the same service, but carried out remotely by means of transferred microscopic images of tissue samples displayed on a screen. Telemedicine has a number of application areas in pathology:

- **Clinical-pathological conferences**are communication between the pathologist and the clinician, where the pathologist demonstrates the pathological finding through image display. This application may be carried out through a still-image system, since the pathologist has the opportunity to prepare his case by grabbing and displaying a number of representative images. Live images would however be preferable, and a good video quality is sufficient (approx. 700 pixels, with 24 bit per pixel). No remote control of a microscope is necessary. Video conference facilities must however be available. This is technically a relatively simple application, with bandwidth requirements between 384 -512 Kbps.

- **Second opinion** is where one pathologist consults an other on more difficult cases. The image quality must be superb, which calls for a digital camera. The microscope needs to be remotely controlled, and the specimen should be scanned in real-time. Video conferencing is not mandatory, but advantageous. This is a complex technical set-up, with bandwidth requirements between 2-7 Mbps.

- **Remote diagnosis** involves a pathologist doing telediagnosis on ordinary cases for a hospital without pathology department. This would be the most demanding application, with similar requirements as second opinion, but were video conferencing also would be mandatory. 2-7 Mbps is required.

- **Frozen section service** is a rapid preoperative diagnostic procedure carried out on fresh tissue. The tissue analysis is carried out while a surgical operation is in progress. The continued surgical procedure depends in a number of cases on the outcome of the diagnostic procedure, and unless a pathologist is available during the operation, the patient has to be submitted to two surgical procedures, first explorative surgery and later surgical treatment pending the laboratory results. Telepathological assistance during surgery is therefore an obviously good alternative. Due to the rapid preparation

procedures required, the quality of the specimen is far from optional, and hence a reduced image quality system may be used. Present systems on the marked employ bandwidths between 384Kbit and 1 Mbps.

- **Evaluation of fine needle aspirates** is yet an other application for telepathology. Cell samples from suspect lesions (e.g. tumours) to be diagnosed might be drawn by a syringe if the lesion is accessible with a needle. This is a simple procedure that spares the patient from explorative surgery, and can be carried out by a trained clinician. The drawback is that these procedures have to be repeated in almost 50% of the cases due to improper sampling. The sample therefor need verification by a cytologist on site, while the patient still is in-house. Alternatively, such verification can be made via tele-transfer of images. If no general telepathological equipment is available, this can be carried out by simple equipment for grabbing, transfer and display of still-images, and hence, the minimal bandwidth requirements are low.

- **special diagnosis** - there are a number of special methods for diagnostic and prognostic evaluation in pathology that are often easy to prepare, but where the analysis needs advanced equipment or specially trained personnel. Examples of such methods are ploidy (quantification of DNA), chromosome analysis, nucleotyping, immunohistochemistry etc. Such methods are particularly well suited for telemedicine.

- **Autoscreening & quality assurance** based on high-end image processing and analysis equipment that performs automatic diagnosis of cytological specimens such as cervical smears. It is likely that such systems will operate through the telenet in the future, provided that broadband communication is available.

- **Education & training -** There is a lack of pathologists in many countries in Europe and elsewhere, and new pathologist can only be educated on-site in a pathology department. It would therefore be very advantages if one pathologist could teach several trainees in different hospitals during the same session using telepathology workstations.

- Telepathology, as most medical field, will also to a large extent make use of available technology for accessing **databases** and **web services.**

All though most of these applications have common aspects, they do vary with respect to technical approaches, bandwidth requirements, complexity, design requirements etc., and illustrate the difficulty in describing telemedicine with respect to medical applications. The main common aspect is, however, the user (pathologist) and his basic worktool, the microscope. Telepathology is one of the most demanding telemedical applications, both with respect to bandwidth and technical design. The bandwidth necessary for telepathology (see later) will therefore also be sufficient for other telemedical applications.

Tele-radiology

Like pathology, the medical speciality called radiology is an image-based discipline. Whereas the pathology images are microscopic, the radiology images are macroscopic. The radiologist uses radiation to create an image, often on a film, and uses different physical properties such as direct radiation, decelerating radiation, magnetic resonance and sound. Hence, a number of sub-specialities have been developed:

- X-rays (roentgen)

- Computerised tomography (CT)

- Magnetic resonance (MR)

- Ultrasound

- Nuclear medicine

The processes of teleradiology are however more homogeneous since they all, with exception of ultrasound, are based on one or more still-images (static images). Whereas CT and MR are digital techniques, X-ray and nuclear medicine have traditionally created images directly on film, and ultrasounds have been displayed on analogue monitors. New equipment for ultrasound and X-rays are now based on digital techniques as well, all though the majority of X-rays are still film-based. These may, however, be digitised by a high-resolution scanner. Telemedical solutions exist for all these methods. For CT and MR, there is a clear need for second opinions, i.e., consultations between radiologists. As in other fields of medicine, the specialists acquire special expertise within certain application areas, and it is of great importance to the health service in general that this special expertise is made available to other hospitals and colleagues. This is also true for the other methods, but here there are additional aspects to consider. In the case of X-ray imaging, the practical procedures and handling of the patient is done by specially trained technicians, whereas the radiologist basically is studying the images and making the diagnosis. This of course implies that the radiologist does not have to be on-site, as long as the images can be transferred and viewed at the proper resolution. Since a number of small hospitals as well as urban districts do not have patients- or population densities to justify local radiology departments, one might expect to save both money and time for the health services as well as the patients by introducing tele-based radiology centres.

Tele-endoscopy and other camera-based techniques.

Endoscopy (looking inside) and laparoscopy are diagnostic tests and/or tools that enables the doctor to look inside the body with a miniaturised colour TV camera with a wide angle lens, often mounted on a long thin flexible fiberoptic tube. When using this equipment to enter the body openings, one may, without any surgical procedures, obtain images for diagnostic purposes in ear, nose and throat (ENT), gastrointestinal as well as gynaecological medicine.

A related method is called laparoscopy, where the camera and instruments are inserted into the abdomen or chest through small skin cuts allowing the surgeon to explore the whole cavity without the need of making large standard openings dividing skin and muscle.

In both cases, the images are displayed on a TV monitor, and the diagnosis is therefore performed on the monitor display. Obviously, the camera signals might as well be transmitted to an other location, and the diagnosis as well as the surgery might be guided remotely by an expert in the field. It is probably not necessary to mention that same procedures would apply to a camera used outside the body, e.g., in dermatology.

Endoscopy and other camera-based techniques are to day used by the specialists in the different medical fields. The procedures might as well be carried out in the small medical centres or even at the office of your family doctor, provided that the images are transferred to the specialist for diagnosis.

The telemedical systems developed for these purposes today has been limited in quality due to lack of broadband communications. Video signals are often transferred by codecs employing the H320 communication standard developed for video conferencing, which is far from optimal for these systems. The image quality requirements are obviously higher than what is needed for conferencing, and the compression algorithms are not as effective, since they are based on transmitting only the changeable parts of the images. In video conferencing, large parts of the images are identical for long sequences (e.g., the studio background), whereas the whole image changes all the time in endoscopy as the camera is moving. One should therefore expect to see new technical solutions for endoscopy when the availability and pricing of broadband communication improves.

Clinical conferences and remote teaching

There is a general need to consult health personnel, both from the patients as well as between colleagues. As already stated several times, the knowledge and expertise within different fields of medicine are distributed, and no single hospital is self-sufficient. As previously explained, patients are refereed in a hierarchical way through the health system, and a number of specialist has ambulatory assignments. Training courses and continued medical education is important for any health worker, and clinical conferences on single cases involving different specialists are a part of the daily routine. Telecommunication should provide easier and more cost-effective access to existing information channels, as well as open new possibilities through

interregional and international communication. It is generally assumed that all hospitals and medical centres in the western world will have access to at least one video conferencing studio within the next 5 years. Even though aggregated BRI's works OK for general conferencing, this is hardly the future solution to broadband communication.

Pathology, radiology, endoscopy and clinical conferences are just some of the most obvious examples on how telemedicine might be used to improve diagnostic quality and at the same time reduce costs and save time. Other examples might be audio-based diagnostics, such as heart sounds, which often might be difficult to diagnose for a general physician but easy for a remote cardiologist. A number of examples are not mentioned here, and still many have not yet been thought of. Telemedicine has been recognised as a very potent new tool in health care during the last 5 years, both by governments, health administrators, clinicians and laymen. This has happened in spite of the fact that proper telecommunications have not really been provided for this purpose, and that most of the technical solutions have been both complicated, impractical and expensive. There is little doubt that improved availability and pricing of broadband communication, if established, will be a driving force for future developments within telemedicine.

6.6.4 Technical approaches

The different applications are based on either analogue or digital images with voice, and the technical approach is therefor basically one of the following three:

- digital still images (e.g. x-rays)

- analogue video - (e.g. endoscopy, laparoscopy, clinical conferences)

- high quality digital "video" - (e.g. telepathology, 3-D MR)

Digital images might come from various sources, depending on application and resolution requirements. Images may be digitised from video cameras using frame grabbers or codecs (e.g., dermatology, endoscopy), from digital cameras (e.g., microscopes), through scanners (film), or as an inherent part of the medical equipment (CT, MR etc.). Different types and degree of compression will be applied, and control signals are often required for remote control. Most telemedical applications will need integrated video conferencing facilities.

Standards have to be developed in an early phase for telemedicine to be successful. Again, due to limited bandwidth availability, a number of different protocols are in use to handle the data stream (e.g., TCP/IP), the compression (e.g., JPEG, MPEG, H221, H261), the image formats and patient information (e.g., extended TIFF, DICOM) and so on. As long as bandwidth is a strong limitation, new "standards", protocols, control mechanisms and display methods will by necessity continue to be developed, which is threatening the very concept of telemedicine, which of course is communication! A significant part of the total costs of telemedicine equipment is spent on multiplexing lines and compressing data, and telemedicine would probably be better served if these costs were spent on broadband communication, allowing for more simplified and standardised equipment.

6.6.5 Expectations and future work

Telemedical applications have been outlined with respect to technical solution, bandwidth requirements, marked demand, user-patterns, geographic distribution and organisation. The next phase of this study will attempt to estimate techno-economical requirements and total bandwidth demand for a given line in the health service (e.g., for central hospitals). These results will be used to evaluate the feasibility and requirements for a broadband network for the health services, and a limited cost-benefit analysis (Price vs. Need) will be performed.

6.7 Requirements And Options For Learning, Creativity And Entrepreneurship

The work of the ATHINA Project is guided by three policy objectives which were assumed :

1. creating jobs through innovation and investment in the Attica region and in Greece
2. reinforcing Greek sovereignty and cultural identity
3. ensuring universal access at reasonable cost.

The Project was also given four operating principles, which in all likelihood would be of major concern in the Information Age for every country:

1. an interconnected and interoperable network of networks
2. collaborative public and private sector development
3. competition in facilities, products and services
4. privacy protection and network security
5. Alignment of public policies with regards employment, with the realities which is likely to prevail in the Information Society.
6. lifelong learning as a key design element of Greece's Information Society, in particular with regards defence against joblessness.

7. ATHINA Project Statement on the Information Society

The Project vision for the Information Society evolves from the concept of an integrated and seamless network of networks that will carry and support a vast range of advanced communications and information services. This infrastructure represents the foundation for Greece's prosperity in a knowledge-based global society by providing new dimensions for learning, creativity and entrepreneurship.

The metaphor of an Information Society for describing the scope and depth of the changes that are currently underway within our society and of reflecting the aspirations and concerns of individual Greeks. The term does not convey imagery about the physical structures through which information will move, such as networks, terminals and databases, but attempts to capture its potential as a mechanism for building a new sense of Greek community and opportunity.

The vision is to establish a network of communities, "centred" in the capital, but extending around the nation linking it with the rest of the globe in the fullest pursuit of individual expression, creativity, learning opportunities and entrepreneurship. As we design the various intersection points, we must reflect the fact that ideas, knowledge, attitudes, traditions and institutions define us as Greeks and contribute to our economic, social, cultural and educational well-being. In its capacity as a communications network for Greek community and opportunity, Greece's Information Society can develop, convey and extend these attributes. Its essence is to provide a medium for us to achieve our goals as individuals and as a nation.

The success in this enterprise demands leadership. We, as a society, must make well-considered decisions about what will and should be available on the Information Society, from entertainment, to business, to learning content, and to how people can get this content, use and share it. We need to enable the progress of those who build these advanced networks and respond to the wishes of those who use them. At the same time, it is important for us to understand the impact that the communications infrastructure will have on our lives and on our shared future as we move to an economy in which the ability to capitalise on ideas and knowledge will be the primary source of our competitive advantage.

In order for Greece's Information Society to meet the economic, social, cultural and educational objectives anticipated at this stage by visionaries, the ATHINA Project, in tandem with similar initiatives, must not only foster the development of the Society, but also ensure that it responds to the needs of Greeks. The challenge is to ensure that Greece's Information Society carries not only opportunities for all Greeks, but also the means by which they can realise them.

The ATHINA Project task is fourfold:

1. to advise government, regional & local authorities and other public and private sector bodies in issues pertaining to the Information Society
2. To contribute to the consensus building process, co-ordinated by the European Commission, together with our European partners
3. to serve as a catalyst for the accelerated development of Attica's and Greece's Information Society
4. to inform and educate about its possibilities.

Our commitment is to provide the best possible advice on how Greece's Information Society can help us, as a nation, achieve our objectives in a way that reflects our shared values. While it might not be realistic to expect that our public policy makers will embrace and implement our every recommendation, we hope that the results of our labour will receive fair consideration.

7.1 Public Policy Issues

7.1.1 Organisational & Institutional Framework

1. What are the necessary adjustments to be made in order to accommodate the realities of the Information Society ?

Information Society shall require a radically different way to conduct business, entairtain and have access to public and private services. It is the ATHINA project members strong opinion, that the current institutional framework does not suffice for electronic communication at all levels. As an example, it is not possible to have Telemedicine applications, prior to establish properly the institution of the family physician. Or, it is not possible for the Government to develop electronic commerce based procurement processes, before establishing the necessary procedures and appropriate Business Registers. The list of issues is very long and quite complicated.

In order to define the issues and take advantage of the work carried out in other countries, it is the ATHINA project opinion, that the state should create a permanent Information Society Office, in tandem with the private sector and the citizens' and labour associations, under the auspices and control of the Parliament of Greeks, in order to create a policy framework and action plan for recommending change and monitor its progress.

2. What are the requirements on the Educational production at all levels of the learning process ?

The ATHINA project work underlines the observation made by numerous other sources, that the Greek educational production does not suffice, neither in volume nor in quality, to meet the requirements of the Information Society. In addition, the curricula of schools at all levels of the learning process, should be enriched with relevant courses and awareness creation mechanisms. If this is the case, what is needed is a major restructuring of the educational system. The Educational Institute, by law, the counsellor of the State to educational policy issues, should establish a presence in the issues involved.

7.1.2 Network infrastructure issues

3.   What is the proper balance between competition and regulation?

The ATHINA Project members agree with the Bangemann Report statement, that competition, not regulation, should drive the development of the Information Society and new communications and information services. There is at the same time, however, consensus on the continuing need for a national regulatory agency.

Whereas traditionally the key providers of the network infrastructure, namely the telecommunications industries, have been regulated, technological change and the global forces of deregulation and free trade have resulted in pressures for greater reliance on market forces and re-regulation. Greece's policy makers and regulators have responded to these pressures by gradually moving toward a more competitive system. Today, non-voice services are open to competition, cellular telephony services are provided by a duopoly (with a third operator about to commence operations) and traditional telephony will be opened to competition in the beginning of next century.

It the ATHINA project's view, that the state should act in order to create a policy framework which will ensure that competition is fair and sustainable, and opportunities for market growth. Furthermore, the framework should ensure the universality of certain specified services.

4.   How quickly can Greek industries move toward universal standards, and how should these standards be determined?

The ATHINA Project believes that government as an important purchaser and end user of new technologies, should endorse open standards to allow the development of the widest possible range of new technologies. The adoption of universal technical standards will be a key element in ensuring the interconnection of existing and planned networks, the interoperability of information systems and services domestically and globally, and the provision of new media-based learning solutions.

The ATHINA project suggests that Greece should monitor the development of standards, adopt a proactive role in setting emerging international standards and take positions on these standards. In addition, the working group also recommends that the government should endorse open standards that are supported by industry. The project believes that the formula for approving standards should reflect the partnership between the government and industry.

5.   How can the government co-ordinate its activities with other governments?

The full implementation of Greece's Information Society is a multilateral, multi-jurisdictional undertaking, involving other levels of government within Greece and foreign governments. The central, regional and, in some cases, municipal governments are active in the development of network infrastructure and advanced information technology products and services. There is a need for different levels of government to work together to reinforce initiatives and to maximise the economic, social, educational and cultural benefits for all regions of Greece.

The Attica region, which hosts the central government, and has a very big number of local authorities (72 only in Attica basin) is an interesting paradigm where the co-operation described above, can be tested and its results disseminated throughout the country.

It should also be noted, that other nations, such as Japan, see the Information Society as a solution to the growing problems of urbanisation and environmental degradation associated with traditional energy intensive manufacturing industries. The Japanese go further than most in recognising the potential of the Information Society as one means of creating an information economy in Japan that would be based on sustainability through conserving resources and reducing pollution. The Japanese Telecom Project , similar to the European Union RISI initiative, has recommended to the Japanese government, among other things, to extend fibre to the homes, businesses and institutions of the nation by the year 2005 as the means of accelerating the benefits of the Information Society for all its citizens. The Telecom Project considers the Information Society to be the means of opening up Japanese culture to the world and a prerequisite to equipping the Japanese for success in the creation of content and services.

The member nations of the European Union have been active for many years in creating the capability to develop the Information Society and to introduce key communities to the associated advantages and benefits. The EEC also considers the Information Society as fundamental to its goal of further political and economic integration. Individual member nations such as Germany have additional specific domestic needs for the Information Society. Since reunification, Germany must

operate its federal government from two physical locations. The German government has challenged its information industry to develop and provide the means by which it may operate efficiently and effectively, immediately and over the long term, as several departments and agencies move to Berlin, leaving other federal entities in Bonn. In this way, the German government has cast the Information Society as central to the functioning of the nation state.

The nations of the Pacific Rim have also demonstrated initiative through the Asia Pacific Economic Co-operation (APEC) forum to accelerate realisation of the benefits of the Information Society, particularly as a means of fostering development and trade. Certain Asian countries have taken leadership positions, as in the case of Singapore, which is very advanced, not only in deploying the Information Society to all citizens, but also in using technology to train and develop its work force through distance learning.

7.1.3 Content On The Information Society

6.   How should copyright and intellectual property issues be addressed?

The Project has recognised from the outset that the development of Greece's Information Society would be seriously hampered if issues relating to intellectual property and copyright protection and compensation were not resolved, in particular given the fairly bad record of Greece with respect to software piracy. The Project is not well equipped towards developing policy recommendations to government on copyright reform, or defining appropriate mechanisms to ensure that the rights of creators and rights holders are respected. However, it stresses the issue that there is a need to ensure that users of protected materials can have reasonable access to them.

Given the ease with which content can be reproduced and manipulated in digital format, the protection of, and appropriate payment for, copyright is a critical issue. The need is to make sure that copyright protection and compensation systems are effective in the increasingly electronic distribution of cultural, information and entertainment products.

The ATHINA Project believes that Greek creators must be satisfied that proper mechanisms regarding the use of their works are implemented. The Working Group on Learning and Training is addressing the issue particularly as it relates to the importance of fostering creativity and its recognition in the information society, the requirements for easy identification of rights holders, the importance of access for users as a fundamental principle of lifelong learning, and preferred treatment requirements for schools and libraries.

7.   What measures are needed to support Greek cultural and other content-based products and services?

The Project believes that the Greek Information Society should reinforce Greek sovereignty and cultural identity. The Project also recognises that the Greek content issue is closely linked to the job creation objective and should be addressed in that perspective. Greek cultural particularities, most notably the language, must not be treated as a barrier, in the Information Age, but a point of strength and a job creation opportunity.

Since most of the economic activity related to the Information Society will be generated by the production of relevant value-added content, the resolution of this issue is also critical to the creation of new Greek jobs. Furthermore, to ensure that all Greeks can benefit from the content travelling on the Information Society networks, we must address the issue of universal access at reasonable cost.

8.   What controls, if any, should be placed on the information that is put on the network?

The Project supports the principle that freedom of expression be preserved on the Information Society, consistent with Greek Constitution, law and democratic traditions. The Project members have discussed the capacity of existing law to deal with offensive content in the context of new information technologies. Offensive content is easier to disseminate in electronic form and is more difficult to monitor and to proscribe. There is a general consensus that a public policy should be defined in accordance with similar initiatives of some of our European partners.

However, the project, due to inadequate resources, does not pursue further the issue.

9.   How can the Information Society be used to improve government services to the public?

The Project believes that initiatives should be taken aiming at standardising government information platforms as an important step toward open government. Members also welcome steps being taken by a number of government departments and agencies to use new information technologies to deliver services and information to Greeks.

10.   How can the personal privacy and security of information be protected?

The Project agrees that protection of personal information should be one of the primary considerations in implementing Information Society services.

7.1.4 Benefits Of The Information Society

11.   How can we ensure that Greek information industries take full advantage of the R&D and technological development opportunities presented by the Information Society?

While recognising the principle that private sector decisions and investment should develop Greece's Information Society, the Project believes that the government has an important role to play in supporting R&D.

Through a number of meetings, Project members have become aware of the enormous wealth and diversity of government information holdings, whether it be collections in national museums, films and documentaries held by the National Film Board or economic data held by agencies such as Statistics Greece.

The Project recommends that Government agencies should facilitate, through funding reallocation and strategic/shared risk partnerships, development of electronic access to the information, documentation, heritage materials, etc. in this nation's libraries and other cultural and information-handling agencies, including government departments.

12.   How can the Information Society best be used to improve the growth and competitiveness of all Greek businesses, especially SMEs, throughout Greece?

Project members agree that the Information Society's impact on economic growth and competitiveness will flow from its enabling and empowering effects on individuals. The Project recognises that the fundamental challenge is to increase the level of awareness of these opportunities within the Greek business community and to encourage a commitment to lifelong learning as a key design element of Greece's Information Society. The government can exercise leadership by example. It can also support the development of business networks and provide training. Project members also welcome government initiatives in the area of electronic commerce, and in particular, in establishing standards for national and international electronic commerce.

13.   How can Greeks be assured of universal access to essential services at reasonable cost?

The Project recognised that the issue of universal access to essential services is extremely complex and required broad consultations, for example, with representatives from Greece's remote communities and handicapped Greeks. It recognises that access and affordability will have to be considered by a number of its working groups. The Project has also studied how new information technologies can be matched to human needs in the areas of health care, education and justice.

Universal access to Greece's Information Society is twofold:
1. access to transport/network services and
2. to information/content services.

In this context ultimately, the following questions, should be answered : 'How should universal access and basic services be defined?' and 'What pricing mechanisms should be in place?'

Evidently, answering such questions, should take into account, the concerns of remote areas of the country and those of underprivileged people, such as handicapped Greeks. With regards to the first issue, the ATHINA project, noted the excellent opportunity provided by the existence of the peer RISI project from Epirus and is committed to seek close co-operation.

Overall, the issues are complex and consequently the Project recommends that the responsible Government agencies should commission an expert study in order to document the status of universality in Greece. The study will examine the structural and regulatory constraints that may impede the offering of new services to the population; elaborate criteria to revise and modernise the concept of basic services within the context of the Information Society; and explore new technologies, sources of financing and methods for promoting access to the resources of the Information Society at reasonable prices, for all Greeks, regardless of where they live.

This issue is of concern as well to other working groups, who focus their work to higher level ("value-added") services. For example, it should also be examined this issue in the context of promoting Greek content and culture as well as the universality of access and affordability to network-based learning solutions. This includes formal education (kindergarten to post-secondary), learning in the workplace, professional training and personal development. Lifelong learning is considered a prerequisite for Greece to be competitive and for Greeks from all regions to participate in the information society. As well, it is key to nation building and to meeting the needs of groups with special needs.

14.   What consumer awareness and learning opportunities should be provided to enable Greeks to be effective users of the Information Society?

The Project agreed that consumer awareness and learning opportunities should be considered from the perspective of an integrated approach to learning as an ongoing process. The Project feels that such an approach would address the awareness issue while ensuring that Greeks had access to opportunities to learn new skills in a rapidly evolving economy.

The challenge for the Project in responding to this issue will be to determine how to increase consumer awareness of the benefits of the Information Society in its broadest possible sense. Consumers will need to be convinced of the importance of Greece's Information Society to their individual lives in, for example, employment, education and recreation. In addition, there will be a need to identify learning opportunities that can combine the development of functional skills and a general comfort with technology.

The ATHINA Project, in the context of its work drafting a Strategy plan for the Information Society, will be developing recommendations to be included in a national strategy on learning and training, which will stress the importance for Attica and Greece in general, of adopting a lifelong learning culture. Recommendations will be directly linked to user needs and propose a series of measures, which involve governments, business, learning institutions and the learning profession, publishers of new media materials, distributors and users.

15.   What opportunities does the Information Society present to improve central government, other public agencies and municipal operations?

The ATHINA Project has been considered on current initiatives under way within government to improve its internal operations, using IT & communication technologies. The principal programme for improving central government operations, is KLEISTHENIS, co-funded by the Community Structural Funds. Evidently, the programme is structured in a fashion, pointing at automating urgent needs of the state and most notably, Ministry of Finances, which accounts for about 2/3 of the programme budget. Apparently, other state needs are not addressed through this initiative, therefore the government should maintain its level of spending following the completion of the said programme.

The Project has considered specific issues, such as how the government can support Information Society development by being a model user. The Project believes that government agencies across Greece can substantially improve their operations through the application of communications and information technologies. The Project believes that government must move quickly to implementation. Beyond the improvement of internal operations, governments can stimulate the development of the Information Society by acting as model users of the Society and its services.

As a significant example, the government can streamline both its own internal operations and those of a considerable amount of the private sector businesses, by establishing an Electronic Commerce based public procurement process. Towards this end, the Greek State can benefit form the experience gained elsewhere, most notably in the US.

ATHINA project believes, that such a model, can be implemented as a first step, within the boundaries of the Attica basin, where most central government agencies are hosted, together with major municipal establishments. A synergy of those organisations, will be eventually of benefit for all Greeks, as lessons learnt, may be easily spread out.

8. APPENDIX A : TELEMEDICINE

8.1 Aims & Background

One of the great challenges in health service of to day and the future is how to find a balance between the medical possibilities and the practical possibilities of health care. There is a growing gap between the expectations of the population, and the resources that society can, or are willing to set aside for health purposes. The rising costs, an ageing population, increasing liability insurance costs, and the closures of rural hospitals are some of the problems of to day's healthcare in Attica region.

Telecommunications and information technology (the key components of the Information Society) may contribute to a more effective use of the limited resources available, and tele-medicine might prove to be a practical and economic solution to a number of problems associated with health care. Access to medical services may be limited by geography, communication, transportation, and shortage of trained personnel, as well as economy. There is a lack of medical specialists in several fields, such as neurology and radiology, and it is further more not economical to provide a number of advanced medical services at the smaller hospitals. Instead of having the specialists or the patients travelling around, a long-distance tele-diagnosis might save money and time. Such activities will also help to reduce the isolation of rural health care professionals, as well as provide a more efficient and continuos medical education and training. The improved ability to get second opinions and other consultations through tele-medicine should improve the diagnostic quality and thereby the treatment of the patients.

One of the main controversial issues of health care has been whether to centralise the hospital treatment of certain diseases such as cancer. Arguments in favour of centralisation have been to save money and obtain full use of expensive equipment, as well as improved quality of treatment due to greater experience. This is compared to the advantage of being treated in the local hospital. By tele-medicine, the possibility exists that a large number of patients may be treated in their local environment by medical specialists in central institutions, and this might prove to be the solution of the national health administrator's dilemma; how to have the cake and eat it too.

The medical society have always been an early acceptor of new technology, and are often seen in the fore-front applying new technology to current needs and applications. There has long been a growing interest and need for the use of telecommunication and information technology in medicine, and a number of medical multimedia applications using telecomms have been developed during the last years. More than 400 scientific papers have been published on this subject, and a number of countries have national strategies on the implementation and use of telemedicine.

A major limiting factor in communicating medical multimedia applications has, however, been the availability and price of broadband telecommunication services.

8.2 Telematics Applications For Improving Employment And Making Life Better For European Citizens

Advances in medical science are straining Europe's health care resources. The availability of new treatments together with improved life-expectancy means that demand is exceeding supply. The task of managing scarce medical resources is a major economic and ethical challenge.

The Telematics Applications for Health Care Sector is developing applications which are helping Europe's health care services meet people's expectations. The efficient exchange of information between health professionals saves time and money. The transferability of multimedia patient records between remote sites constitutes a major break - through - saving lives by enabling faster and more effective responses.

Telematics applications can improve clinical effectiveness, continuity and quality of care by providing the full range of healthcare professions and health service management with access to specialised

skills and competence's. Tele-medicine can bring medical care to people in their homes, in isolated places or in emergencies and permits remote consultation between health professionals.

There is a number of actors for these applications: citizens, family doctors, service providers, therapists, hospitals, social workers, pharmacists, telecom operators, psychologists, social security institutions, computer industries, medical doctors, health care authorities, care givers. Among the Telematics applications that will be useful and important within the next years are: multimedia medical files, computerized drug prescription, network for donor bank, transmission of radiological images and of biological signals, tele-diagnosis etc.

8.3 Definition Of Telemedicine

With the advancement of technology comes the inevitable combining of that technology with other areas of knowledge. In few fields does the advent of the technological age bring so many reasons for excitement and so many problems as in the field of medicine.

8.3.1 What is telemedicine?

Telemedicineis the delivery of health care to distant patients. The term literally derives from the Greek ``tele'' meaning ``at a distance'', and the Latin ``mederi'' meaning ``healing''. It enables people in remote and isolated areas to have access to highly trained medical specialists.

Technically speaking, is the use of any electric signal to transmit medical information. The range of uses is almost unlimited, from military operations in Somalia using tele-consultation to treat our soldiers stationed abroad to a simple phone call from one doctor to another. Telemedicinemay formally be defined as:

The investigation, monitoring and management of patients and the education of patients and staff, using systems that allow ready access to expert advice and patient information no matter where the patient or relevant information is located.[1]

"Telemedicine" means the practice of health care delivery, diagnosis, consultation, treatment, transfer of medical data and education through interactive audio, video or data communications.

Telemedicinehas the potential to provide great advances in the medical field. Instant access to information and the creation of an international medical society could create a new area where medicine is more efficient, more accurate, and more available to all.

We ought to make a distinction between Medical Informatics and Telemedicine:

- With the term Medical Informatics we mean the Information Technologies in total (Computer Systems, Databases, Software, Multimedia Applications etc.) which are used in the rendering of health services and in medical education.

- By the use of the term Telemedicinewe refer to the use of telecommunications and informatics for the rendering of the above services. The distinction between the two terms is often difficult, because most of the Telemedical Applications include issues of Medical Informatics.

However, before this can become a reality issues such as security of medical records, ethicality of remote diagnosis, and the liability dispersion created by Telemedicinemust be addressed. In other words we have to introduce some Health care plans concerning telemedicine. Health care plans shall

not require face-to-face contact between a health care provider and a patient for services appropriately provided through Telemedicineand subject to all terms of the contract between the enrollee or subscriber and the plan.

8.4 TELEMEDICINETODAY

Telemedicineis being used today in too many areas but we might even haven't notice it. Interactivity is a critical component of modern Telemedicine: It refers to person to person interactions supplemented by the transmission of basic clinical information (e.g. patient history or clinical observations).

The practice of Telemedicinehas never been easy, basically for lack of infrastructure. As the disparity between the quality of care available to the urban population and the remote or isolated citizens increases, the only viable remedy comes from communication technologies. ISDN is the first widely available public network to provide support for integrated services. It evolved from the public telephone network and is well suited for telemedical applications.

Communications satellites can transmit data between geographically remote locations such as between land based stations and vessels on the open sea.
 Below there are some fields where someone can find Telemedicine today.

1.By video, e-mail, telephone, etc., consulting with doctors across, state, national, and continental borders is now being done every day. This teleassistance is rapidly growing.

2.Video conferencing for diagnosing or educational purposes. A doctor in one hospital can talk with a patient or doctor in another area to speed diagnoses and their accuracy. A surgeon can watch a procedure remotely and consult to make sure things go smoothly. Medical school students can learn medical procedures without having to be in the operating room.

3.Sites containing medical information are popping up on the web every day. One can go to find information on a certain condition or treatment, read up on medical interests, buy products, or even visit a "cyberspace telemedical office."

4.The use of Telemedicine to reach underserved areas such as rural sections of the country or military bases in other countries is a huge field of Telemedicine being researched now. The benefits of these services could be amazingly far-reaching.

5.Remote supervision of physicians assistants or nurses that is required by the state can be done through means of telecommunications.

6.A hugely controversial, but possible, use of Telemedicinefor the future is the establishment of large medical records databases.

7.An already extremely common use of Telemedicinetoday, research databases such as Duke University Medical School Library's Medline make medical research infinitely more efficient than before.

8.5 The Benefits Of Telemedicine.

The benefits of Telemedicine are many. Instant access to information, whether it be about a certain patient or a certain topic, can be essential or even life saving. The Telemedicine Research Exchange notes the story of a rural doctor who had never before done an amputation being helped through the procedure by an well-practiced physician over a video link. The two saved the life of the amputee, who did not have enough time to reach the larger facility.

A multifold increase in efficiency for all types of medicine would be another large benefit. Travel times for patients and doctors could be significantly reduced as well as research time, and "paper

handling" of medical records (which can be unbearably slow). It has already been seen that Telemedicine enacted on foreign military bases has sped up the whole process of treatment for soldiers abroad. Consultation from major medical centres to the military bases make diagnosis quicker and more accurate.

Accuracy of diagnosis is always a huge concern for the medical community. Getting it right and on the first try is obviously the preferred way of doing things. With tele-assistance, it is hoped that it will be easier for a doctor to get a "second opinion" on their diagnosis of a patient. With greater access to help, more patients will be treated correctly, the first time. This leads to even more benefits, such as quicker average recovery time, less use of unneeded medicines, and reduced costs to patients and hospitals.

Self-help may increase with the online availability of so much medical information. Informed patients can result in less unneeded visits to the doctor, or patients better able to express symptoms to the doctor when they go. One problem in the medical field is people who do not know they have an illness or do not know whether to go to the doctor or how to treat it. A simple search of their symptoms with an online Telemedicine office, or a query to an online doctor can save embarrassment yet allow that person to get the information they need.

Telemedicine promises the day of individualised care guidelines for the ill and easier long-term monitoring of chronically ill patients.

Better reaching underserved areas, such as rural communities, is one of the most important promised benefits of the telemedical age. Programs have already been passed by Congress for the implementation of this aspect of Telemedicine.

Improvements in everyday medical research have already been seen. Searching a topic for clinical or educational purposes is amazingly simple and only requires a fraction of the time the same research used to take.

8.6 Issues Raised by the Use of Telemedicine

A number of issues is raised by the use of Tele-medicine in our world us we know it. The most important ones are among the following:

1.Confidentiality and security

• The confidentiality of medical records is the biggest barrier to the full realisation of tele-medicine.
• Instantaneous access, though extremely beneficial to the medical community, requires the institution of large medical record databases containing information about all patients cared for by a particular hospital, HMO, etc.
• Large databases of medical records, left unprotected, jeopardise the integrity of those records as confidential.

2.Dispersion of liability

• Use of tele-consultation, tele-assistance, and tele-medicine, in general, disperses liability for damage between many parties.
• The question of who is responsible when several parties are involved becomes an important one.
• Statutes for malpractice become muddled when jurisdictions are mixed.

3.Licensure and accreditation

• Tele-medicine creates conflicts between states, or countries, over the rules and regulations of accreditation and licensure.

4.Fraud

• Accuracy of information. Is the information people receive online correct?
• The source and currency of information must be considered.
• Fraud relates also to medical records, is their privacy being compromised?

5.Ethicality of tele-diagnosis

• As much help as tele-medicine may be, there is no substitute for being in the room with a patient.
• Too much reliance on remote diagnosis or assistance can result in inaccurate diagnosis and is therefore unethical.

8.7 Current experiences in Europe

The concept of Telemedicine is not novel. In historical terms the foundations for medical telematics were laid in Italy in 1935 with the creation of the International Radiomedical Centre in Rome. A number of pioneering Telemedicine programs were initiated in USA and Canada in the 1960s and 1970s, and medical images and other data are now transferred on-line between local health personnel and consultant physicians and other specialists in central health institutions all over the world.

Norway is seen as many as a leader in telemedicine, and started using telecommunication in remote diagnosis and expert advice as early as in 1922, providing medical advice via Bergen Radio to ships at sea. During the last 10 years, a number of large projects have been established in Norway, and a diversity of telemedical applications has been developed and evaluated on an experimental basis. During the last 5 years, several of these applications have been established on a routine basis within the health services of Norway. The emphasis in the early years was on what we might define as the "rural aspect", providing health services to rural areas with low coverage of medical professionals. The emphases in recent years have been on the "quality aspect", using Telemedicine in central-, as well as rural areas, to improve the quality and safety of medical diagnosis in general (e.g. second-opinion, special diagnosis, quality assurance, clinical conferences and remote teaching). Hence, there are significant experience to build upon and refer from, which constitutes an excellent basis for a case study.
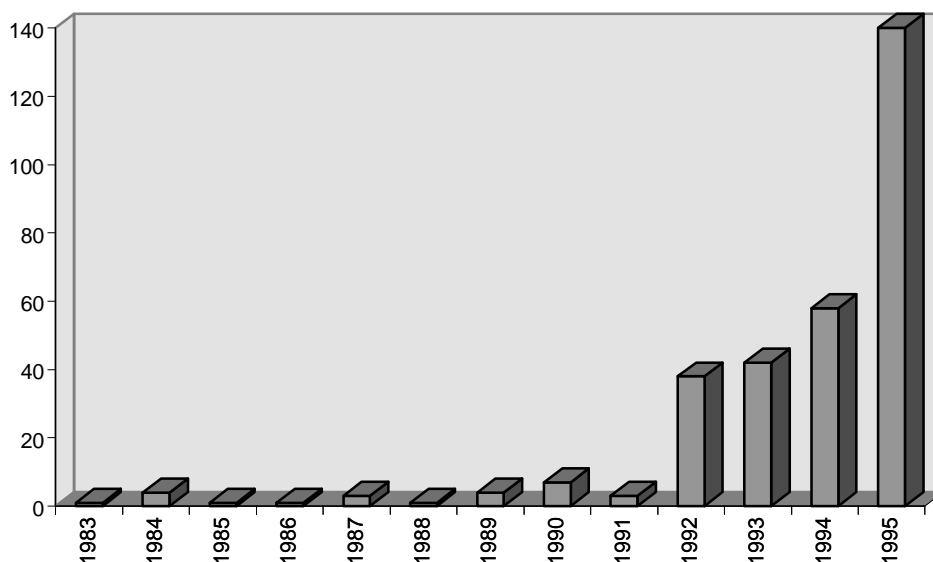
Figure 11 - The number of articles on Telemedicine indexed in Medline

Telemedicine is a fast growing field internationally as well. If one looks at the number of medical publications of new methods or applications in Telemedicine over the last decade or so (figure 1), it is evident that the number of involved hospitals and physicians are rapidly increasing.

There are already many hospitals, governmental institutions and companies operating on the international marked, offering routine diagnostics, as well as special diagnosis and expert advice in several fields of medicine. Many of these institutions and companies are operating in the U.S., such as:

■ Armed Forces Institute of Pathology (AFIP) in Washington, who offers tele-based consultations in pathology on a number of different platforms, and employing bandwidths from 28K to 1Mb/s.

■ WorldCare is a commercial company with basis in Harvard Medical School, offering diagnosis, so far mainly in the Middle East and within radiology, using regular telephone lines to receive still-images, and returning the diagnosis on fax within 48 hours.

■ The Mayo Clinic have its own satellite, which is used for communication between its own hospitals in U.S. and Mexico

■ PapNet, a company that receives routine cervical smears and returns images as well as the diagnosis electronically. Several systems for this kind of autoscreening of specimens are under development, and are mainly used as a quality assurance program for pathology laboratories. These types of services are not strictly telemedical to day, as most information is transported on electronic storage media through the mail. These services would undoubtedly benefit from an improved availability and pricing of broadband telecommunication services.

The need and demand for second opinions are increasing, and we expect to see several systems working between larger institutions all over the world. One example is the company Second Opinion Solution (SOS), which is a joint venture between the companies Telenor (Norway), Bull (France), Hamamatsu (Japan) and Fairfield (UK), who offers a system for digital telepathology, including teleconferencing, running under TCP/IP, using LAN, ISDN or Satellite, and testing bandwidths between 512Kbps and 8Mbps. Telenor has also launched IntraMed, a closed medical network based on satellite communication between hospital's world wide.

8.8 Geographic distribution and organisation

In most countries, the health services have a clear geographic and organisational structure, and telemedical communication must to a large extent be expected to follow this structure. It should be noted, however, that Telemedicine is also welcomed by many as "the way out" of the established organisation of health services, and one should therefore also expect Telemedicine to form new geographic and organisational lines within the health services. The telemedical communication structure may be grouped in the following 4 areas:

- international communication

- interregional communication

- intraregional communication.

- local communication

International and interregional communication will mainly be second-opinions and special diagnosis within different fields (such as pathology and radiology), whereas the larger parts of telemedical activities will probably, as to day, be carried out intra-regionally and locally.

On the national level, the health services are often organised in different health regions. The communication lines for interregional Telemedicine will to a large extent be the same as for normal telephony, since the regional centres are located in the main cities. The health services are divided into 5 health regions, and each region is "headed" by a major university hospital (Regional Hospital). Some of these hospitals have a

national responsibility within one or more medical areas, in addition to their regional responsibility for all diseases.

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┌─────────────────────────────────────┐
│           Regional hospital          │
└─────────────────────────────────────┘
                   ↑
┌─────────────────────────────────────┐
│            Central hospital          │
└─────────────────────────────────────┘
                   ↑
┌─────────────────────────────────┐
│           Local hospital         │
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         ↑                 ↑
         │     ┌───────────────────────┐
         │     │   Medical specialists  │
         │     └───────────────────────┘
         │         ↑             ↑
┌─────────────────────────────────────┐
│    Primary physicians (family doctors│
└─────────────────────────────────────┘
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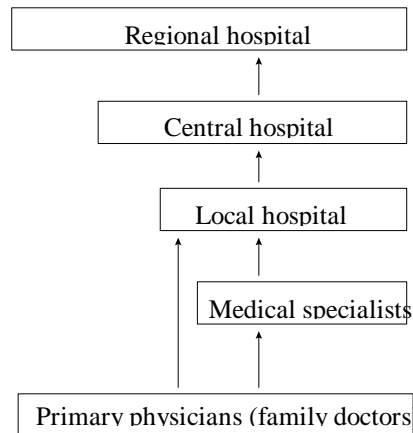
Figure 12: Referal of patients

The communication structure will partly be vertical (to some extent follow the hierarchy of case referrals shown in fig.2), and partly horizontal (e.g. between central hospitals). A typical example would be telepathology, where *frozen section service* (preoperative diagnosis) will be requested by local hospitals and given by the central hospital in the same county, whereas *second-opinions* in pathology will be bi-directional (and often horizontal) between hospitals with pathology departments (central hospitals), probably to a large extent within the region, but also between hospitals located in different regions (inter-regionally).

The geographic distribution of Telemedicine will of course follow physicians and hospitals, which are distributed according to population densities, at least in the western countries. Looking at health- region II in Norway as an example, this region contains almost half of the Norwegian population, and is composed of 7 counties, each with an average of 15 municipalities or urban districts. In addition to the regional university hospital, the region has a central hospital in each county. There are on an average 3 local hospitals in each county (1 of 5 municipalities), and each municipality or urban district has one or more medical centres, in addition to a number of medical specialists and primary physicians.

It is therefore highly likely that the geographic distribution and structural requirements of Telemedicine will follow that of regular telephony, with the only real difference being the bandwidth requirements and need for specialised equipment.

9. APPENDIX B : Copyright Reform - A discussion

9.1 Use Of Works

Some important questions which have been arisen during deliberations within the ATHINA project meetings were the following :

1. When do existing rights apply?
2. Does the nature of copyright protection have to be changed to address the use of works on the Information Society?

Economic Rights

- Reproduction

    A copyright owner has the exclusive right to produce or reproduce the work or any substantial part thereof in any material form whatever. Therefore, a work would be subject to the reproduction right where it is electronically reproduced. A fixed copy is considered to be reproduced when it is downloaded from a BBS or Web Server to a hard drive, disk or any other storage device. Further, it is debated that accessing a work constitutes a reproduction.

- Communication to the Public by Telecommunication

    A copyright owner has the exclusive right in the case of any literary, dramatic, musical or artistic work, to communicate the work to the public by telecommunication. The right to communicate to the public encompasses transmissions of signs, signals, writing, images or sounds or intelligence of any nature by wire, radio, visual, optical or other electromagnetic systems. In plain language, it covers the transmission of a work via cable, radio, satellite and telephone wires where such a transmission is made to the public.

    If a work is placed on a computer "bulletin board" or a "Web Server" , so that it is communicated to any member of the public that wants to dial in and read the work, then, in the view of the ATHINA Project, the exclusive right of the copyright owner of the work to communicate the work to the public would be infringed if this is done without permission.

- Publication of a Work

    Generally, the publication right refers to making copies of a work available to the public for the first time, but does not include the performance in public of a literary, dramatic, or musical work, the delivery of a public lecture, the communication of a work to the public by telecommunication, or the exhibition in public of any artistic work.

    It is the view of the ATHINA Project that electronic transmissions resulting in the making of copies available to the public constitute a publication.

- Browsing

Browsing, become commonplace with the emergence of Internet as a major information provision service. Should 'browsing' be permitted as a use of works in the Information Society?

The Information Society promises easier and broader access and reproduction of books, artwork, music, films, videos, live and recorded music and other works. Creators are concerned that despite the potential for easier access, their royalty share will stagnate. Users, in contrast, are concerned that each time they access a work, in whole or in substantial part, for the purposes of determining whether they would like to use it, they will be infringing copyright. Specifically at issue here is the right of

reproduction. Users are concerned that 'browsing' through a database may constitute a reproduction and entail costs that would not normally be associated with perusing reference works in a traditional library.

Within the current copyright framework, the issue is whether browsing entails the making of a copy and/or the communication of the work to the public. The ATHINA Project is of the view that browsing on the Information Society entails the making of a copy; in order to browse, the work must be accessed. It is the ATHINA Project's view that any act of accessing a work constitutes a reproduction, even if it is a temporary or ephemeral fixation. As such, browsing a work or a substantial portion of a work is subject to the right of reproduction. However, the issue should be discussed in more depth both within the project and outside it. ATHINA project is committed tio initiate such a disussion in the broadest extend possible.

9.2 Moral Rights

1. Given the ease of manipulation of works in a digital environment, what is the impact on moral rights, particularly the right of integrity? Should the right of integrity be made subject to a waiver?

   Once in a digital format, literary, dramatic, musical and artistic works can be easily manipulated or altered. For example, consider a photograph wherein each individual element can be re-coloured, removed, displaced or distorted without any visible trace that the photograph has been changed. In many cases, it is precisely the potential to alter, reproduce or otherwise review a work that makes the digital world so attractive. Will these activities be curtailed or unnecessarily limited by an excessive enforcement of the moral right of integrity? If so, should moral rights of creators be abolished? Conversely, will authors refrain from authorizing the reproduction of their works in a digital format for fear of allowing them to be so easily modified?

2. Can the moral rights of the author be adequately enforced on the Information Society?

   Because of the interactive nature of the digital medium, it will be extremely difficult for an author to be aware of modifications to a work. Those who make their works available will be at risk both in respect of their reputation and in respect of their economic interests. The ATHINA Project acknowledges the concern that, in a digital environment, it may be difficult to ensure the original of a work can be identified. The problem is one that is rooted in technology rather than in law. To assume that it will be impossible to monitor the use of works on the Information Society is incorrect; where there is an interest in using new technologies, a way of using it that is in the interests of most parties will likely be found. Encryption and other technical solutions for preserving the original of a work are becoming easier to use and more widely available to authors of a work in digital form. In any event, removing or altering the legal framework because technological development may prevent the enforcement of rights in practice, is pushing the issue in the wrong direction. Maintaining the system of rights that enables creators to control the use of their works should help ensure that a manageable system of enforcement will be developed. Therefore the legal framework governing copyright should ensure, rather than curtail, the development of systems to monitor the uses of copyright on the Information Society.

9.3 Government Copyright

1. Should the Government continue to claim copyright ownership for works disseminated on the Information Society or should works of the Government be put in the public domain?

   The use of, and access to, government information will increasingly become an issue as the Information Society is developed. Placing public information, such as basic health and welfare information, statistics and legal documents, in the public domain should be an essential principle. In this regard, the ATHINA Project is of the view that universal, equitable and affordable access to public information should be technology-neutral. In this broader context, the government should adopt a more flexible approach that recognizes its accountability in respect of the dissemination of

government information and provide the public with basic information it requires to make decisions about health, welfare and business.

Ensuring universal and easy access to public information on the Information Society does not, in the ATHINA Project's view, require the abolishment of Government copyright. A more flexible approach to public information and the recognition of the principles of accountability and affordable access can be balanced with recognition of the right of government to create information products for which revenue should be received. The copyright of the Government should be retained while concurrently the government should make a greater effort to place more government information in the public domain which requires neither prior permission nor payment. Government copyright should be retained in order to ensure that where necessary to justify costs, the government retains the ability to generate revenues. Greece's Information Society should be used to improve the public's access to government information and serve as a conduit for Greek citizens' use of government information sources to create an information-based economy.

9.4 Distribution Right

1. Are there any new rights that should be introduced with respect to the Information Society? For example, should there be an electronic distribution right to cover the transmission of digital works?

The Greek "Copyright Act" does not contain an electronic distribution right as such. The Act does give the copyright owner a right of first publication (making copies of a work available to the public) but that right is limited to the _first_ publication of the work. Further distributions of works are not within the control of the copyright owner, once the first publication of the work has been authorized.

9.5 Administration Enforcement

1. Creators of works in a digital medium are concerned about the unauthorized use of their works on the Information Society and feel that there are currently no effective means by which to ensure fair remuneration. What mechanisms (legislative, policy, technological) could be introduced to address the problem? How can the use of works be tracked for the purposes of remuneration?

Many creators are concerned that once a work is distributed in a digital format, its value and possibly its integrity will be decreased. From an economic perspective, creators fear that works stored and distributed in a digital format will be widely pirated, resulting in economic loss to the copyright owner.
These concerns stem from the ease of duplication of digital works and the ease with which various protection schemes can be sidestepped.

Interestingly, the concerns regarding protecting the commercial value of information mirror those faced during the previous decade with computer software. From both the practical and policy perspectives, there are lessons to be learned from the experiences in computer software as well as with the taped duplication of music and videos.

Technology Issues

Encryption: Currently, satellite broadcasters use encryption technologies to scramble signals to counter pirating. The technology works best in a point-to-point transmission and, if applied to a point-to-multipoint system, would require a complex two-key system and could involve significant administrative costs.

Fingerprinting: This technology involves incorporating identifiers for the unique differences between original copies. Police use this technique for tracking sensitive documents. In computer software, each copy incorporates a unique ID that must be known and accessed to activate the software. Although it

has proven to be the most effective means of enforcement in the computer software world, it would have limited applications on the Information Society.

Tagging: Tagging is the incorporation of a copyright notice or other message into the protected work to make it obvious that an illegal copy has been made and distributed. Examples include name and registration number inserted into a software program and notices inserted in televised movies or other programming fare. On the Information Society, tagging could involve a copyright notice scattered throughout the content. This approach may do little to dissuade unauthorised use or reproduction of works unless the fear of detection (as a result of legislative or administrative controls) is sufficiently strong.

Conversion/Anti-Copying: This involves the transformation of a digital work into an intermediary form so that the raw information or content cannot be edited or altered. The technology may impede unauthorised reproduction since the quality of the work diminishes with each successive copy.

Cheaper is Better: The concept is to make it less expensive to purchase the original work than to make a copy of the work. The approach requires high volume sales and would not be suitable for works that do not attract a wide audience.

Policy Issues

Deregulation/Laissez-faire approach: There is a growing trend toward market deregulation in the provision of products and services within the communications environment. The approach would continue this trend and allow the market to determine the quality and range of products and services to be offered. A serious disadvantage of the approach is the lack of controls for the promotion of Greek content and the danger of dividing consumers into 'haves and have-nots'. The approach may also have
a significant negative impact on smaller Greek companies.

Non-legislative Government Intervention: Government could use its diplomatic and policy muscle to get the industry players and its international trading partners to crack down on copyright violation. The approach requires a commercial rather than a cultural focus which has not been the Greek approach to date.

Codes and Standards: An industry-wide code or standard could be adopted to govern copyright. This is a traditional approach which is slow to adapt to technological change and the danger of adopting the lowest common denominator to ensure adoption by all parties is always prevalent.

Education: Building on the heightened public awareness about the issues surrounding the pirating of computer software, the approach may be one of the most effective means by which government could pursue a non-legislative agenda for enforcement of copyright on the Information Society. The approach would require the joint effort of government, industry players, the cultural industries and copyright collectives.

Legislation Issues

Civil Sanctions: Civil sanctions leaves copyright enforcement to an action for copyright infringement. To be effective in the new digital world, the application of civil sanctions requires technologies to track the distribution of copies and identify the copyright owner of the work.

Criminal Sanctions: Tougher penalties, including financial penalties, could be introduced for illegal copyright activities. Again, to be effective, it would require technologies to track copies and identify the copyright owner of the work.

Of all the techniques tried in respect of copyright enforcement for computer software programming, three appear to have been successful: 1) Criminal sanctions, supported by a combination of private and public sector prosecutions; 2) Identify new ways to present information

without releasing the underlying digital information, such as encryption; and 3) public education respecting illegal copyright activities and the resultant penalties.

2. Can the enforcement of rights impede or prevent reasonable access by users to protected works on the Information Society? Will copyright become an unreasonable burden? If so, in what circumstances?

The question implies that the principle of 'reasonable access' may at times be more important than the rights of copyright owners. Unfortunately, one of the consequences of attempts to protect intellectual property rights, including copyright, is the increasingly complicated level of access for users, even if they are willing to pay, and access to otherwise free works. Examples abound.

If the experience with the computer software industry is any indication, the Information Society may go through an initial trial stage in which various methods to protect copyright will be awkward or expensive. Eventually, the process of enforcing rights should become more streamlined, prices will be lowered, competition will increase and the copyright owner and user will settle on more efficient ways of protecting and using protected materials.

To suggest that copyright will become an 'unreasonable' burden implies that there is no alternative way of obtaining or generating information or of distributing information in a way that is acceptable to both creators and consumers. The Information Society promises to make information more accessible,
not less.

However, special attention should be paid to institutions which might possess unique or critical information for public consumption. One such example is the government's copyright in legislation and regulations, judicial and quasi-judicial orders and economic information. If the government were to use its role as public guardian to limit who has access to the information, it could be seen as imposing an unreasonable burden on the public who is governed by that legislation or who has a right to the information.

3. What are the administrative alternatives for the clearance of rights for the use of works on the Information Society, particularly in respect of multimedia works?

There are two problems in respect of the clearance of rights. Creators of multimedia works and other composite works have difficulty in identifying individual copyright owners in specific works or portion of works and frequently the transactional cost of clearing rights appears to be prohibitive. Secondly, many creators are reluctant or are refusing outright to grant permission to reproduce the work in a digital medium out of concern for the eventual unauthorized use or modification of the work.

One option may be to establish a rights identification centre where all rights holders could register their works, describe the nature of the available rights and provide a contract for licensing arrangements. Multimedia developers wishing to obtain the rights for a particular work or portion of a work would have a centralized system for locating a copyright holder and negotiating the appropriate rights clearances. Such a centre need not be restricted to clearing rights for use on the Information Society. To be truly effective, any such system would need to include _all_ rights applicable to the Information Society.

Another option would be establish an electronic or 'virtual' marketplace for clearance of rights and, ultimately, for arranging commercial licensing agreements. The marketplace forum could be as simple as an Internet service or as complex as a commercial database.

Systems devised to track the use of works on the Information Society, such as a 'tagging' scheme, could also be helpful for streamlining rights clearances. In this respect, any such system would benefit both creators and users.

The role of government should be to encourage but not to engage in the operation of systems to streamline rights clearance for users. The industry itself should be responsible for deciding on the best approach to the clearance of rights for the Information Society. However, as noted earlier, special legislative provisions to combat misrepresentation or fraud in the operation of these systems might be appropriate to encourage the development of such systems.

9.6 Public Education

1. Educating Greeks about copyright is essential for the development of Greece's Information Society. How can users and creators be better informed about the application of copyright in a digital world?

Greeks need to know more about all aspects of copyright and Intellectual Property Right. Copyright must be better understood as an integral component of the creative process and as a natural extension of responsible research and use of particular forms of expression. Individuals, whether in educational settings, business environments or at home with personal computers, must take responsibility for their use of copyright protected sources of information and other works. In addition, creators of digital works should take steps to better inform themselves about the copyright process and the rights and responsibilities of copyright owners.

The central government can lead by example by implementing model copyright user practices in all departments. By respecting the rights of others and ensuring that use of protected works is properly compensated, the central government can set the standard for users in both private and public sectors. As a copyright holder itself, the central government can show others how to exercise copyright in a responsible and reasonable manner by actively participating in copyright monitoring/reporting programs. Digital identification methods to encode and ensure the integrity of government works should become a routine part of the dissemination of government holdings in a digital environment.

The central government should consider a public education campaign to make available basic information on all aspects of copyright, including legislation, regulations and procedures, and rights clearance, in a variety of formats for users and creators. The central government can support and strengthen efforts to make copyright part of the educational and cultural industries. Copyright must become a concept that is understood and practised rather than an inconvenience or expense to be ignored.

Copyright is both an economic and a cultural issue and both perspectives should be recognized in any public education initiatives. As a business issue, copyright stimulates demand for digital products and increases employment in the creative and cultural industries. A practical model for the dissemination of information on copyright will help both creators and users treat copyright with the same level of importance as they would a change in tax laws or developing a new source of supply for a manufacturing process. Copyright monitoring and compliance on the Information Society should become one of the essential 'costs of doing business'.

Copyright's importance to Greece's cultural resources should also be recognized and reflected by ensuring that users and creators respect the rights of others as well as understanding how to exercise their own rights as creators of content for the Information Society.

9.7 International

1. In what ways should Greece harmonise its copyright regime in relation to international developments in respect of the Information Society?

International developments are still at a very preliminary stage as the EU member states, U.S., Japan and other countries wrestle with possible updates to their copyright legislation in light of information Society developments. In the absence of a clear international consensus on these measures, it is premature for Greece to consider "harmonisation" as an end in itself.

9.8 Copyright List Of Issues

The Project agreed that the fundamental questions to be posed in respect of copyright and the Information Societyare as follows:
1. What are the barriers encountered by creators in making protected works available in a digital environment?
2. What are the barriers to users in accessing such works on the Information Society? The issues to be addressed can be divided into three categories: Legislative, Policy, Administrative (Enforcement and Clearance).

The following specific issues have been identified by the ATHINA Project :

9.9 Categories Of Works

1. Are there categories of works that are communicated electronically that are _not_ subject to the current   "Copyright Act" and which will not be accessible on the Information Society due to a lack of protection?
2. Should works be defined separately or, for the purposes of being technology-neutral, should separate categories of works be eliminated? And if so, should this be done only in respect of digitized works on the Information Society?
3. Are multimedia works adequately covered by the legislation ? If multimedia works must be defined separately in the "Copyright Act," how should they be defined?

Ownership

1. Who owns what rights? Who controls them? (e.g. multimedia works, Government copyright) Should the Government continue to claim copyright ownership for works disseminated on the Information Society?

Moral Rights

1. Can the moral rights of the author/creator be enforced on the Information Society? If so, how?
2. Given the ease of manipulation of works in a digital environment, what is the impact on the right of integrity? Should it be made subject to a waiver?
3. Are there categories of works that should be covered by moral rights but exempt from economic rights?

Use Of Works

1. Does the nature of copyright protection have to be changed to address the _use_ of works on the Information Society? Are there any barriers that prevent or impede reasonable access to and use of protected works? Are there categories of works that will not be part of the Information Society due to an excessive level of protection?
2. Are there any activities or uses of works on the Information Society that are _not_ covered?
3. When should a use of a work be subject to copyright and when does use require a payment for services only?
4. How do existing rights apply? For example, does the electronic dissemination of a work to a user constitute a publication? When is a work electronically reproduced? When is it communicated to the public by telecommunication? When is it performed in public?

5. What activities, if any, would be subject to the rental right? Should the rental right be subject to criminal enforcement?
6. Are there any new rights that should be introduced with respect to the Information Society? For example, should there be an electronic distribution right to cover the transmission of digital works?

Exceptions

1. How should exceptions to copyright liability in terms of the Information Societybe addressed?
2. Since the U.S. is evaluating its 'fair use' provisions, should Greece also examine the notion of 'fair dealing' and its relevancy to digital works?
3. Should 'browsing' be permitted in the context of use of works on the Information Society? When would it be considered a Public Display? What forms of browsing should be allowed? What could be covered by the fair dealing provisions?

Administration

Enforcement:

1. Creators of works in a digital medium are concerned about the use, reproduction and manipulation of their works on the Information Society and feel that there are currently no effective means by which to ensure remuneration. What mechanisms (technological, policy, legislative) could be introduced to resolve the problem?
2. Are particular civil or criminal remedies needed (e.g. statutory damages) for the use of works in a digital environment? If so, what would be the scope of the remedies?
3. How can the use of works be tracked for the purposes of remuneration? How can the use of a portion of a work be defined for the purposes of compensation? Or should this constitute fair dealing?
4. Can the enforcement of rights impede or prevent reasonable access by users to protected works on the Information Society? Will copyright become an unreasonable burden? If so, in what circumstances?
   Clearance of Rights:
5. What are the administrative alternatives for the clearance of rights for use of works on the Information Society, particularly in respect of multimedia works? (e.g. collectives, copyright clearance centre with a voluntary registration system, compulsory license, contractual arrangements)
6. Should infringement apply only in the case of works that have some form of prevention mechanism (e.g. as is currently the case of encrypted satellite signals)?

International

1. How should Greek copyright be defined in relation to other models being developed in other countries? (e.g. U.S., Europe, Japan)

Harmonization of rights internationally: In what ways should Greece harmonize its copyright regime in relation to international developments in respect of the Information Society?

Public Education

1. How can users and creators be better informed on copyright liability and protection for the use of works on the Information Society?
2. Is there a role the government can play in influencing the direction and nature of digital works available on the Information Society?

10. APPENDIX C The Central Government

10.1 Current State

State bodies typically handle all incoming and outgoing mail by traditional means and process (registration books and multiple protocol levels) while possessing neither any specific infrastructure for electronic document exchange nor any electronic filing systems. The public administration sector makes minimal or no use of an electronic mailing system - the pilot electronic mailing system of the Greek government is the only exception to this situation. The frequency of both internally and externally processed documents is high with fluctuations due to external factors that affect specific public services (elections, contests, etc.). Documents ate mostly sent by mail, while for small distances a clerk may be used. Also, the use of Fax machines is widely spread in contrast to the use of Telex which remains minimal. The mean time required to handle a document (internally) is approximately two work days.

Statistical data regarding document exchange

The volume of exchanged documents on a yearly bases is more than 100.000 documents per ministry, while the mean number of pages per document is approximately three. This estimate does not take into account classified documents, documents exchange through the political offices of ministers, subministers and general secretaries several ministries or other services used different buildings all in proximity to one another which allows the creation of a closed network by leased lines or use of the public X-25 network of O.T.E. (Hellenic Telecommunication Company).

Use of computer for data storage.

Most ministries poses central systems with terminals that support access to databases that have been developed from informatics administrations in co-operation with various private enterprises. This applications concern manly the employee salaries and various aspects related to each ministries authority (administrative, financial, statistical application).

The needs of the Greek public administration for access to Greek databases is limited, although specific demands related to the object and the activities of each ministry's interest have been expressed (labour laws for the ministry of work, social insurance for the ministry of the social insurance, financial data for the ministry of finance etc.)

The use of electronic mail in the Greek ministries is limited and concerned mostly communications with [MEA](), commission administration, EUROSTAT and other public services in various member nations. The results of the pilot operation phase are encouraging is regard to the expansion of the use of electronic mail for communication between the various services of the Greek public administration.

In almost all ministries and local authorities the are is the need for protection of the exchanged information that regards personal civilian data or national security classified issues (ministry of foreign policy, ministry of health, ministry of finance etc.).

The vast majority of public enterprise does not use any electronic filing and documentation system. In only a few ministries and local authorities is used same kind of electronic filing system which is outdated an requires immediately replacement.

Electronic computer and network infrastructure

Most ministries posses large central systems (typically mainframes) for running applications and terminals for user access. Personal computers are bought to fill specific needs and are established at various administrations with no network access or use of common servers. With very few exemptions (KEPYO, ministry of agriculture), any existing local area network are of small size and

not fully exploited. Also, very few ministries poses a robust network were all P.C. and servers are directly connected. The most common case is the use of HellasPac network or analogue leased lines for the communication needs between specific administrations of the ministries and the corresponding administrations at local authorities. In this way it is possible for various district services to access the services of the central computer system of ministries for the needs of using specific applications (i.e. registration from ministry of transport & Communication). Finally, in the various local authorities there exist modems for dial-up communications between specific administrations (Ministry of Agriculture, Public Financial Service, Ministry of Transport, Ministry of National Education).

As far as the various commercial and office automation applications are concerned, installation at various scales has been performed, but without any planning and co-ordination of any kind. Furthermore, these installations have been based on the knowledge, expertise or economical potential of specific employees and not on decisions and strategies of the specific department's leadership. In a number of cases, commercial applications are known to have been installed without the required vendor licenses. Also, there is an evident lack of a common policy and co-ordination regarding the supply and installation of common software applications in different services, administrations and departments (i.e. the use of different word processors).

Future Evolution Of Current State

In specific ministries and local authorities there exist development plans for an integrated management information system with final scope the complete automation of services. In some cases, open contests regarding the implementation of such plans have been announced, while others are already ongoing projects.

The research concluded that the vast majority of public servants in Greece understands the importance of electronic mail systems and recognises the various offers of use of such a system in the Greek Public Sector.

10.2 Ministry Of National Economy

Overview

The Ministry of National Economy is organised in 26 departments. All personnel at the ministry produces documents of some kind. The document category which has both the largest volume and the highest frequency is common mail. Documents such as Internal Guidelines are produced less frequently, while other documents such as Laws and Presidential Commands are produced rather rarely.

It is estimated that the majority of incoming documents originates from the private sector, especially from partners of the Foreign Commerce department. However, all the remaining categories constitute high flow sources of incoming documents.

The frequency of outgoing documents varies depends on the Administration. For instance, the Financial Administration produces about 200 documents on a daily basis that are addressed to the European Union only.

Document Exchange

The dominant means of exchanging documents is the common mail system, which however does not perform faultlessly (delivery does not always occur!). The use of Fax is wide spread and is the next most popular method of exchanging documents. Clerks are employed mostly for documents addressed to the department of Public Investments (there are deliveries to the Bank of Greece almost daily), but only for small distances. The use of electronic mail systems is practically none. The use of courier services remains limited also.

All incoming documents are registered through a traditional registration system (protocol books for both incoming and outgoing documents) which deploys a registration protocol with four distinct registration levels!. The registration service only employees 14 individuals and is the one responsible for the mean delivery time of two days per document.

Statistical Data Of Document Exchange

The flow of documents is characterised by high periodicity with two evident peaks on July and December of each year. It is estimated that the total volume of incoming and outgoing documents ranges to 220.000 on a yearly basis with a mean number of pages per document equal to 3.

Main Databases

The Ministry of National Economy makes use of a number of databases, the most common of which are:

- Public Investment Program

- European Union Support Framework

- Private Investment Program

- Payroll

- Administrative

The department of financial expertise has expressed the need to connect to the OLIS database. Furthermore, the need for access to the Internet is common amongst all departments in the ministry.

Electronic Exchange Of Data

The ministry of National Economy is connected to 15 local authorities over X.25 leased lines for the needs of a monthly file transfer of files regarding the current state of the absorption of the European Union Support Framework funds. Overall, the needs of electronic exchange of information are high.

Electronic Mail Infrastructure

The department of Informatics of the ministry of National Economy is a member of a pilot project about electronic mail exchange with the MEA in Brussels but is not fully exploited. Also because of the General Secretary Of Interstate Financial Relations has been obligated to communicated with the E.U. in electronic mail form, it supports the implementation of electronic mail system in its department. The confidence on the security of the electronic mail system is low, however the confidential documents are exchanged through the current traditional mail system.

The use of filing systems is deployed without any specific guidelines of a central administrative authority. Only some individual efforts have been implemented, but the general idea is the traditional filing by the secretaries.

Computer And Network Equipment

The hardware equipment of the ministry is characterised by the use of a mini computer, some personal computers (not any of the newest technology i.e..486), many printers and a local network in the department of Informatics. The are also 2 leased X.25 lines that provide access to the HELLASPAC Network.

Software

The only organised software platform is on the mini computer system, which is used for the communication needs of 20 personal computers that are used as terminals for the applications that exist on the mini computer. The rest of the personal computers run typical office applications that may vary on instance.

Future Prospects

Without doubt, the wide spread use of electronic mail systems is expected to benefit the ministry in terms of both financial expenses (paper costs, mailing costs, etc.) and administration complexity (faster document dispatch and communication).

10.3 Ministry Of Foreign Policy

The main ministry consists of 7 General Administrations and 22 Departments. All personnel produces documents, as long as they are responsible for that. Most incoming documents concern communications with the Greek authorities abroad and briefings of local authorities on subjects that may be specific amongst Consulates.

The main volume of outgoing documents is about communication with the MEA. It is estimated that the total volume of documents towards the Public Services, constitutional bodies of the European Union and other bodies equals the volume of documents towards the MEA.

Document Exchange

The ministry dispatches all documents through the department of General Protocol, except for the case of classified correspondence which is handled by the Confidential Protocol department. Handling of outgoing documents is supported by means of special Lists of Outgoing Documents. The dispatching of simple documents is performed mainly through Fax machines or the traditional mail system, although in some cases, a clerk may used. All classified documents are handled through cryptofax and cryptotelex (which are based on NATO security standards).

Statistical Data Of Document Exchange

The flow of documents ranges high on a steady basis. It is estimated that the volume of incoming Fax documents is 1.000 pages per day, while outgoing Fax documents is about 5.000 pages per day. Incoming mail ranges at 900 documents per day, while outgoing mail is about 700 documents per day.

Main Databases

The Ministry of Foreign Policy makes use of a number of databases, the most common of which are:

- Incoming Documents (Online filing)

- Electronic Filing of Document Dispatch/Reception

- Electronic Protocol

- Reception of COREU Crypto

- E-mail for Political Administrations and Leadership

- Personnel Management

- Payroll

- Filing of Support Program Treasury Records

- Dispatch of Red Cards for Administrations abroad

- Incoming/Outgoing protocol

An obvious drawback to the information infrastructure described above is the existence and use dissimilar software and incompatible applications in areas such as text processing and document filing.

Electronic Exchange Of Data

The deployment of local area networks is wide spread with peer-to-peer connections and connections to servers as well. Data exchange as far as classified or top secrets documents are concerned is high (cryptofax, cryptotelex). Electronic data exchange with the ministry of public order takes palce over the Vision system. The technological infrastructure of the ministry is consider very high in regard to the rest public administration and suitable for the establishment of advanced electronic data exchange in between buildings and with external bodies. However, the needs for even more advanced electronic data exchange with both internal and external bodies remains high.

Electronic Mail Systems Infrastructure

The ministry has installed electronic mail systems in the Informatics and Justice And Internal Affairs departments. The Justice And Internal Affairs Department system is part of the pilot electronic mail dispatch system with the MEA in Brussels, which however is not fully exploited. The Justice Department is able of using an electronic mail system through the Ingres system of the Electronic Filing Department, which however is not correctly used, also. The ministry has performed visits to the corresponding departments in the ministries of France and Germany in order to evaluate more modern work standards and systems. The sense of security in the document exchange process is high. All classified documents are dispatched through the Department of Confidential Protocol.

An obvious drawback to the information infrastructure described above is the existence and use dissimilar software and incompatible applications in areas such as text processing and document filing.

Computer And Network Equipment

The hardware equipment of the ministry is characterised by the use of personal computers, most of which are 486-based. There are two Novell local area networks, SUN Microsystems UNIX systems, a RISC system and a UPS facility. The are also leased X.25 lines that provide access to the HELLASPAC Network.

Software

There are a number of applications, such as databases (DB2, INGRES, etc), development applications (Visual C++, Visual Basic, etc) and various applications document filing, electronic mail, personnel management, payroll and various office tasks.

Future Prospects

There are a number of open contests regarding the supply of both hardware and software in progress. Without doubt, the wide spread use of electronic mail systems is expected to benefit the ministry in terms of both financial expenses (paper costs, mailing costs, etc.) and administration complexity (faster document dispatch and communication) while preserving the same level of security.

10.4 Ministry Of Internal Affairs, Public Administration And Decentralisation

The main ministry consists of 6 General Administrations. The most common kind of documents is the typical mail, followed by various documents. The production of the Booklet of the Greek Government is smaller in both volume and frequency than the two document categories mentioned above.

The flow of documents ranges depending on the current political facts (oncoming elections, government reformations, urgent political events, etc). The communication with the various bodies of the European Union is minimal. Practically, there is no communication (or the need for one) with MEA in Brussels. The category of outgoing documents with the highest volume is about dispatches of the Booklet of the Greek Government to various bodies throughout the Greek district.

Document Exchange Means

The majority of exchanged documents is handled through the classical mail system. The use of clerks for document dispatches within the region of Athens is high. The use of Fax machines ranges next in deployment scale, while there is no use of electronic mail systems.

The dispatching of documents takes place through a registration system with two distinct registration levels. Most documents are handled in electronic form (about 130.000 publications per year compared to the 10.000 publications produced through the traditional registration system).

Statistical Data Of Document Exchange

The flow of documents is characterised by high periodicity with an evident peaks between May and July (due to budget depositions) and another one at the end of the year. It is estimated that the volume of incoming and outgoing documents ranges to 100 pages per day, with peaks of up to 1.000 pages per day.

Main Databases

The Ministry of Foreign Policy makes use of a number of databases, the most common of which are:

- Booklet of the Greek Government

- Financial Services, Payroll

- Administration Services

The department of Informatics has 15 employees.

Electronic Exchange Of Data

There is no automatic electronic exchange of data. The National Printing Office requests direct access to the database of the Greek Parliament to provide an improved service of dispatching, formatting, printing and publicing of the Booklet of the Greek Government. So the needs for even electronic data exchange is high. Any existent local area networks serve specific functional needs of the National Printing Office.

Electronic Mail Systems Infrastructure

There is no electronic mail system in place. The issue of security exists throughout the document formatting process, from draft editing to final printing. Therefore, the need for security throughout the document handling process is very high. There exists an electronic filing system about previous publications of the Booklet of the Greek Government.

Computer And Network Equipment

There is a central UNIX system from Digital Corporation, several personal computers and printers, and a UPS facility. There is a local area network for the DTP and informatics departments, but no digital phone center.

Software

There is a central database management system (Oracle 6.00) on the central UNIX system. There is a co-ordinated electronic filing process as far as the publications of the Booklet of the Greek Government are concerned, which is also capable of providing information to the public upon request. Besides the DTP department, all other applications (Payroll, Administration) are not based on modern technology.

Future Prospects

There are no immediate plans for the supply of hardware or software or upgrade of the existing infrastructure. There is also no evident trend for modification of the administration process in the near future, although the benefits from the use of electronic mail systems are considered of high importance.

10.5 General Secretor Of Industry Ministry Of Development.

The General Secretor of Industry is one of the 3 general secretors of the ministry of development and is composed of two independent administration (personnel, financial), two individual offices, two committees, and two general administrations that co-ordinate the work of 14 sud-ordinate administrations.

The main volume of produced documents concerns open contest matrices. The General Secretor of Industry works mostly with private entrepreneurs, other ministries and local authorities and the MEA and rest bodies of the European Committee. The General Secretor of Industry is part of the pilot program of electronic mail system in the Greek public administration. It is estimated that MEA sends to the department of international relationships of the General Secretor of Industry 50 electronic mail documents per day, which concerns technical plans and regulations of other member nations.

The is also constant communication of the General Secretor of Industry with other ministries, the Greek parliament and other bodies through Fax. It is estimated that the General Secretor of Industry receives 50 incoming documents per day and dispatches 150 documents of huge volume daily.

At the General Secretor of Industry a large of internal notes dispatched daily though the document process.

Computer And Network Equipment, Software, Future Prospects

At the General Secretor of Industry the is an ICL DRS server and 70 terminals as well as 9 DataMicro with windows applications. Applications include word-processing, spread sheets , standalone and client server databases.

The General Secretor of Industry has installed a touch-screen on-line system for civilian briefing purposes, a web server for the same purpose and plans to gain access to the database of the Greek Technical Chamber.

Ongoing projects include the supply of personal computer with integrated fax and modem, the installation of a new hub-based network, the direct connection to OOSA the Organisation for Economical Planning and Development through leased lines and the connection to the sub-ordinate administrations at various local authorities through the HellasPac network or through lesased lines also.

10.6 Ministry Of Finance

The ministry consists of the General Administration, the center of informatics, the general accounting office, the fiscal departments and customs.

The ministry receives documents from others ministries, private or public bodies and others bodies in site Greece or abroad. The destination for document produced at the ministry are other ministries and public services as well as private and public bodies (embassies, consulates and various bodies of the European Union).

Document Exchange Means

The majority of exchanged documents is handled through the classical mail system. The use of clerks for document dispatches within the region of Athens is high. The use of Fax and telex machines ranges next in deployment scale, while there is no use of electronic mail systems.

Statistical Data Of Document Exchange

The General Accounting Office handles about 500 outgoing documents daily with the mean number of pages equal to 4 and 1.400 incoming documents daily with the mean number of pages equal to 2. Also, within the General Accounting Office there are 2.000 document exchanged daily.

Computer And Network Equipment

There is a double central system (Mainframe) which is mostly use for V.A.T. and Treasury purposes and various mini systems. At 138 fiscal departments the are local area networks that communicate to the central system over dial-up and a HellasCom line.

The is a network connecting 29 customs throughout the country which makes use of X.25 access points.

The center of Informatics communicates with <u>MEA</u> at Brussels for collecting information about V.A.T. trough a national server.

Software

There are custom applications which perform the following tasks related to taxes, communicated with customs and fiscal departments, pensions, payrolls, the V.A.T. and national budget mangement.

Future Prospects

The ongoing TAXIS project will cover the needs of 316 fiscal departments and is expected to benefit the functionality of the ministry.

Outcome Of The Use Of Electronic Mail Systems

Without doubt, the future use of electronic mail systems is expected to benefit the ministry in terms of both financial expenses (paper costs, mailing costs, personnel costs, mail costs, etc.), administration complexity (faster document dispatch and communication), and performance of the document handling cycle.

11. APPENDIX D : IT Penetration in Piraeus Industry & Commerce

This chapter illustrates IT usage in Piraeus commercial and industrial enterprises.

The City of Piraeus is a quite distinct case within the Attica Region, due to the important role the shipping industry is playing. However the other activities, represent a more or less a typical case of IT penetration. Albeit one can observe some fluctuations in figures of ITC usage (e.g. the North of Attica Basin , having a substantial concentration of large corporations has a considerably higher penetration ratio), Piraeus, without shipping, is a typical example.

An extensive survey has been conducted in the secondary sector of the Piraeus economy, during the years 1993-94, by ANDIP S.A., under the auspices of the STRIDE Program of the EU. The study was based an detailed questionnaires submitted to enterprises, covering the broadest possible spectrum of the Piraeus industries.

Although the data are now slightly out of the date, the general trend of the Piraeus industrial sector, give a fairly firm feeling that they are still giving an accurate picture.

a. *Classification scheme and rating method*

The questionnaire which was employed for the purposes of the survey covered a broad spectrum of issues, ranging from usage of simple office automation and communication equipment, to issues of usage of complex software tools and methods (e.g. CAD/CAM systems, production control facilities etc.) as well as issues of communication and telematic service. In addition the survey recorded the intention or the commitment of businesses, to upgrade and extend their IT infrastructures. Each response was "weighted" with rating factors, in order to have quantitative results.

b. *Results overview*

Overall, the Piraeus industries, do not have a high technology base, an observation which is amplified by the general image of the enterprises. Furthermore and given the fact that the sample was somehow stranger in the large corporations section, it became evident that the Piraeus industry base is not sufficiently equipped for taking advantage of the Information Society "as it is".

More specifically, and given the rating method described earlier :

- 44% of the industrial enterprises questioned have a relatively low technology base.
- About half (53%) have an average IT technology base, however they do not employ the recent technology - based methods.
- Only 5% of the industrial sector , employ high level (or even state-of-the-art) technology, i.e. basically the most recent with regards international standards and development.

With regards the size of the enterprises, there are a number of interesting observations :

- Half the small or very small enterprises (i.e. having up to 9 employees) are employing relatively low level technology
- About 3/5 (58%) of medium enterprises have an average level IT infrastructure
- Larger industries, a considerable extend, (3/10) have high level IT infrastructure, while most of the rest (7/10) have been rated as average.

With regards the industry sector, we have significant differences.

High technology companies are scattered across most industrial sectors. Concentration of low technology industries are found in the textile and clothing industries while, in general, other sectors are using more often (on the average), more advanced technology.

Office Automation in the Commercial Sector

With regards commerce, the survey was focused mostly on office automation, as an indicator of the IT penetration into the region's business.

It was derived that :

- Almost 9/10 (88%) of the region's commercial business are using some sort of modern office automation facility even at elementary level. These facilities are facsimile devices for computers
- A substantial number of commercial enterprises have a considerable IT infrastructure, mainframe computers (12%) or workstations (29%).
- 19% of the enterprises have other types of computers while a 14% have some other electronic equipment.

Medium to large enterprises have in their entirety office automation facilities while in small ones, this percentage is 80%.

Per sector, the lowest level of technically equipped enterprises is at the retail sector (76%) while at the other sectors this percentage is close to 100%. Fully equipped are about 20% of the company operating in the wholesale business and almost 65% the retail business.

Research Personnel

Overall, only 13% of the industrial enterprises have permanent research personnel. This percentage is larger in big companies (30%) while only 11% in SMEs.

Almost all companies in the tobacco sector employ permanently research personnel. Considerable percentage are in the food sector (22%) printing and publishing sectors (33%) machinery (23%), electrical engineering (43%) and construction (20%). In these sectors on the average, 27% of the companies have permanent research personnel.

With regards the job description of the research personnel, the norm is that they are working towards new production methods for organisation and quality improvements. Only in few cases, we have new product development.

Co-operation with Research Institutes and Participation in Innovation Programmes

Only few industrial companies have co-operation within the context of innovation programmes. More specifically :

- 12% of the industrial enterprises have co-operation with Technology - Institutes, Universities or other Research Centres
- 18% of the companies have been funded at least once by the European Union, through some innovation programme
- 13% of the industrial companies have participated in national research or innovation projects

These percentages are differentiated with relevance to the size of the enterprise. Thus :

- Small companies are conducting research to levels ranging between 8-11%
- Medium size companies : 12 - 20 %

- Large companies : 30% (with regards co-operation with Research centres) and almost 60% (participation to EU or nationally funded programmes)

Per sector, co-operation with Universities or research centres at levels beyond 10% the following sectors :

- Food
- Printing/Publishing
- Rubbery and plastics
- Chemical industries
- Electrical engineering
- Construction

Equally, participation in funded programmes by the EU or the state. at levels beyond 10%, have the following sectors :

- Food
- Tobacco
- Textiles
- Paper mills
- Rubbery and plastics
- Oil and coal products
- Metal processing
- Electrical engineering
- Construction
- Printing /publishing

Intention for participation in the future in such programme have shown more than 30% of the industrial enterprises questioned.

Per sector, these units represent the entirety (100%) of the tobacco sector, 50% of the textile and publishing industries and almost 67% of the paper sector.

On the average more than 50% of large companies have the commitment to participate in these initiatives. SMEs have much less willingness to participate, due to variety of reasons.

Innovation and research programmes are mainly in the domains of infrastructure upgrade and IT introduction in the production process.

Commercial Companies

Only 5% of the commercial companies participate in nationally funded programmes (mainly by the Industrial Development Bank and the Manpower Organisation) and they belong usually in various sectors of the wholesale and retail business.

Personnel Training

In 27% of the industrial companies, employees participates in training seminars. These seminars are targeting mostly administrative personnel and in some cases, specialised blue collar workers.

High levels of participation exists in the textile, metal processing electrical engineering, construction, food, publishing and oil and coal sectors (50-56%).

Almost 80% of the big industrial companies are conducting personnel training programmes.

About the same level (27%), in the percentage of commercial companies are conducting similar training seminars (mostly concerning marketing and sales and computers).

The biggest percentage (40%) as in the retail sector while at big companies this figure is about 75%.

Organisation Issues

Only 7% of the industrial enterprises is using advanced data collection and processing systems (for costing , production control, ordering and invoicing as well as CAD/CAM systems). However only 2%have a totally interested data processing system.

About 31% of the industrial companies have recently changed their organisational structures.

- 51% of the total, is for the introduction of MIS systems
- 44% for production rationalisation purposes
- 20% for legal issues

These changes are mostly in the food, chemical, metal processing, electrical engineering, transport, and construction sectors.

Advanced data collection and processing systems are used by 9% of the commercial companies. Again, only 2% of the total, have fully integrated information systems. Normally, they use computer software for sales statistics, order statistics, market analysis, accounting and payroll.

33% of the commercial enterprises have recently changed their organisation.
- 46% for introduction of MIS systems
- 7% for legal issues
- 14%, due to recruitment of new personnel
39%, for other reasons

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