Deliverable 1.1 ICT Infrastructure Assessment Report

Project Number: IST-2000-28403

Project Title: Electronic Commerce Leveraging Network for Developing European Regions (e-Minder)

Deliverable Type: (PU/LI/RP)*: LI

Deliverable Number: D1.1

Contractual Date of Delivery: 28/02/2002

Actual Date of Delivery: Created on 6/3/2002 9:50 AM

Title of Deliverable: ICT Infrastructure Assessment Report

Work-Package contributing to the Deliverable: WP1 Initiation Phase

Version: v01

File-name: 220306_V08_CY_ICT_Rprt.doc

Nature of the Deliverable: (PR/RE/SP/TO/OT):** RE

Responsible Partner: VIT

Contributors: All partners

Abstract:

This document is a report containing information pertaining to the Information and Communications Technologies (ICT) Infrastructure level within the three regions involved in the e-Minder project Cyprus, Galicia and Pomerania. It presents the current ICT penetration situation and it makes recommendations for the future.

Keyword List: ICT, e-Commerce, SME

***Type: PU-public, LI-limited, RP-restricted**

****Nature: PR-Prototype, RE-Report, SP-Specification, TO-Tool, OT-Other**

Table of Contents

1 ICT Infrastructure Assessment Report Introduction

1.1 Introduction

This document is a report assessing the Information and Communication Technologies (ICT) infrastructure penetration in the regions of Galicia, Cyprus and Pomerania. These three regions jointly comprise a consortium involved in a European Union project called e-Minder. E-Minder's main objective is to minimize the existing gap between the most and the least developed European Union regions as far as the use and development of e-Commerce is concerned.

This report provides an assessment of the existence and usage of Information and Communication Technologies (ICT) within society as well as within the Small-Medium Enterprises (SMEs) sector of each one of the three regions. The information used for this assessment is a combination of results of surveys that measure the ICT penetration together with other readily available information on ICT obtained from a number of sources, which are mentioned in the report.

1.2 Objectives

The objectives of this report are:

- To measure current penetration (existence and usage) of telephony, computers, and the Internet.
- To measure ICT penetration within the citizens, the SMEs, the education and public administration sectors.
- To define metrics for ICT penetration assessment.
- To define metrics for comparison of local ICT penetration with that of advanced European regions.
- To use the report as a future comparison reference.

1.3 Definitions

In this subsection the terminology and concepts used in the document are defined.

1.3.1 ICT

The Organization for Economic Co-operation and Development in 1998 defined ICT as:

- The goods that:
    - are intended to fulfil the function of information processing and communication including transmission and display, or
    - use electronic processing to detect, measure and/or record physical phenomena or to control a physical process.
- The services that:
    - are intended to enable the function of information processing and communication by electronic means.

[*Source: OECD (1998), DSTI/ICCP/AH/M(98)1/REV1*]

1.4 Research and Methodology

The two major methods that were used in accumulating the information necessary to assess the ICT penetration in the three regions are surveys/questionnaires and existing published data on current penetration. As mentioned earlier, the results presented in the report are a combination of both the survey results and the other ICT available information.

Throughout the document when data is presented in the text or used in a table the source from which the data was obtained is cited at each instance. When the data presented was taken from a web site, the source where the data was gathered from and the date of the remote access are given.

CYPRUS

In Cyprus a number of surveys were contacted in urban and sub-urban areas as follows:

- Citizen survey to obtain information on PC ownership and usage as well as Internet subscription and usage. Sample included 1510 people from 16 to 65 years of age residing in urban areas;
- SME survey to obtain information on PC/Server/Networking/Internet/e-mail/Software availability, type of usage, percentage of usage, plans for expansion. Sample included 300 companies in urban and suburban areas;
- Questionnaires given to Private educational institutions both at the primary and secondary levels. The questionnaires aimed to obtain information on PC/ Server/ Networking

/Internet /e-mail /Software availability, type of usage, percentage of usage and plans for expansion;

- Questionnaire given to the Department of Information Technology Services of the Government of Cyprus.

Additional publicised information on ICT availability, usage and strategy were obtained from the following sources:

- Cyprus Telecommunication Authority
- Department of Statistics of the Government of Cyprus
- Ministry of Education of the Government of Cyprus
- Other published surveys on ICT penetration conducted between October 2001 and January 2002

GALICIA

The data presented in this document about Galicia ICT penetration were gathered from different sources via direct contact (trough telephone, e-mail or surface-mail), published public reports and books or web sites. These sources are:

- National and regional governments: Comisión del Mercado de las Telecomunicaciones (Spanish Telecommunication Authority), Xunta de Galicia (Regional Government of Galicia, mainly the Ministry of Universities and Education, Ministry of Presidency) , Ministerio de Ciencia y Tecnología (Ministry of Science and Technology of Spain), Centro de Investigaciones Sociológicas (Centre for sociological researches);
- Non-profit observatories and organizations: ObservatorioTic (http://www.observatoriotic.org), AIMC (http://www.aimc.es);
- Directly from corporations: La Caixa, Mundo-R, Telefónica, etc;
- Other EU Projects: Sensitic;
- International companies or organizations: NUA, EITO, Eurostat, etc.

POMERANIA

Most data from the Pomeranian Region was collected and tabulated for the e-MINDER project in co-operation with specialists from non-profit organisations acting in the Pomeranian Region. These organisations are the Institute for Private Enterprise and Democracy as well The Gdansk Institute for Market Economics.

Additional information was obtained from:

- National and Gdansk Regional Statistics Offices

- Ministry of Economy, State Committee for Scientific Research, Ministry for Communication, Office of Telecommunications Regulation (URT),
- main communication services: Polish Telecommunication(Telekomunikacja Polska S.A.),
- other monitoring initiatives: Demoskop, OBOP/Taylor, ID BRE Bank, US Embassy, Net Track, Global eMarketing, AE Kraków .

A survey of small and medium companies was conducted by applying the representative method. The companies were selected from an Internet tele-address directory by choosing companies which listed their website and e-mail address in the directory and which represented industry sectors with the probability of high active usage of the Internet among SMEs.

1.5 Report Highlights

Through the various data gathered for the purposes of this report from the regions of Cyprus, Galicia and Pomerania, a number of results stand out. All three countries have adequate ICT infrastructure, but the numbers for usage vary among them. Cyprus has a 51% PC ownership among citizens, with Galicia following at 35% and Pomerania at 20%. The Internet Access among citizens is 41% for Cyprus, 19% for Pomerania and 14.5% for Galicia.

Personal Computer (PC) ownership results among SMEs (SMEs with at least one PC) also vary among the three regions. Cyprus and Galicia have a very high rate of 99% and 95% respectively, with Pomerania following at 42%. Internet Access among SMEs is also very high for Cyprus and Galicia with 92% and 70% respectively while the Pomerania results show a much lower penetration at 9%.

Many more results and indicators are presented in the sections that follow for a detailed analysis of the ICT penetration among the three partner regions of the e-MINDER project.

2 ICT And The Citizen

CYPRUS

2.1 Telephony

In Cyprus the telecommunications infrastructure industry is regulated by the Government and there is only one entity, the Cyprus Telecommunications Authority (CYTA). In other words there is only one provider for both fixed and mobile telephony.

The number of telephone subscriptions for personal usage as of December 2001 is 436,197, which corresponds to 64 lines per 100 inhabitants. Between the years 1994-2000 the telephone subscriptions were growing at a rate of 5%. In 2001 the subscriptions were reducing at a rate of 8% because of the higher demand for ISDN lines. Mobile telephony has experienced a rapid growth during the past year. Mobile subscribers have been increasing at a rate of 17%, in the year 2001. At the time that the study was made (November 2001) there were 304,400 mobile telephony subscribers, which corresponds to 44 lines per 100 inhabitants and it is projected that at the end of the year 2001 the subscribers will reach 310,000. [*Source CYTA*]

2.2 PC Ownership

Fifty-one percent (51%) of the population of Cyprus owns a personal computer (PC):

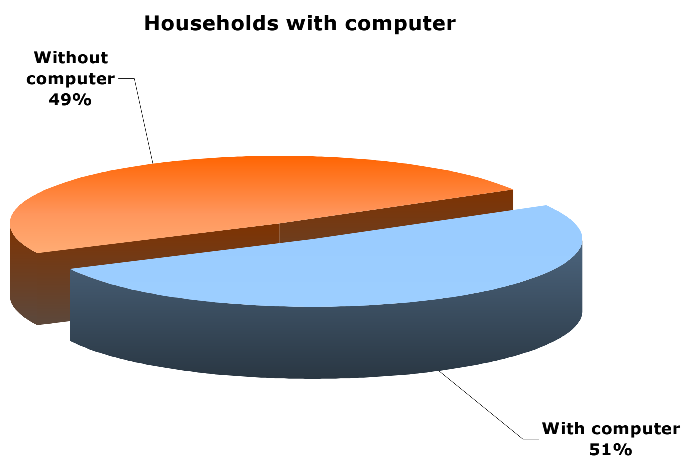

Figure 1: Cyprus - PC penetration at home – there were 51 PCs per 100 households in Cyprus

Source: Cyprus Socio-economic Survey

The list of reasons of non PC ownership is shown in the following graph:

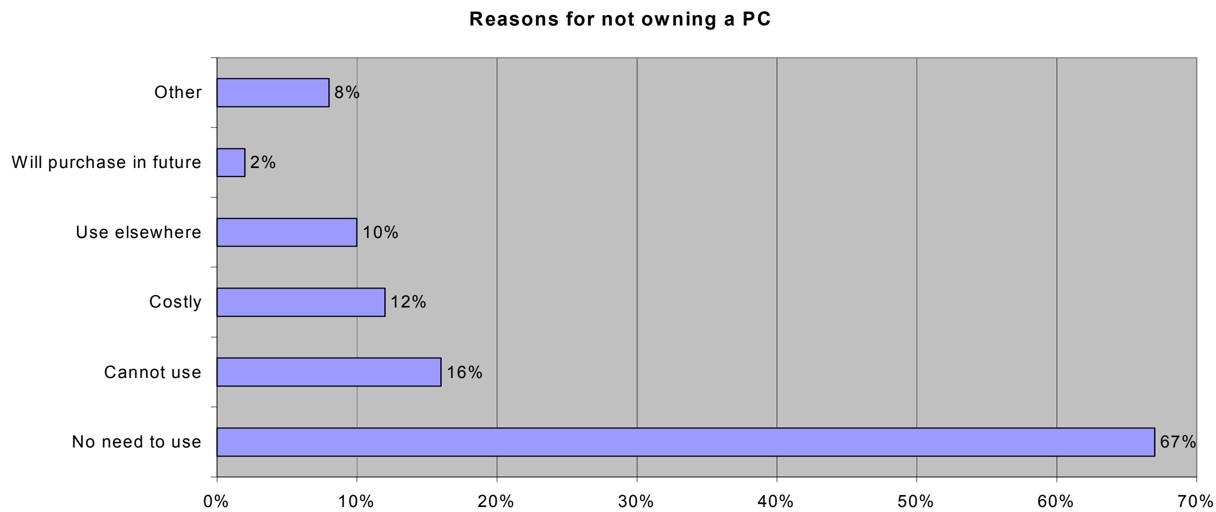

Figure 2: Cyprus - Reasons for not owning PC at home

Source: Cyprus Socio-economic Survey

A better understanding of the PC usage can be obtained through a demographic analysis of the results given in the graphs that follow.

PC ownership within the various income groups is given in the next graph. The income groups are defined as follows:

- A-B: Higher social class. Includes free-lancers and entrepreneurs with university degree with post-graduate diplomas or more than three employees (or ten if the don't have university degree) or with five-years work experience. Also university professors, managing directors in public or private sector, and high-ranked army personnel are included in this income group.
- C1: Entrepreneurs that don't fall under A-B, teachers, employees with university degree, lower-ranked army personnel, accounting & insurance clerks, etc.
- C2: Mainly people with higher-secondary education only (Lyceum – Ages 15-18).
- DE: People with junior-high education (Gymnasium – Ages 12-14) only and unemployed.

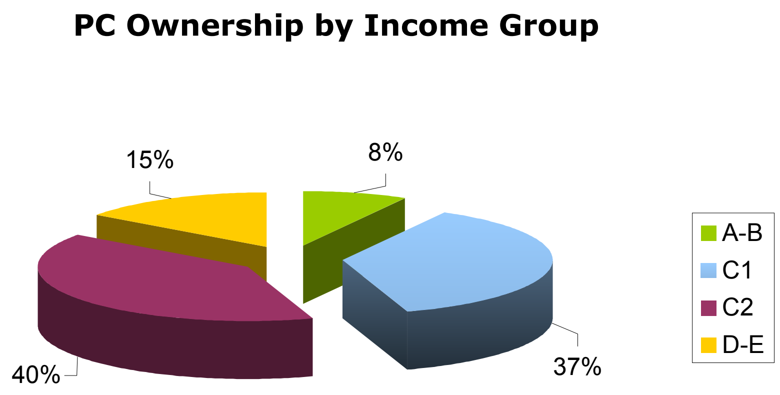

Figure 3: Cyprus - PC penetration by Income Group

Source: Cyprus Socio-economic Survey

The percentage of PC ownership broken down by age groups is given below:

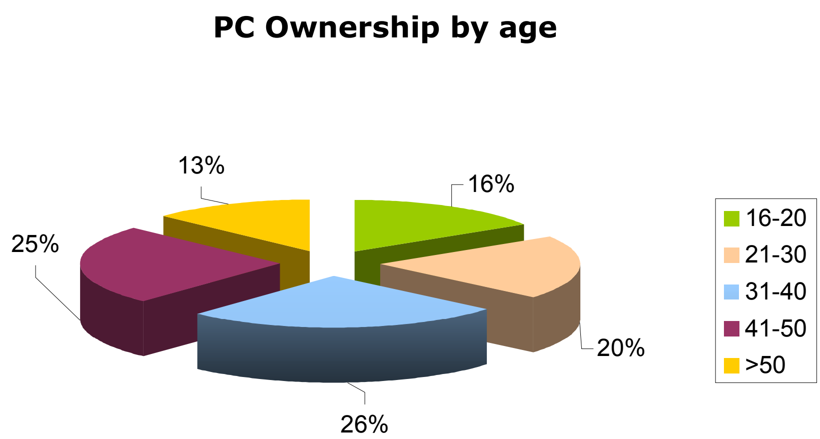

Figure 4: Cyprus - PC penetration at home: by Age

Source: Cyprus Socio-economic Survey

The following graph shows the PC ownership among males and females

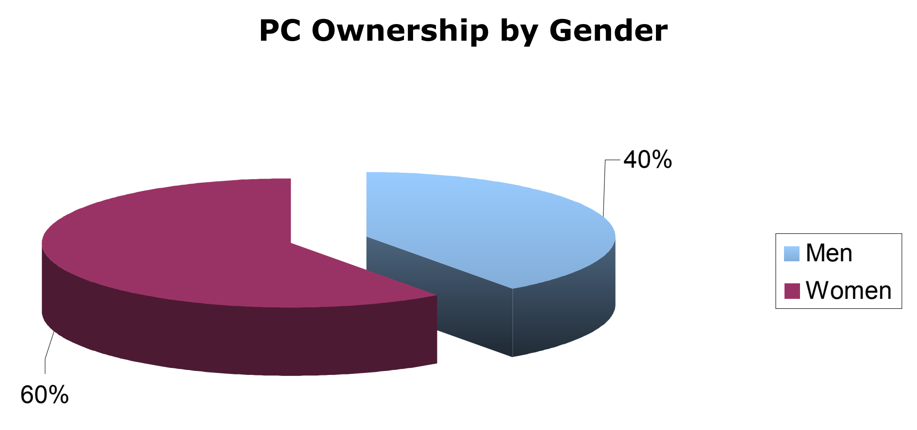

Figure 5: Cyprus - PC penetration at home: by Gender

Source: Cyprus Socio-economic Survey

Finally PC ownership by occupation categories can be observed as follows:

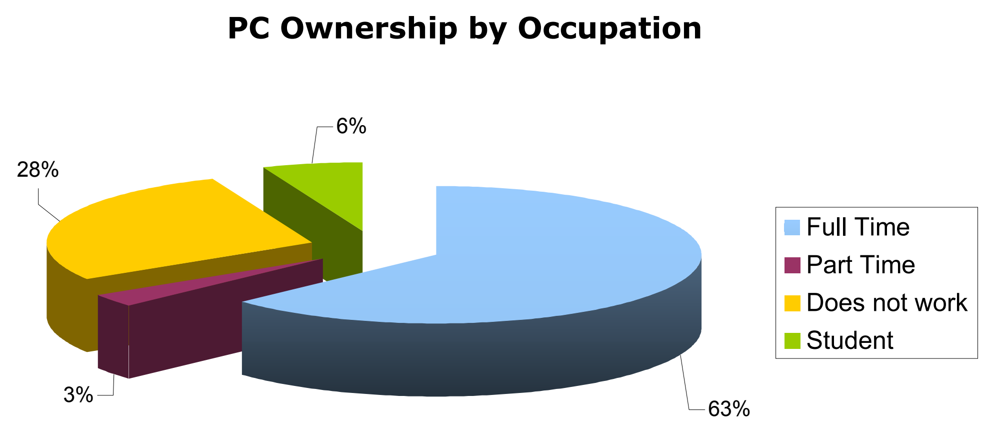

Figure 6: Cyprus - PC Penetration by Occupation

Source: Cyprus Socio-economic Survey

2.3 Internet Access And Usage

2.3.1 Internet Penetration

Thirteen percent of Cypriots are not familiar with the term Internet. Like in the case of PC ownership, this percentage is significantly higher among people elder than 50 years of age and people of the lowest socio-economic category. The main reason for not having Internet access is inability to use it. Eighty-seven percent (87%) of Cypriots (2 out of 5) know what the Internet is. That percentage is comprised of 41% of those who have access to the Internet and 46% of those who don't. From the 41% who have access to the Internet 30% have access from home (3 out of 10), and 11% from other places. The highest percentage of Internet access from home comes from people aged between 16 and 20 years, people from Nicosia and from higher socio-economic groups. Cypriots with Internet access, spend on average 7.5 hours per week on the Internet. Younger users (16-20) spend on average 10 hours per week. A separate study focused on rural areas only and including people from 18 to 78 years of age, showed that Internet access in those areas is 12%. This is consistent with the findings of the Cyprus Socio-Economic Survey conducted for the purposes of this project since the population of rural areas is primarily of older age and of lower socio-economic groups.

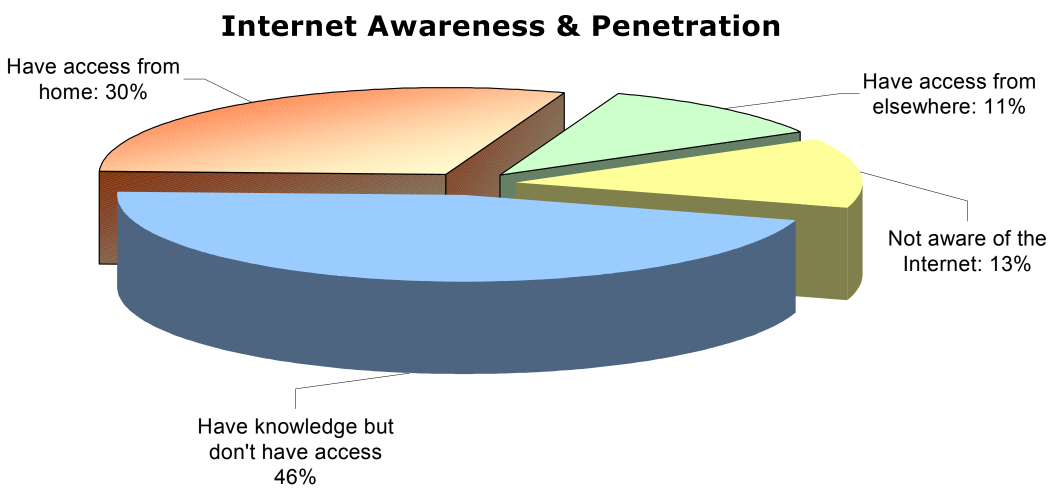

Figure 7: Cyprus - Internet Awareness & Penetration: February 2002

Source: Cyprus Socio-economic Survey

The percentage of those that is familiar with the term *Internet* but do not have Internet access is broken down by reasons for not having access, as follows:

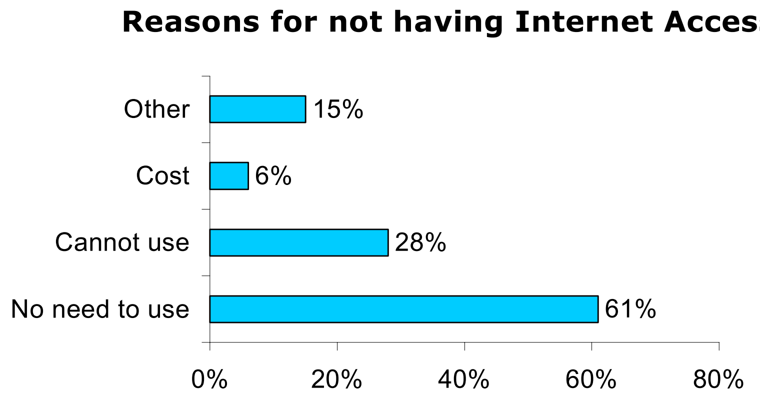

Figure 8: Cyprus - Reasons for not having Internet access

Source: Cyprus Socio-economic Survey

Internet access, either from home or elsewhere is broken down by sex and age in the following graphs:

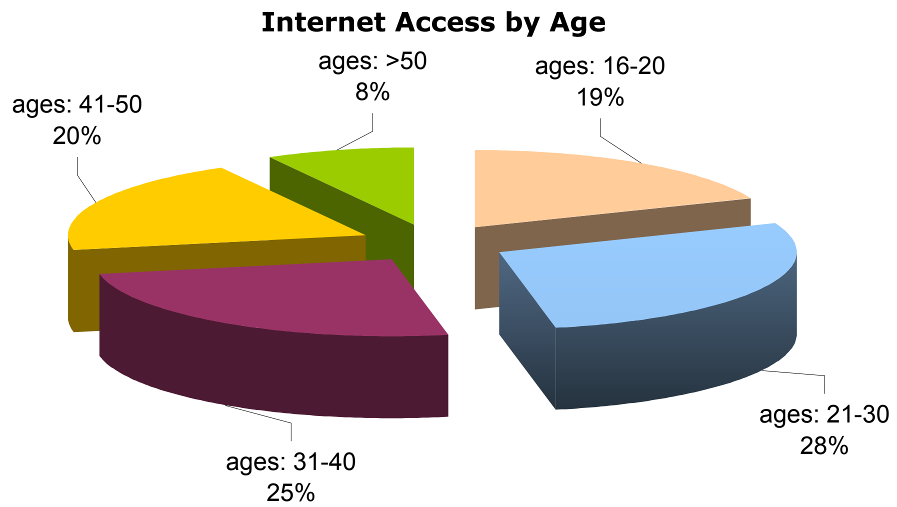

Figure 9: Cyprus - Internet Access by Age

Source: Cyprus Socio-economic Survey

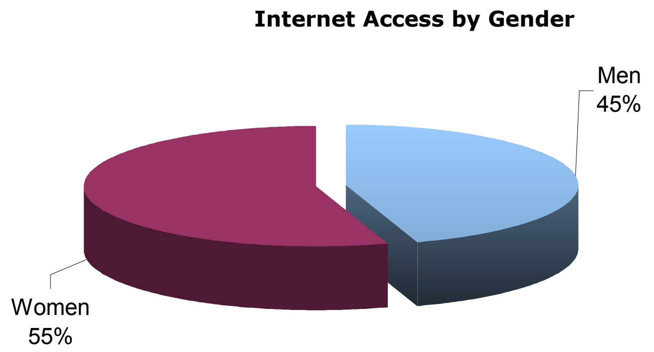

Figure 10: Cyprus - Internet Access by Gender

Source: Cyprus Socio-economic Survey

The following graph shows Internet access by occupation:

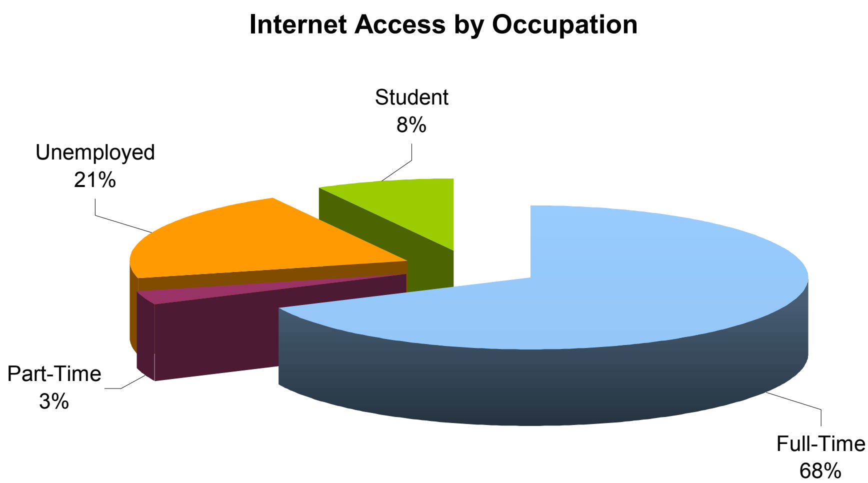

Figure 11: Cyprus - Internet Access by Occupation

Source: Cyprus Socio-economic Survey

Those that don't have access from home, get access from other locations. Some of the surveyed individuals connect from more than one place. The following graph shows the breakdown:

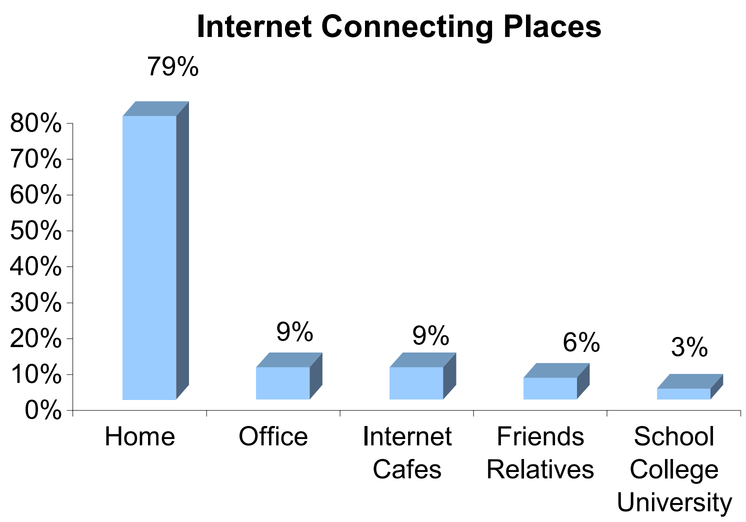

Figure 12: Cyprus - Internet Connecting Places

Source: Cyprus Socio-economic Survey

2.3.2 Type of Connection

2.3.3 Usage

E-mail dominates the use of the Internet with a percentage of 64% of those using the Internet. The second most often use of the Internet with a percentage of 57% is general information gathering and web search. Educational reasons are the third most cited reason for using the Internet. Internet usage is provided in the following graph.

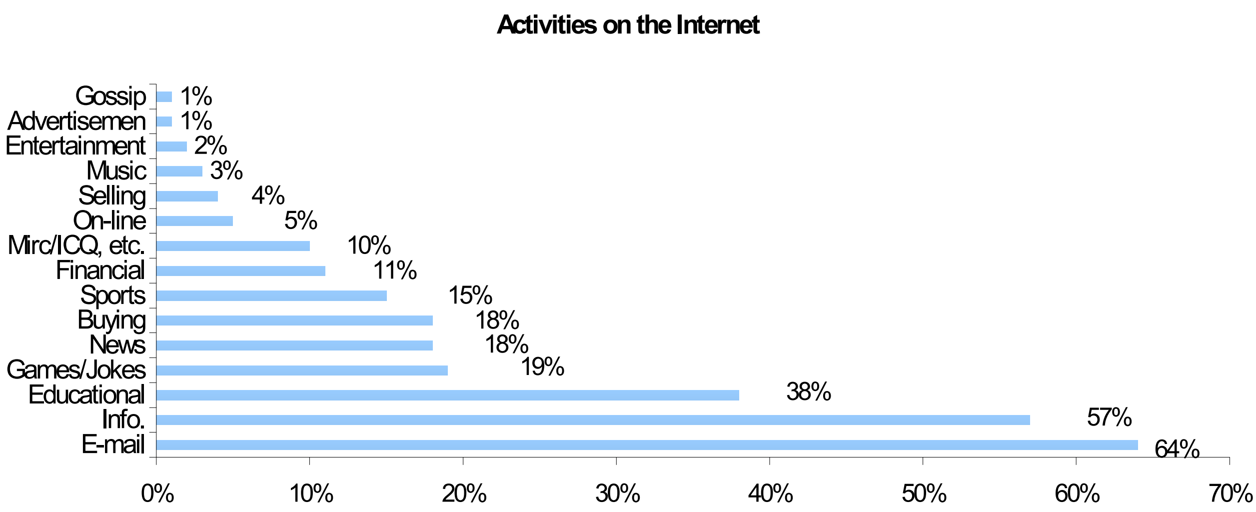

Figure 13: Cyprus - Usage: Internet Activities Among Users

Source: Cyprus Socio-economic Survey

GALICIA

2.4 Telephony

Fixed telephony is provided by several carriers in Galicia (Telefonica, Mundo-R, Comunitel) using both conventional technologies (ISDN, PSTN, etc) and cable networks. However, due to the recent liberalization of this market, Telefonica still has a predominant presence, having more than 99% of the fixed market. Its network is 96% digitised and covers almost all of the geography of the region but still there are at least 40.000 people with rural wireless telephony which can not be used to access Internet. The newest rural fixed telephony can not yet be used because the authorities still have not authorized their usage. The cable networks (e.g. Mundo-R) are still in early stages, covering mainly the big cities (more than 50000 people), but they have an important growth of 20% monthly. Also, there are plenty of companies which provide cheaper phone calls using the same last-mile infrastructure adding a prefix to the final number (JazzTel, Ono, Comunitel, etc). Some of them are implanting their own lines, mainly in big cities (e.g. Jazztel has announced the final installation of its MAN in Vigo, one of the most populated cities in Galicia, Retevisión has trunk exchanges in A Coruña and Vigo and other access in other 4 cities). As it can be seen from the table below the figures for Galicia are much lower compared to the average of Spain and other European countries.

Place	Population	Km2	Telefónica	Mundo-R	Retevisión	Ratio
Coruña (A)	1.108.980	7.936	420.997			0,38
Lugo	366.934	9.856	136.017			0,37
Ourense	345.620	7.273	132.849			0,38
Pontevedra	908.803	4.494	323.149			0,36
Galicia	2.730.337	29.560	1.013.012	27.064	109.600	0,38
Total Spain	40.203.444	504.744	16.844.411			0,42

Table 1: Fixed telephone lines in Galicia and ratio per inhabitant.

Source: La Caixa 2001, La Caixa, R Cable, Retevisión

There are four kinds of fixed telephony technologies: PSTN, ISDN, ADSL and cable. Analog lines and ISDN are available almost in the whole region (except in rural areas with geographical difficulties), ADSL is still being implemented, increasing very fast the number of persons with possibilities of obtaining it and the number of councils, mainly in the coast (because the high population of these zones. See map).

Place	Number of lines	%availability
A Coruña	390.076	92.6
Lugo	89.357	65.7
Ourense	95.794	72.1
Pontevedra	315.519	97.6
Galicia	890.746	87.9

Table 2: Galicia - Number of fixed telephone lines, which can be used for ADSL

Source, Ministry of Science and Technology of Spain, Jan. 2002

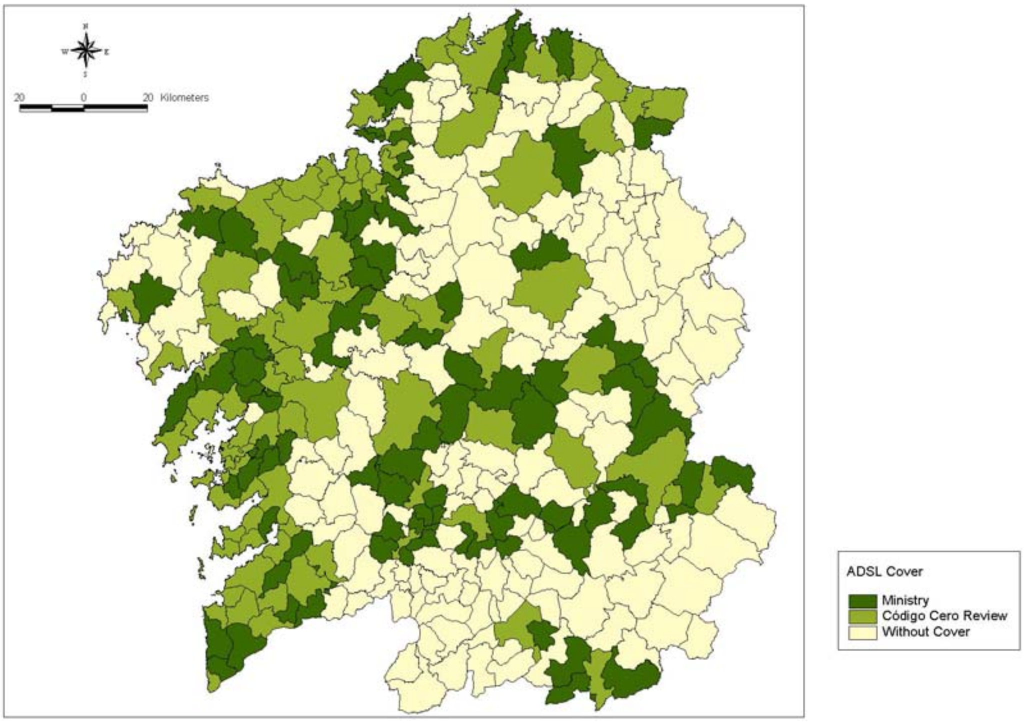

Figure 14: Galicia - Map of councils with ADSL accesses in Galicia

Source: Own elaboration based on data from Ministry of Science and Technologies. Some small councils can have access due to proximity to other-Código Cero, light green

The situation of mobile phones is similar to the previous one. There exist three companies which provide GSM service in Spain. Actually, there are only residual access to GPRS and none of UMTS (due to delays in the technology). In GSM the WAP service has a very low acceptance (e.g, in Airtel/Vodafone only 1.8% of customers have contracted this service meanwhile e-mocion, WAP service offered by Telefonica Moviles, had 1.500.000 clients), but the SMS service is widely used, mainly by young people (Vodafone routed 1.478 million messages in year 2000, Telefonica Moviles 4.351 between January and September of 2001).

There does not exist any data about the real number of users of mobile phones due to the existence of prepay and contract modes. The penetration of this kind of telephony can be assumed to be similar to the rest of Spain. The CIS (Centre for Sociological Research, http://www.cis.es) presented a direct result for the whole of Spain of 58% of people (CIS. Barómetro September 2001) that can be assumed equal in Galicia. Taking data from the three companies which provide GSM service in Spain, the penetration is close to 72% (maybe, the difference comes from new customers since September 2001 and, mainly, from the fact that some people have more than one mobile, the population in Spain increased a lot during the last years and there are clients without activity).

Company	Customers
Telefónica Móviles	16.800.000
Amena	5.225.000
Vodafone	7.148.000

Table 3: Number of mobiles phones in Spain

Source: the companies at end of 2001. Data from Vodafone are of March 2001

As it can be seen from the data presented in the table above, which corresponds to a 72% of the total population and the CIS data, it is possible to calculate that there exist between 1.600.000 and 1.900.000 mobile phones in Galicia.

2.5 PC Ownership

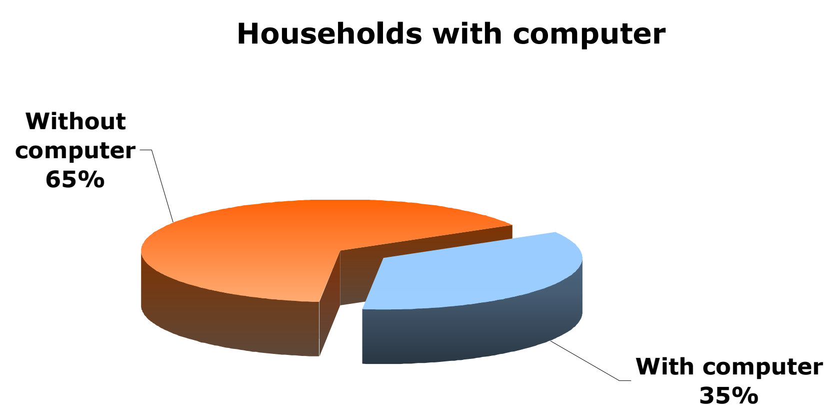

Figure 15: Galicia - Homes with computer.

Source: European Project Sensitic(http://www.sensitic.org). Data gathered between 18th of May and 1st of June of 2001

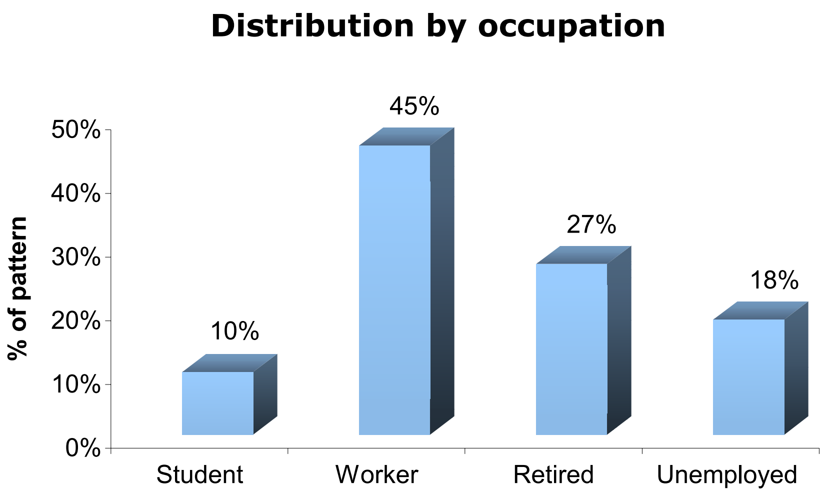

Figure 16: Galicia - Type of people owning a computer.

Source: Sentitic

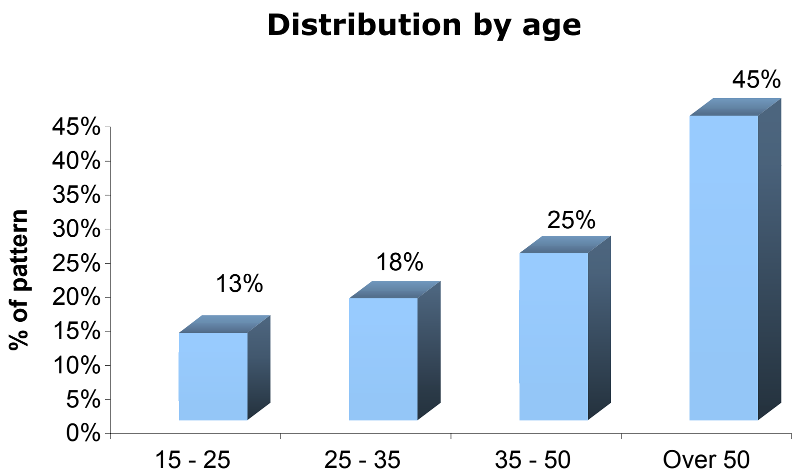

Figure 17: Galicia - Computer Ownership by age

Source: Sentitic

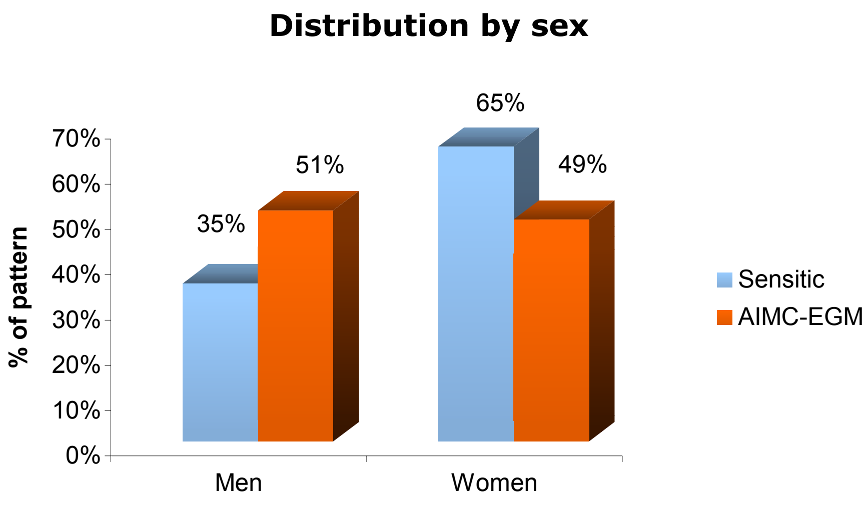

Figure 18: Galicia - Computer Ownership by sex.

Source Sensitic and AIMC-EGM

2.6 Internet Access And Usage

The Internet penetration in Galicia is very low compared to other countries in ODEC or even with Spain. The data from AIMC show that only 14,6% of people used Internet during the month of November 2001 (Source: AIMC-EGM November 2001). However, the percentage of users is growing very fast (80% in the last year). The users are mainly young people (less than 35), which is extremely important as Internet access among the youngest (less than 20) who represent the future is increasing very fast. The core users are between 20 and 35, this means, new workers and university students. The users are mainly men who almost double the women (60% of the users were men).

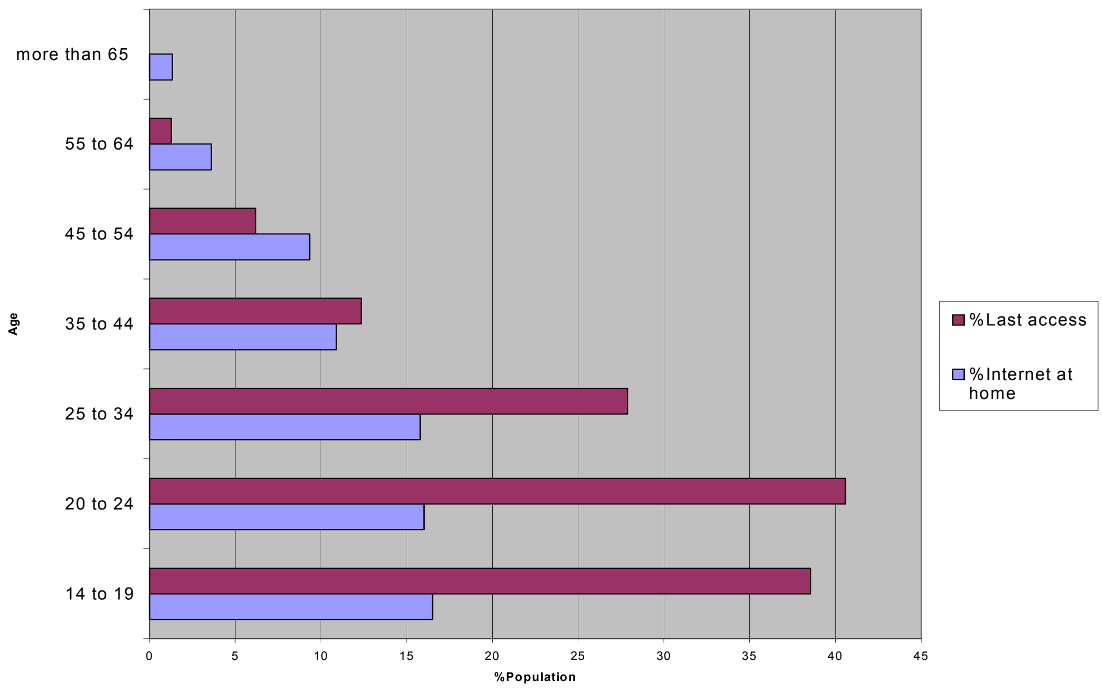

Figure 19: Galicia population with access from home and which accessed the Internet in November 2001

Source: AIMC-EGM

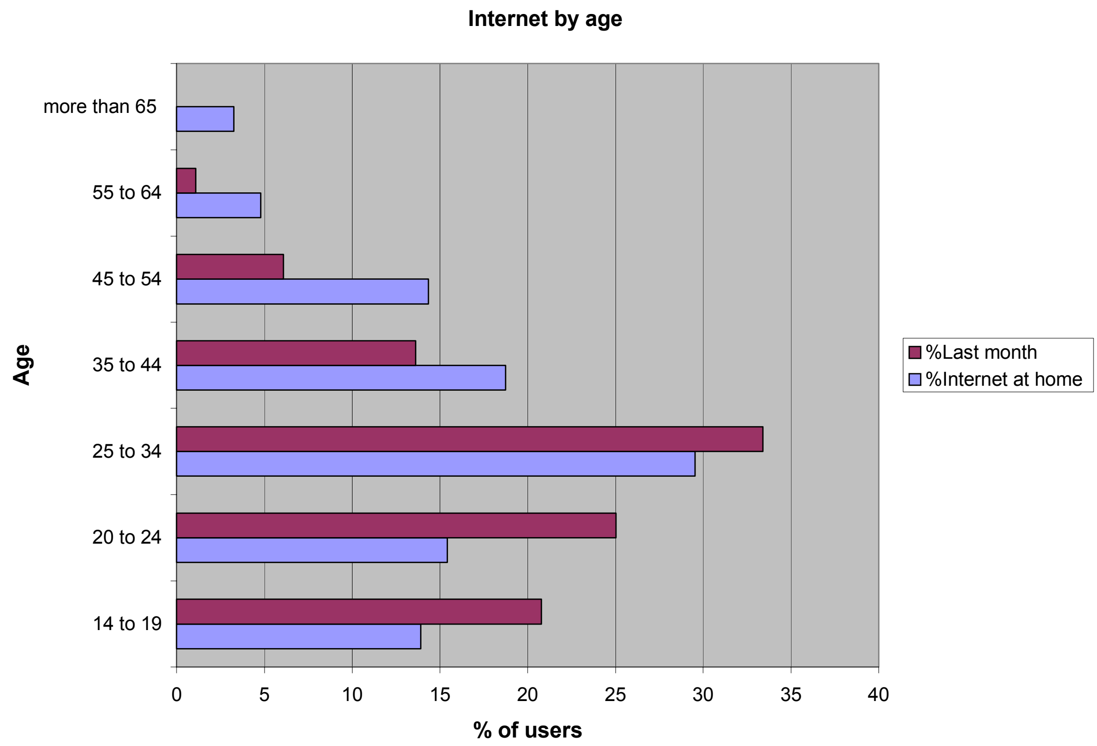

Figure 20: Galicia - Users by age

Source AIMC-EGM Nobember 2001

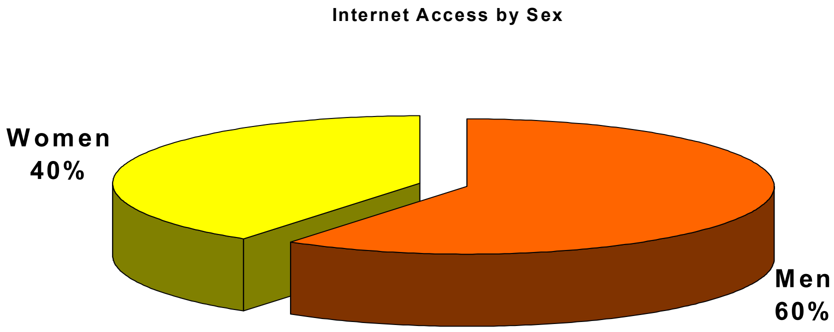

Figure 21: Galicia Internet Access by sex. Users during the month of November 2001

Source: AIMC-EGM Nobember 2001

POMERANIA

2.7 Telephony

The tables and graphs that follow give a picture of the current Telephony penetration in the Pomeranian Region. In Poland 73% of households have fixed-line telephones and 32% have mobile telephones (GUS).

2.7.1 Fixed-Line Telephony

The total population in Pomerania amounts 2 204,7 thousand, out of which 29,2% subscribers.

	Towns	Villages	Total
Number of telephone subscribers	438 380	205 350	643 730
Percentage rate %	68	32	100

Table 4: Fixed Line Telephone Penetration in the Pomeranian Region

Source: URT

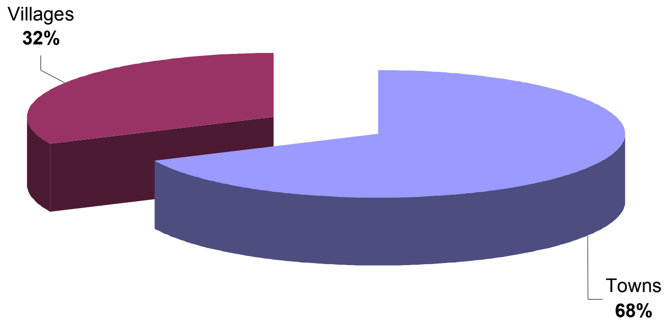

Figure 22: Graphical representation of Fixed Line Telephone Penetration in the Pomeranian Region

Source: URT

	Towns	Villages	Total
Number of telephones in households	362 250	169 690	531 940

Table 5: Number of Households with fixed telephone lines in the Pomeranian Region

Source:URT

	Poland	Pomerania
Penetration ratio (number of telephones per 100 inhabitants)	28	29

Table 6: Penetration of Fixed Telephony among citizens in the Pomeranian Region

Source: URT

2.7.2 Mobile Telephony

In the Pomeranian Region three operators of GSM and one of NMT450 standards mobile telephone networks are active. The total number of mobile telephones in Poland amounts to 10,08 mln (according to the operators' data). This number comprises subscribed and pre-paid services. It is possible to estimate the number of mobile telephones in the Pomeranian Region to 0,57 mln.

Operator	Number of Telephones in mln	Percentage
ERA GSM	3,80	37,70%
PLUS GSM	3,44	34,13%
IDEA GSM	2,80	27,78%
IDEA NMT450	0,04	0,40%
Total	10,08	**100%**

Table 7: Number of mobiles phones in Poland

Source: the companies at end of 2001

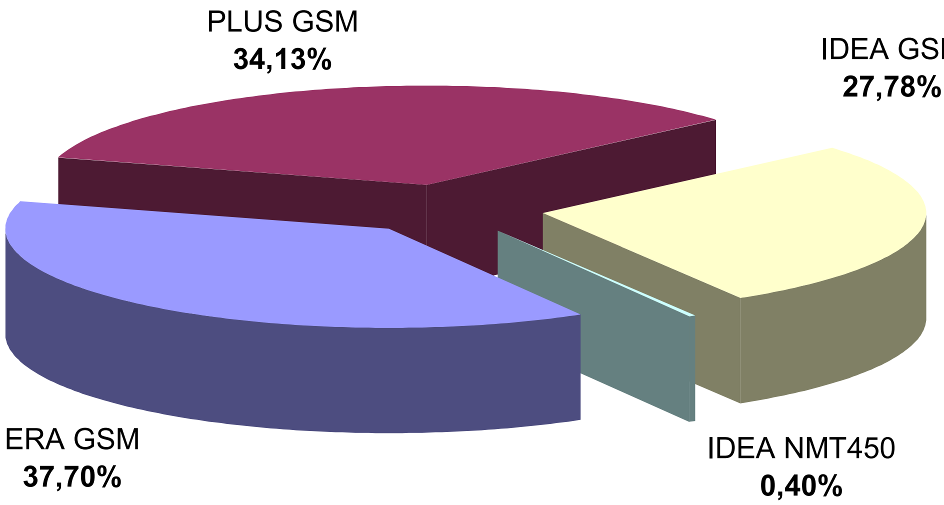

Figure 23: Mobile telephone – penetration in Poland

Source: the companies at end of 2001

2.8 PC Ownership

In June 2001 a multi aspect opinion poll about the living standard level was conducted on the area of the whole country. Similarity to the first of this kind survey conducted by National Statistics Office (GUS) in June 1997, the latest referred also both to the financial standing of households and non material factors influencing the living standard.

The assessment of the way the household income is managed showed the biggest group of Poles (32%) who lived in a very economic way in order to be able to save for a more serious purchases. 21% of households could afford only the cheapest food and clothing. A group of 12% households stated they had enough money only for the cheapest food and they lacked money for clothing, while in 5% of households there was not enough money for both food and clothing. Totally 70% of households are in difficult financial situation.

The way of household income management according to the self-assessment	Percentage of respondents
Enough money for everything without any special efforts to economize	5
Live in an economic way and can afford everything	25
Live in a very economic way in order to be able to save for a more serious purchases	32
Enough money for only the cheapest food and clothing	21
Enough money only for the cheapest food and lack of money for clothing	12

Not enough money for both food and clothing	5

Table 8. Assessment of the way of household income management

Source: GUS

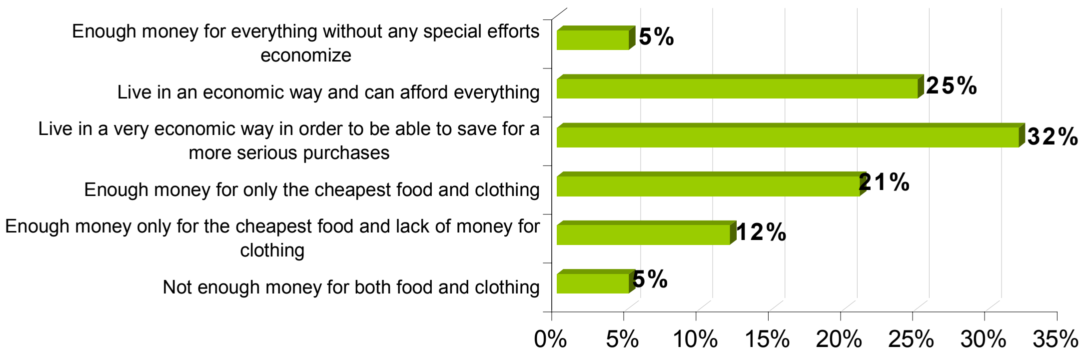

Figure 24: Assessment of the way of household income management

Source: GUS

The survey on household equipment with long term use products showed a small improvement in comparison with the situation in 1997 and it is presented in the table below.

Long term use products	Percentage of respondents
Laundry machine	74
Dishwasher	4
Microwave oven	22
Radio set, radio-cassette recorder	94
CD player	44
Colour TV set	94
Videorecorder	57
Fixed-line telephone	73
Mobile phone	32
Personal computer	20
Internet access	8

Table 9: Pomerania - Household equipment with long term use products

Source: GUS

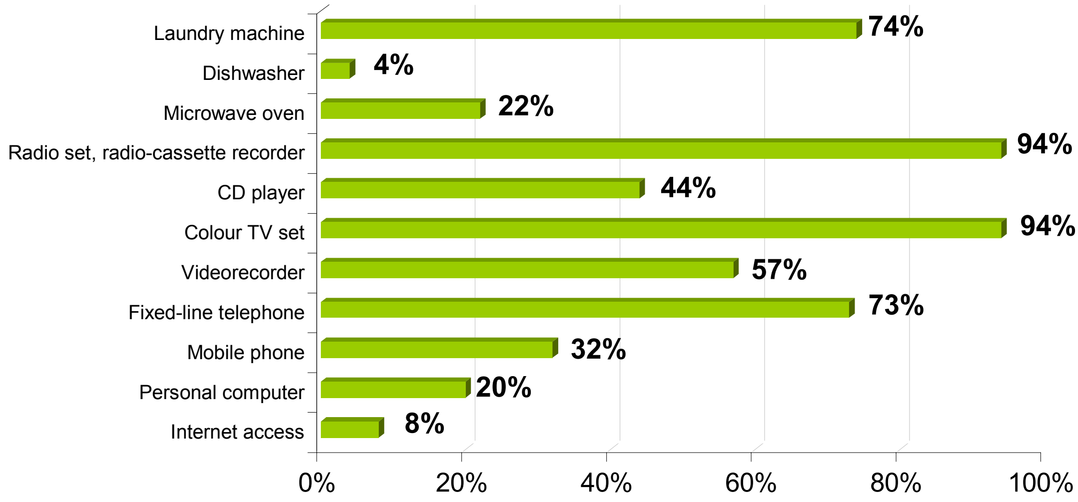

Figure 25: Household equipment with long term use products

Source: GUS

The conducted research allows to draw a general conclusion, whether and to which extent Polish families use devices and technologies facilitating them to exchange and acquire information. 20% of households possess a personal computer.

	Percentage of respondents
With computer	20
Without computer	80

Table 10: Households with computer

Source: GUS

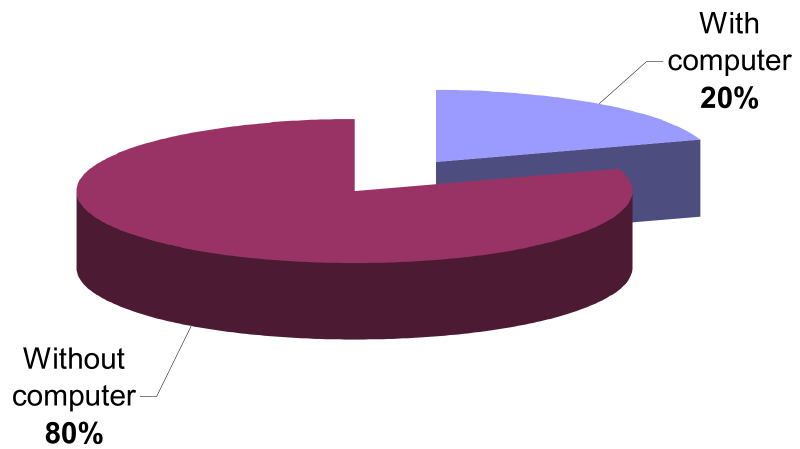

Figure 26: Households with computer

Source: GUS

	Percentage of respondents
With	20
Without but they want	35
Without but don't need	45

Table 11: Households and computers

Source: GUS

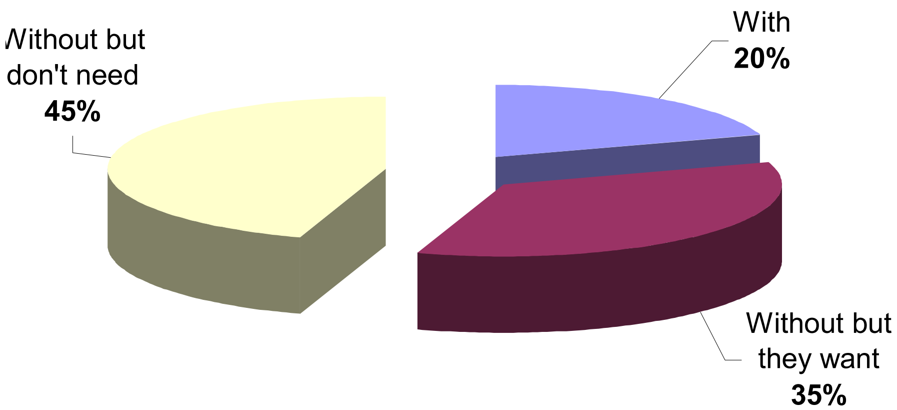

Figure 27: Households and computers

Source: GUS

	Percentage of respondents
Never	65
Sometimes	14
Frequently	21

Table 12: How often people use computer

Source: GUS

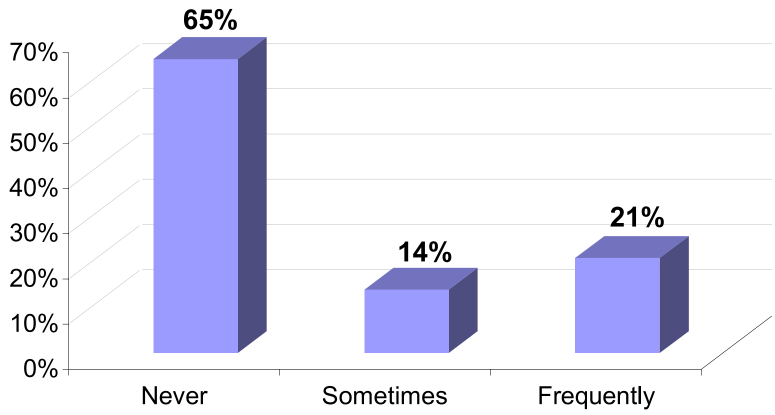

Figure 28: How often people use computer

Source: GUS

Number of years	Percentage of respondents
18-30	36
30-40	58
Over 70	98

Table 13: Distribution by age persons never using computer

Source: GUS

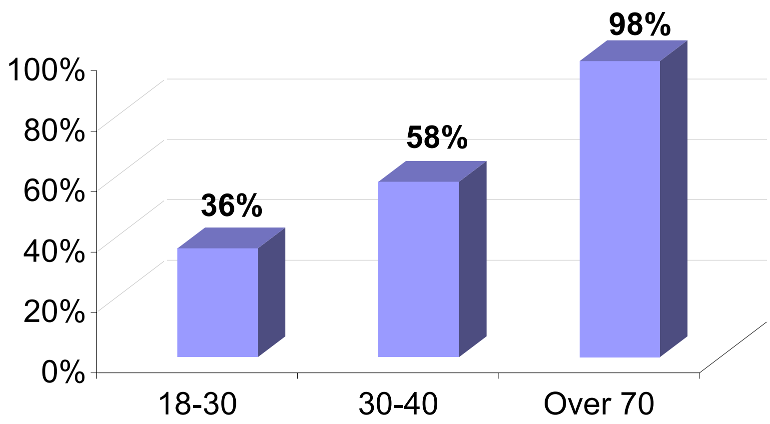

Figure 29: Distribution by age persons never using computer

Source: GUS

	Percentage of respondents
Learning	11
Games	13
Private contacts	4
Work at home	7

Table 14: Distribution by usage

Source: GUS

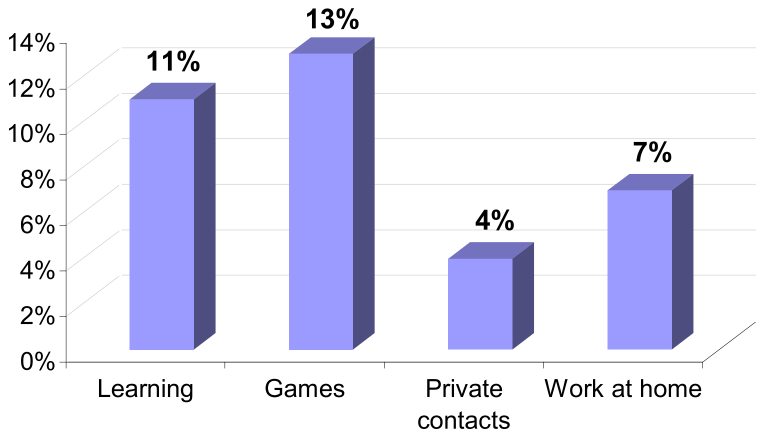

Figure 30: Distribution by usage

Source: GUS

Every 9th adult Pole uses a computer (at home and outside) for learning, more or less the 7th person plays computer games, while the 25th over 18 years old person uses a computer for starting and maintaining contacts.

2.9 Internet Access And Usage

2.9.1 Usage

The role of the Internet for citizens is different from the one for companies or institutions. The two main reasons for Internet use by the citizens are for communication and entertainment purposes

The two figures below depict the results of the research on a representative group of people for the whole of Poland (Taylor Nelson Sofres 2001 r.). Within the Pomeranian Region the percentage of Internet usage is about 19,2% (OBOP 7,3 mil. in Poland and 416 830 in Pomeranian Region), which is a little higher compared to the national average of 15%

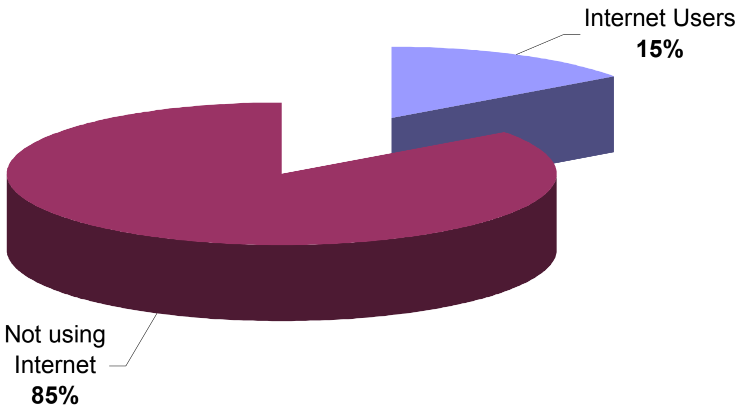

Figure 31: Internet users in Poland in 2001

Source: Taylor Nelson Sofres

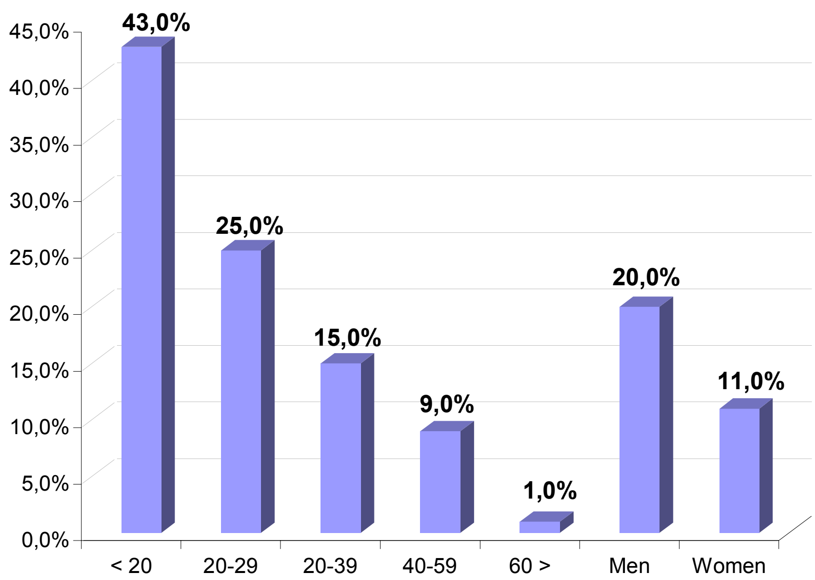

Figure 32: Percentage of Internet Users in Poland according to age groups and sexes (2001)

Source: Taylor Nelson Sofres

Unfortunately due to many reasons, the results of surveys and studies on Polish society are very divergent. An example is the research conducted on the order of the US Embassy in Poland. However, a common feature of the tendency is observed, e.g. successive age groups are characterised by a 100% increase/decrease in relation to the preceding/following group.

Age group	Percentage of respondents
18-24	36
25-34	17
35-44	8
45-54	8
55-64	3
> 65	1

Table 15: Age of Polish Internet user

Source: Emabassy of the US in Poland

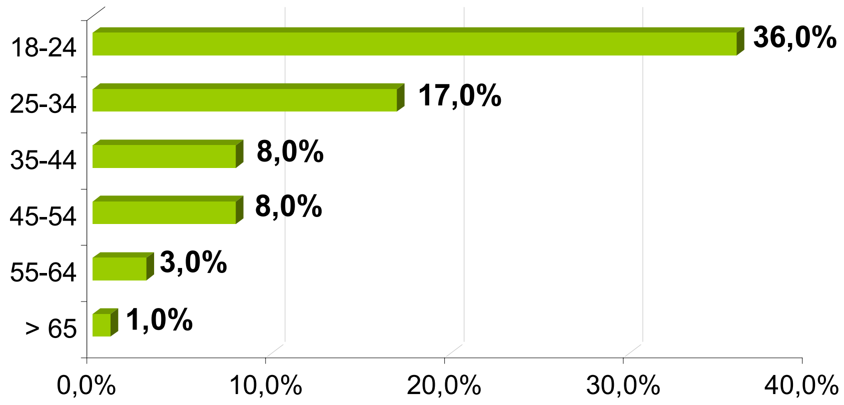

Figure 33: Age of Polish Internet user

Source: Emabassy of the US in Poland

The results of researches on the intensity of Internet usage are also divergent depending on the age. The division into age groups plays a significant role in details, however the main intensity of Internet usage forms at the level of 80% of citizens, which closes at the age of 40. The research conducted on the whole Polish population has been confirmed by the pilot observation of Pomeranian Region society.

Age group	Percentage of respondents
15-19	15,5
20-29	45,6
30-39	20,2
40-49	10
50-59	0,3

60-69	0,1

Table 16: Pomerania - Internet usage and the age

Source: SMG/KRC (Net Track)

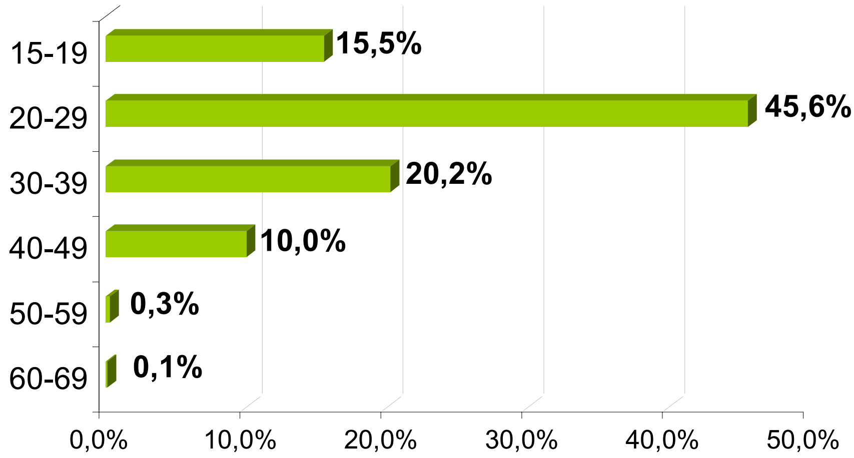

Figure 34: Pomerania - Internet usage and the age

Source: SMG/KRC (Net Track)

The location of the place of Internet access is a typical occurrence for the society in Poland and in Pomeranian Region. Unfortunately about 70% of the population use Internet outside their home and high costs of use as well as not satisfactory state of communication links are the main reasons.

Place	Percentage of respondents
At home	34
At work	31
At school	25
At friends'	14
In an Interet cafè	7

Table 17: Where do Polish people use Internet ?

Source: Embassy of the US in Poland

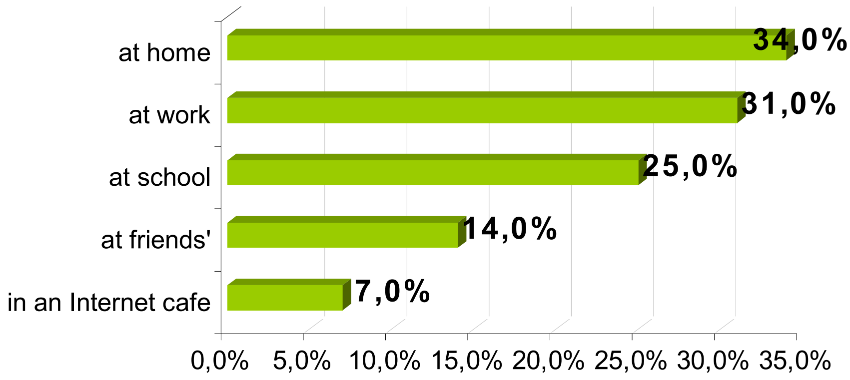

Figure 35: Where do Polish people use Internet ?

Source: Embassy of the US in Poland

The results of the research on the Internet users with respect to their education allow to separate four groups according to the education level: higher (37%), post secondary (26%), secondary (29%) and primary (7%). The big share of users with secondary and post-secondary level of education is closely connected with young age and a big number of Internet laboratories in grammar schools in Poland.

Education level	Percentage of respondents
Higher scientific degree	3
High study	35
Licence	19
General secondary	17
Vocational secondary	12
Post-secondary	7
Primary	6
Not full vocational	1

Table 18: Pomerania - Education Level of Internet users in Poland

Source: AE Kraków

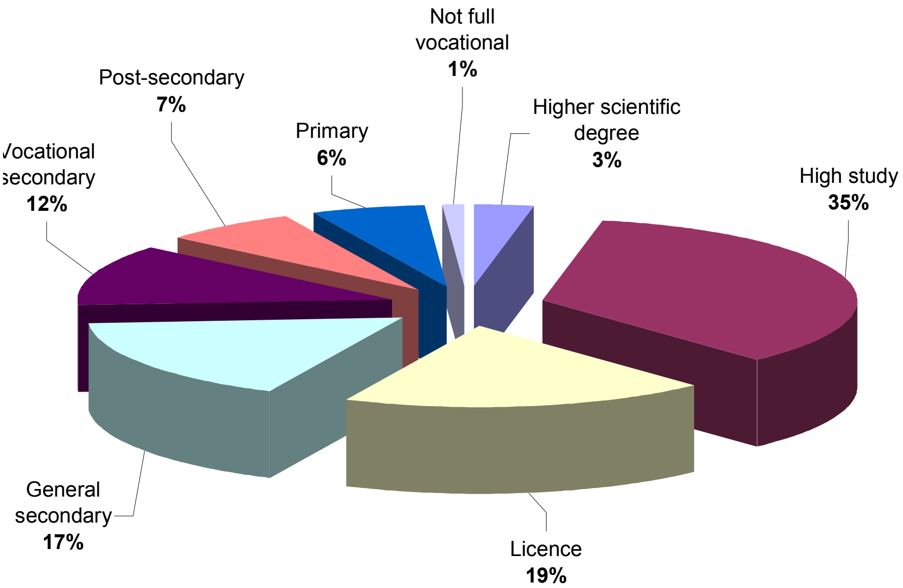

Figure 36: Pomerania - Education Level of Internet Users in Poland

Source: AE Kraków

Currently in Polish Internet the occurrence of portals in other than the Polish language does not exist. Only 9,5% of Internet users use web sites in foreign languages, while 52,3% use mainly web sites in Polish (GfK).

Within Polish language Internet world many trials of measurement of preferences and habits of portals and web sites usage function in real time. All surveys have a selective, subjective and commercial character. At least four rankings of portals and web sites present a competent reflection of their popularity among Internet users. The number of "visits per day" in the top twenty web sites presented in all rankings amounts from 5 000 to 500. The most popular ones are these which relate to: fashion, beauty, humour, virtual meetings, games, motorization, sport, leisure, film and music. At present Onet, Virtual Poland, Interia, Wyborcza, Panorama are among the most popular portals, though the number of portals and rankings of their popularity are characterised by high dynamics (Kopernik).

Many thematic researches confirm the tendency that the Pomeranian Region is characterised by a relatively high development of ICT in comparison with other regions in Poland. A similar result which places the Tricity (Gdansk, Gdynia, Sopot) from Pomeranian Region on the 4^{th}–5^{th} position in the ranking of towns and cities in Poland, is depicted in the below table and chart.

Town	Percentage of respondents
Warsaw	14,6
Katowice region	8,9
Poznan	6,5
Cracow	5,5
Tricity (Gdansk, Sopot, Gdynia)	5,3
Wrocław	4,6

Table 19: Distribution of Polish Internet users – criterion is the town which the user connected from

Source: Global eMarketing

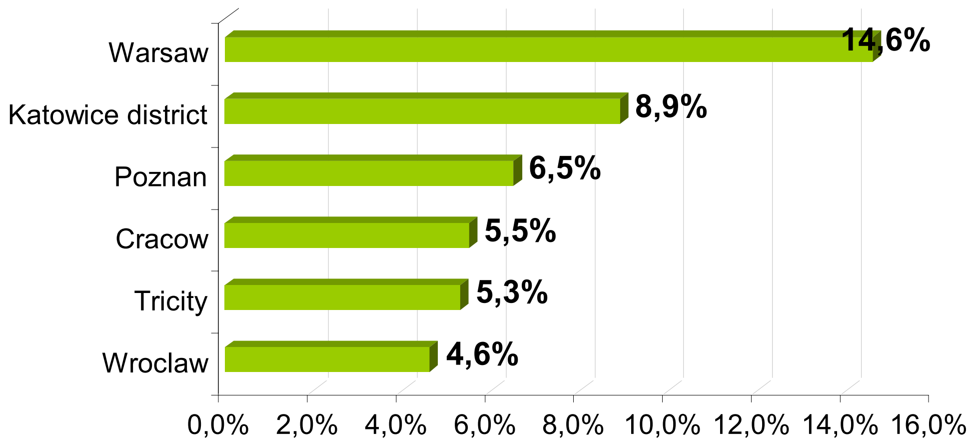

Figure 37: Distribution of Polish Internet users – criterion is the town which the user connected from

Source: Global eMarketing

The percentage of Pomeranian households, which use Internet (6,5%) is equal to the national average. However, it is definitely too low from the point of view of the scale effect, which means the number of Internet users is too small to generate fast e-Business development. (Source: IBNGR)

2.9.2 Type of Connection

In the Pomeranian Region the Internet access services for citizens is often restricted with reference to the type of choice. Among the possible types are either the dial-up connections or housing estate nets. Unfortunately, the access through the cable TVnet has not been offered in the Pomeranian Region yet, although the biggest operator has such plans (such plans were fulfilled in other cities: Warsaw, Cracow). The housing estate nets become more popular, they group from several up to tens of users through the permanent links (comprise small population in big cities). More than 80% of citizens use dial-up connection of the dominant operator TP S.A. In the Pomeranian Region TP S.A. renders two access numbers working at the speed of 56 Kbps in V90 standard and ISDN 2B+D standard.

3 ICT And The SMEs

CYPRUS

3.1 Hardware and Usage

From the companies surveyed 99% have at least one computer in their business. The percentage of companies that have one PC per employee is significantly higher among the service industry as expected, and with companies with average age of executive team among 30 to 40 years of age. The following graph shows the percentage of computer penetration in companies surveyed in relation to the ratio of one computer for each employee.

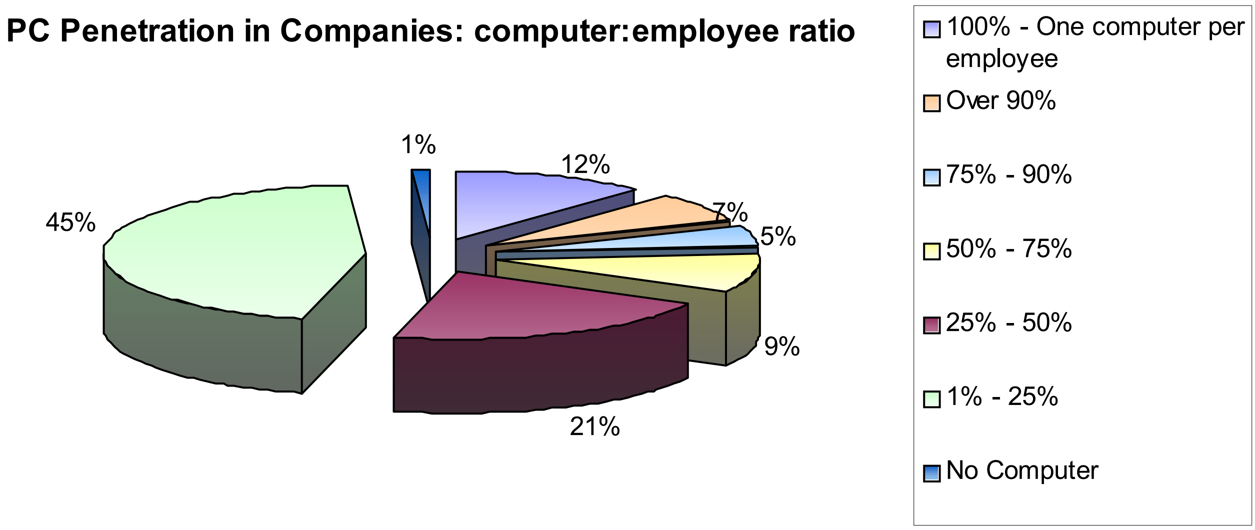

Figure 38: Cyprus - PC Penetration (computer:employee ratio)

Source: Cyprus Socio-economic Survey

Twenty-four percent of companies that have PCs have their own IT department. Seventy-seven percent of companies outsource their software development. Seventy-nine percent outsource their support & maintenance needs, and 70% outsource their IT training needs. The above information is depicted in the following graph:

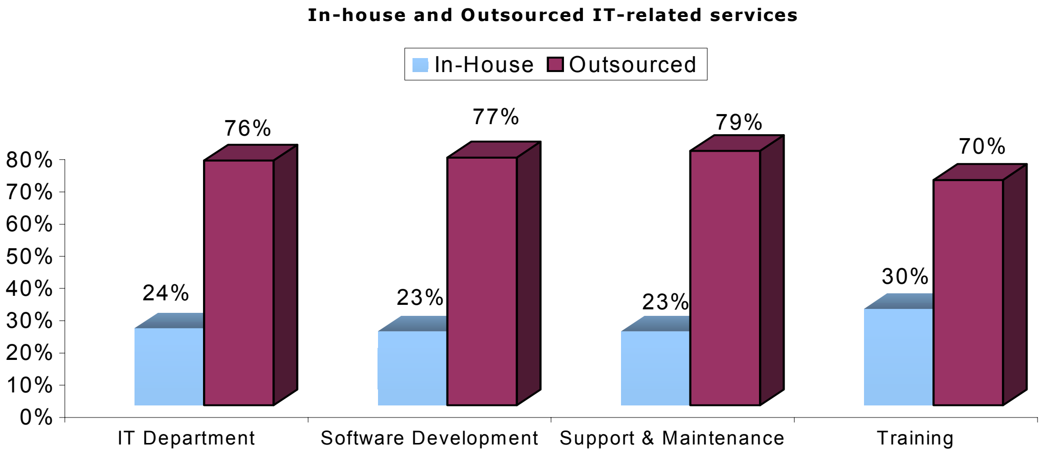

Figure 39: Cyprus - In-house and Outsourced IT-related services

Source: Cyprus Socio-economic Survey

The following graphs show the computer hardware infrastructure of Cyprus companies. Fifty percent of companies surveyed have at least one server. It is expected that this number will rise to 56% in the coming year. There is an average of 17,7 workstations per company and 4,4 notebooks. The presence of mainframe systems is close to zero (2%). Current hardware infrastructure can be seen in the graphs that follow. Nine percent (9%) of Cyprus companies plan to purchase at least one server within the next year.

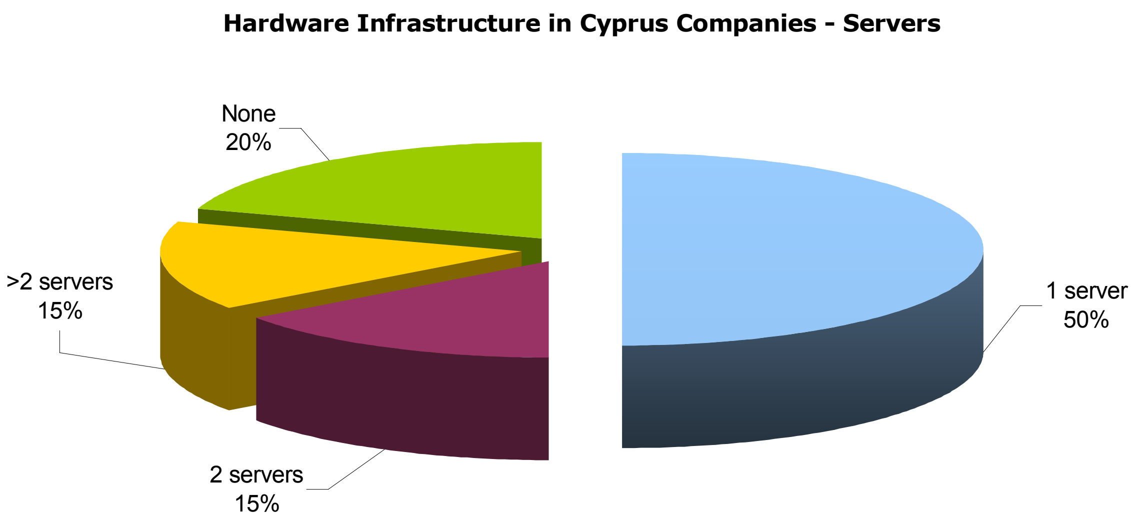

Figure 40: Hardware Infrastructure in Cyprus Companies: Servers

Source: Cyprus Socio-economic Survey

Following is the workstation hardware infrastructure of Cyprus companies. As mentioned before almost all companies have at least one workstation. Thirteen percent of companies plan to purchase additional or replacement workstations within 2002. The following graph shows the number of workstations broken down by company size.

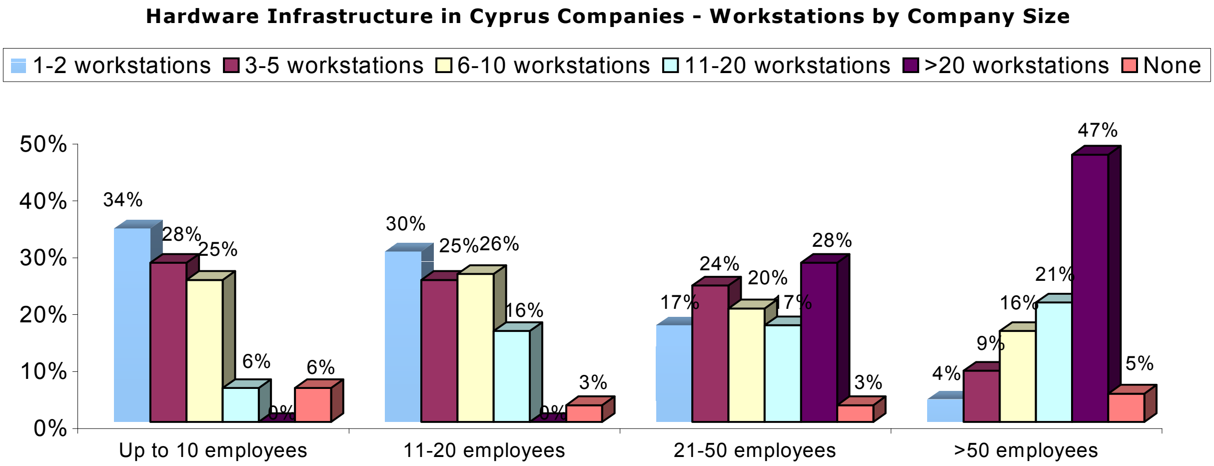

Figure 41: Hardware Infrastructure in Cyprus Companies: Workstations

Source: Cyprus Socio-economic Survey

3.2 Communications

From the companies surveyed 92% have access to the Internet. A 73% has some kind of company network in place, and 53% of the companies surveyed have an electronic link, EDI, Internet, or other, with their partners (suppliers, customers, etc.). According to the future plans of the surveyed companies, these percentages will increase even more. We could assume from these numbers that the communication infrastructure of companies in Cyprus is quite good. Current Status and future plans of companies surveyed, regarding communication infrastructure can be seen below:

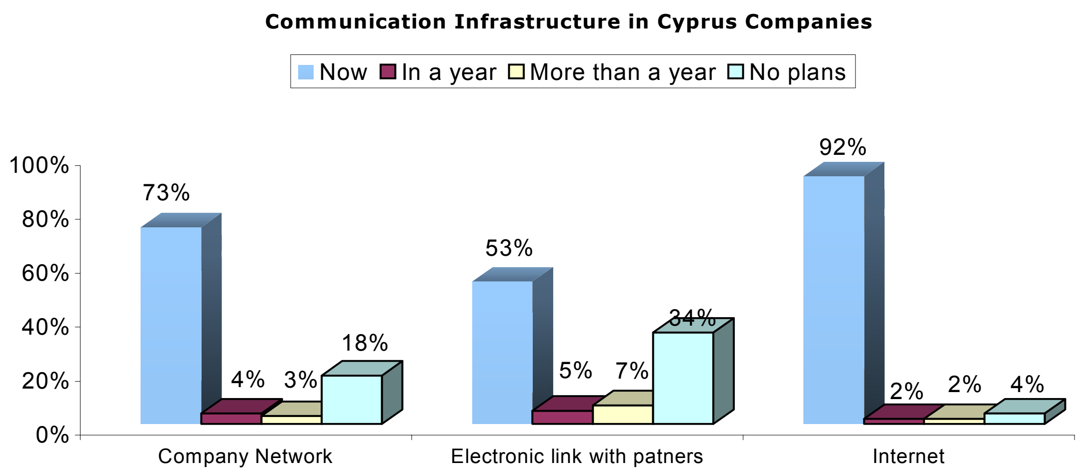

Figure 42: Communication infrastructure in Cyprus companies

Source: Cyprus Socio-economic Survey

Internet access, broken down by company size follows:

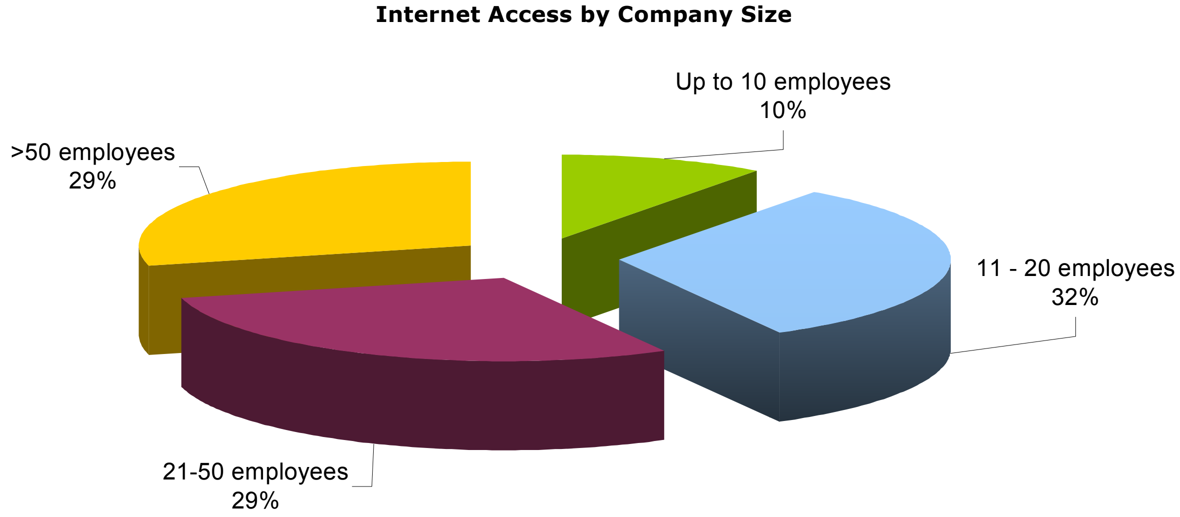

Figure 43: Cyprus - Internet Access by Company Size

Source: Cyprus Socio-economic Survey

Internet access, broken down by connection type follows. It is noted that some services, like ADSL, have only been available since mid-2001 and they are in a way still under consideration by companies. This, in addition to other factors not very clear as of yet – we can only speculate that the costs for businesses versus the benefits of each type of connection given the needs to use it, is either difficult to measure or not enough knowledge exists in companies to take such decisions – there is a high percentage of uncertainty as far as future plans for changing or adding certain type of Internet connection.

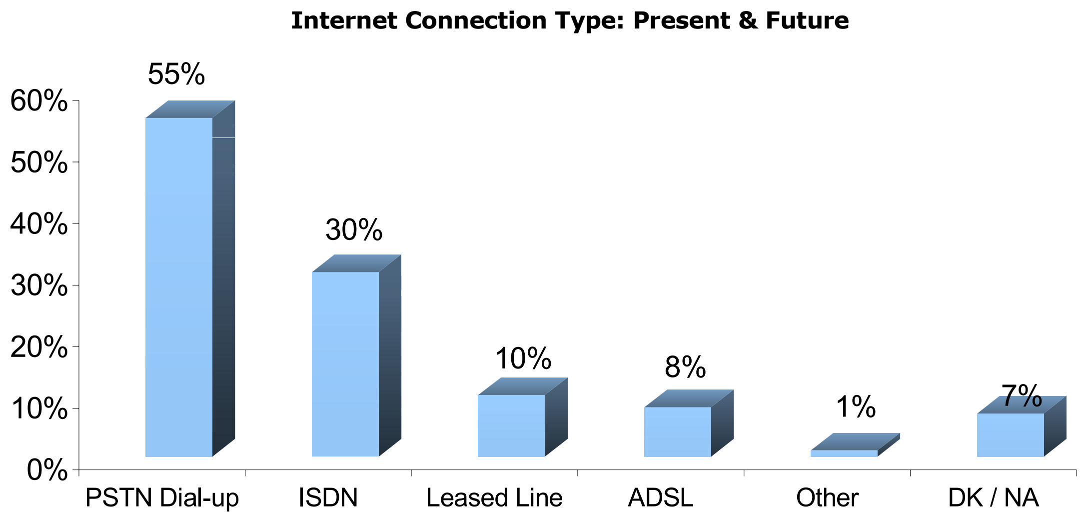

Figure 44: Cyprus - Internet Connection by Type: Present & Future

Source: Cyprus Socio-economic Survey

The companies with Internet access, use the Internet for the following reasons:

Internet Usage	Present
Email	96%
Information Gathering	88%
Information Exchange w/ partners	71%
Find new suppliers/partners	56%
Target potential customers	37%
Buy products / services	36%
Intranet / extranet communication	31%
Teleconferencing / videoconferencing	21%
Direct sales of product / services	21%
Connection from home to office	12%
Don't know / Don't answer	1%
No future plans	-

Table 20 : Internet usage in Cyprus companies: Present & Future

Source: Cyprus Socio-economic Survey

One in four companies with Internet access have all their computers connected to it. Again, this incident is higher in the service sector. Number of computers that have computers connected to the Internet:

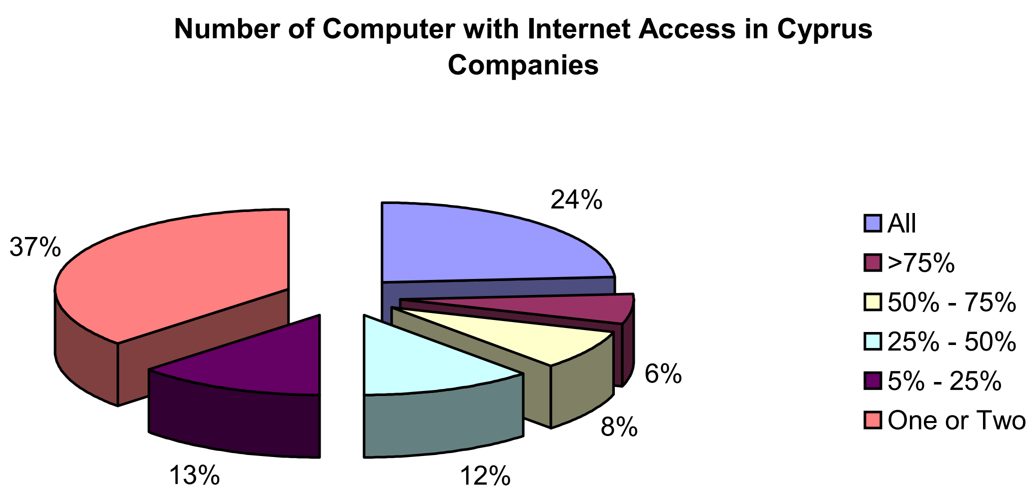

Figure 45: Computer with Internet Access in Cyprus Companies

Source: Cyprus Socio-economic Survey

Daily usage of the PC varies from industry to industry, but the highest incident of daily usage by executives is observed within companies whose executive team is aged between 30 to 40 years. Within the companies, the following persons use the Internet:

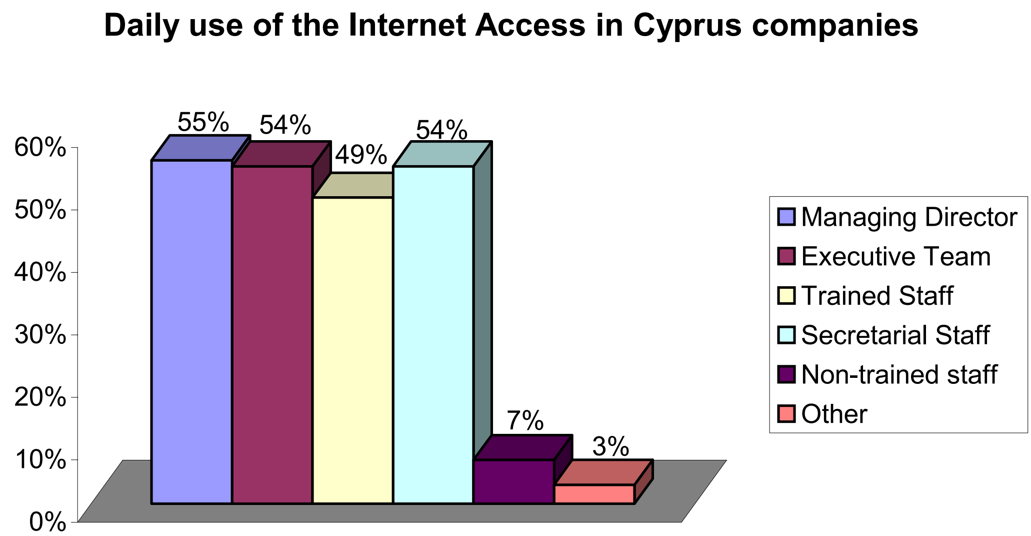

Figure 46: Cyprus - Internet Access by Personnel

Source: Cyprus Socio-economic Survey

Fifty-one percent (51%) of companies surveyed have a web presence (company web-site).

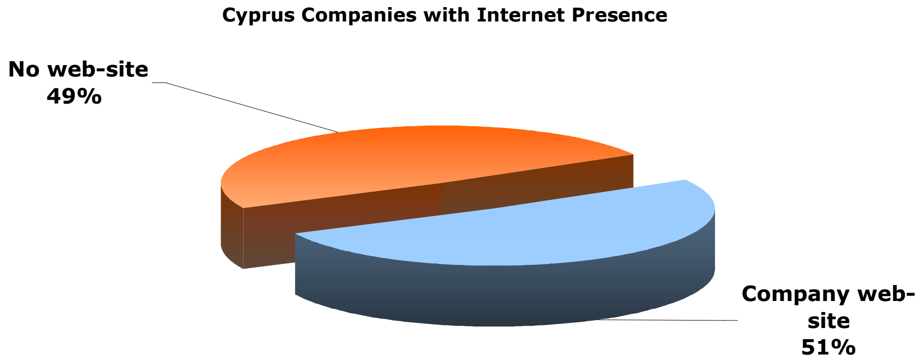

Figure 47: Cyprus - Company Internet Presence

Source: Cyprus Socio-economic Survey

The graph that follows shows the Internet presence broken down by company. It is clear that Internet presence is proportional to the size of the company, that is, the percentage of Internet presence increases with the size of the company.

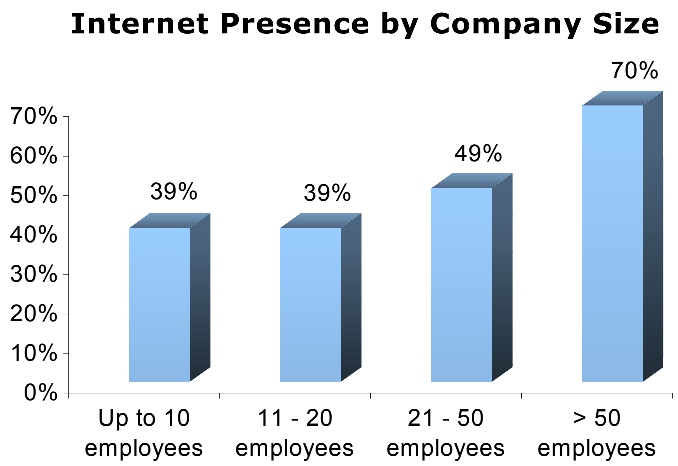

Figure 48: Cyprus - Internet Presence by Company Size

Source: Cyprus Socio-economic Survey

As mentioned earlier, 51% of the SMEs surveyed have Internet presence. The following table shows the reasons that these SMEs have Internet presence:

Internet Presence: Reasons	
Marketing purposes	90%
Promotion of products / services	70%
Communication purposes	57%
E-Commerce	25%
Don't know / don't answer	2%

Table 21: Reasons for Internet Presence: Cyprus Companies

Source Cyprus Socio-economic Survey.

A ninety one percent (91%) of all surveyed companies believe that having Internet presence is beneficial, with the benefits ranging from a little, to extremely beneficial. Overall opinion (mean score of the survey) is that having a web site is "Very Beneficial".

Benefit of Having an Internet Presence	
Extremely beneficial	30%
Very beneficial	42%
Little beneficial	19%
Not beneficial at all	4%
Don't know / don't answer	5%

Table 22: Benefits of Having an Internet Presence: Cyprus Companies

Source Cyprus Socio-economic Survey.

Reasons for not having a website follow:

Reasons for not having web presence	
In the process of having web-presence	44%
No real benefit	24%
Never considered it	20%
Too expensive	1%
Don't know how to begin	1%
Other	4%
Don't know / don't answer	10%

Table 23: Reasons for not having Internet Presence: Cyprus Companies

Source Cyprus Socio-economic Survey.

A 75% of companies are aware of the term "e-Commerce". Again, the larger the company size the higher the awareness of the term "e-Commerce" is.

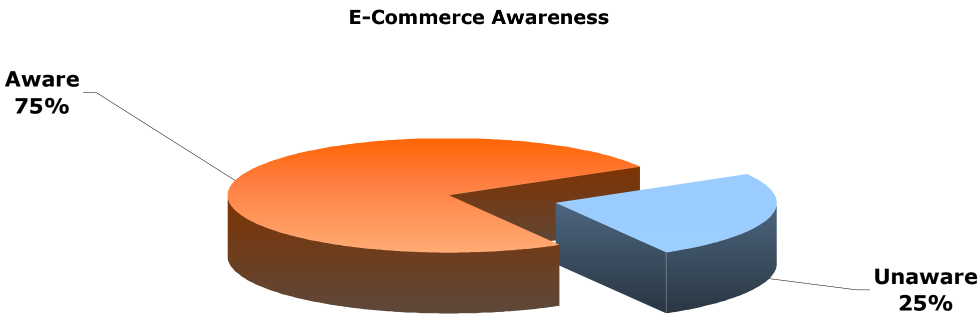

Figure 49: Aware of the term "e-Commerce"

Source: Cyprus Socio-economic Survey

3.3 Software Applications

A breakdown of computer usage by software application category is presented in the following table.

Computer Usage	Present
Accounting / Auditing	95%
Office Tools	90%
Internet	90%
Communication	85%

Computer Usage	Present
Human Resources systems	79%
Logistics / Order processing	75%
Customer Management systems	64%
Inventory Management	62%
Management Software (ERP etc)	39%
Other use	1%
Don't know / Don't Answer	-
No other use	-

Table 24: Cyprus - Computer Usage by Software Category

Source: Cyprus Socio-economic Survey

It is obvious that accounting systems dominate the usage of computers among SMEs with office tools usage and Internet access following as a close second. It is worth noticing on the above table that a large percentage of SMEs use HR, CRM and ERP systems and that a relatively high percentage of companies are planning to use more of these types of applications in the near future.

3.4 Training

Professional training in Cyprus is partially funded by the Human Resource Development Authority of Cyprus (HRDA), which is a semi-government organisation. The training activities promoted by the HRDA are designed to meet the needs of the economy as a whole, including those of enterprises and of the labour force. These needs are identified by research studies and surveys. Training is provided by training institutions, in the public and private sectors, or by enterprises. The HRDA has the overall responsibility for planning and co-ordinating human resource training and development in the country. Through its training activities, the HRDA seeks to achieve the following:

a. The formulation of an integrated training and human resource development policy in accordance with the priorities of national socio-economic policies, on the basis of which appropriate training activities are promoted and training costs are distributed.
b. The continuous assessment of the economy's training needs on the basis of which an integrated training policy is formulated.
c. The modernisation of the training system with the creation of the necessary infrastructure, the systematisation and certification of training and the introduction of standards of vocational qualifications.

d. The distribution of information to enterprises and the public in general so as to raise their awareness of the need for continuing training and the provision of advisory services.
e. The analysis of the *acquis communautaire* in the training field and the promotion of actions for facilitating its adjustment and convergence to European systems and practices.

HRDA offers substantial training to companies on ICT related issues. In the 2nd half of 2001, the approved programmes by the HRDA included subjects in technology (general), programming/application development, software and user support, software use, and the Internet. Some of the high priority programmes offered are: E-marketing methods for Cypriot enterprises, Effective Customer Relationship Management (CRM) through the use of IT applications, and Practical principles for Cypriot enterprises as to how to get into the e-Economy.

In addition to the courses offered by the various training companies that exist on the island, the Cyprus Telecommunications Authority offers Internet related training to both professionals but also to citizens. For this purpose CYTA has developed four main training courses as follows:

"Web-page design". This program teaches web page creation concepts. The duration of the program is 2 days (12 hours). The program is addressed to CYTA's employees and to external clients such as Secondary School teachers, that teach computer science courses, organized groups and Primary School Teachers.

"Internet for All". This is a three hour introductory program aiming to get people acquainted with the use of Internet. The program is offered to CYTA's employees and to external clients. To this date over 5000 people have been trained. The program is offered both in the Greek & in the English language.

"60+ : Internet and New Challenges". This is a seminar type of course offered to senior citizens with its main purpose the sensitization of people over sixty to the meaning of electronic communication and the prospects and possibilities that Internet offers.

"Internet: A tool for All". These are a set of electronic presentations offered to Primary and Secondary schools and the purpose is to give a chance to the students to have a first contact with the basic services that are available via the Internet, to learn about the advantages and disadvantages of the Internet as well as to create awareness on future implementations of the Internet.

GALICIA

3.5 Hardware and Usage

The percentage of SMEs with at least one computer in Galicia is very high as shown in the figure below, approximately 95% according to the consulted sources. The level of computerization varies from close to 90% in micro companies (less than 11 workers) to 100% in the biggest SMEs. Almost all of them use Microsoft operating systems, mainly Windows 98, in their desktop computers (90,7% in year 2001, source SXI+D).

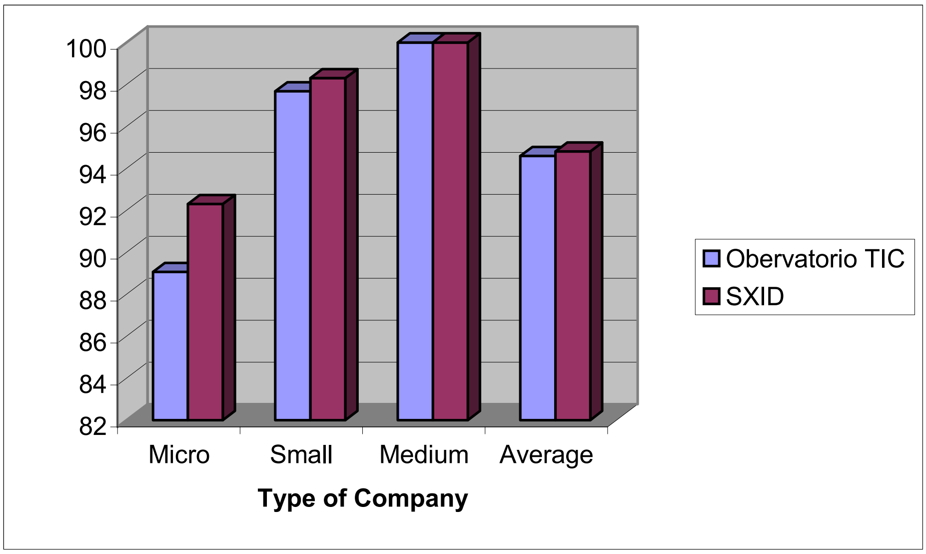

Figure 50: Percentage of SMEs with at least one computer in Galicia

Source: Observatorio TIC and SXI+D

Also the number of companies that have a central server is large and it increases proportionally with the company size (close to 55% in small companies and 85% in medium ones). The operating systems used on these servers are still Microsoft's operating systems in their majority, but others like UNIX or LINUX have presence and in the medium companies also other types of O.S. have a strong presence (maybe because the wide usage of IBM computers with OS/400 or similar). Many medium companies seem to have more than one server machine, using several operating systems (see figures below):

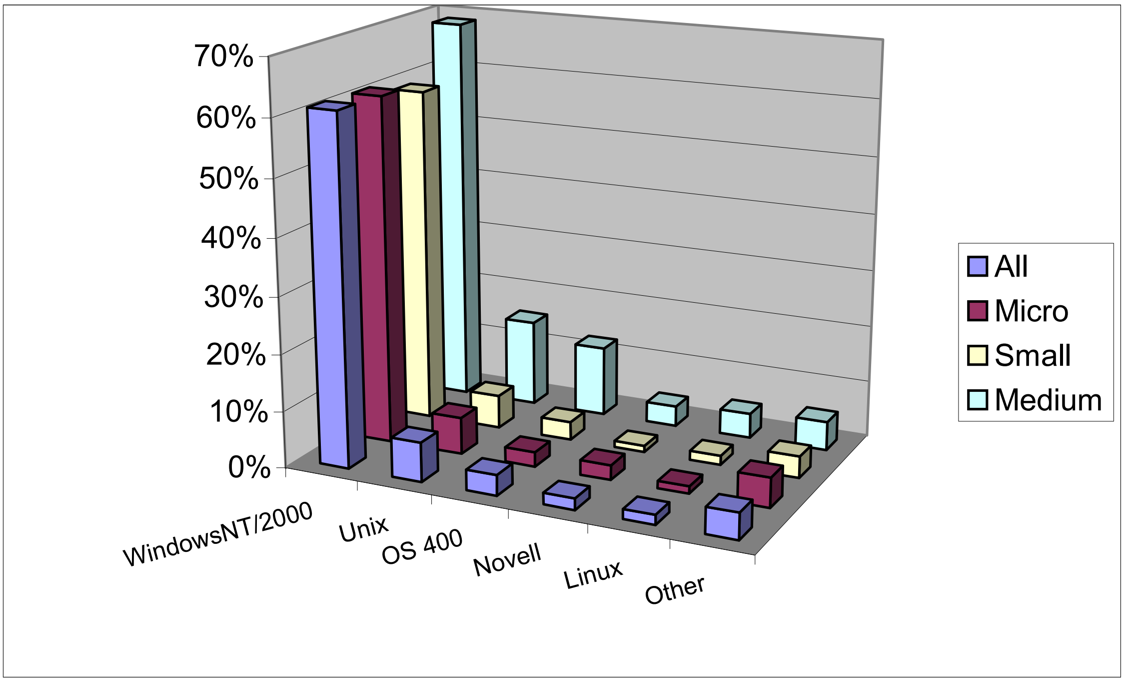

Figure 51: Operating System of the enterprise server

Source: ObservatorioTIC 2001

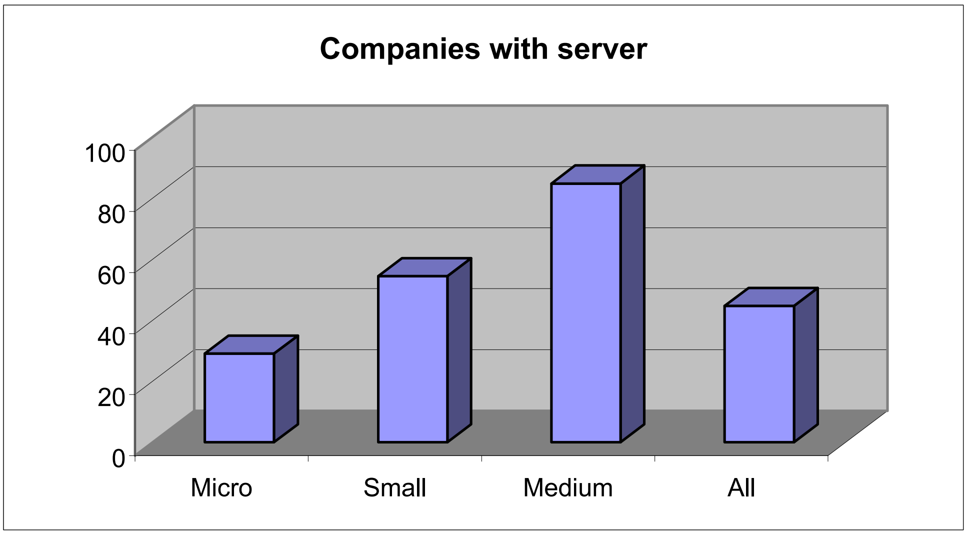

Figure 52: Companies with server in Galicia

Source: Observatorio TIC

3.6 Communications

A surprising 70% of the companies in Galicia have access to the Internet, ranging from 61% for micro enterprises to close to 90% in medium size companies. Usually, they use as the fastest possible connections: RDSI or ADSL (where available, see previous map presented in figure 17). The penetration of ADSL is still very low because it was introduced recently. However, an important fraction of medium size companies used ADSL last year. The analog connections are mainly used by the microSMEs and decrease a lot for the biggest SMEs. A large percentage of SMEs are using also other types of connections, maybe leased lines as Frame Relay. The cable Internet access is still very low, but we expect a significant increase in the next years (R, the cable company in Galicia calculate a 20% increasing).

The SMEs use Internet mainly for business: searching information and financial purposes. The connection for administrative tasks and to the administration is very high in the medium size companies. This can be explained since in Spain there exists a big number of services offered by the central government (both by the Social and Health Service as well as the Tax Service) though the Internet. Even more, some companies are obliged to make some declarations using this medium (for example, the *Sistema Red* of the National Social and Health Service). The usage for other purposes is still very low (below 20%).

	Galicia (all)	Galicia (micro)	Galicia (Small)	Galicia (medium)
Searching general information	62,71	53,21	68,90	80,49
Conection to banks	49,41	40,75	53,20	78,66
Searching Providers' products	36,39	34,72	36,34	43,29
Data transfer with other companies	34,39	32,45	31,98	58,54
Searching providers	31,79	29,43	31,40	46,34
Conection to Administrations	25,08	21,13	22,09	68,29
Place orders to providers	18,98	20,38	16,57	21,95
Publicity	15,71	7,17	21,51	35,98
Product offer	15,59	8,68	20,35	31,10
Reception of orders	13,22	12,08	13,66	16,46
Teleworking	13,06	9,06	13,95	33,54
Data transfer between premises	12,91	7,92	15,41	29,88
Searching clients	12,38	7,55	15,41	25,00
Payments to providers	12,03	12,83	11,34	9,15
Collections	5,02	6,79	3,20	3,66
e-learning	3,00	1,51	3,78	7,93

Table 25: Galicia - Internet usage

Source Observatorio TIC June 2001.

The usage of e-mail is widely spread in the companies with Internet access, ranging from 95% in the micro ones to 100% in the medium size enterprises.

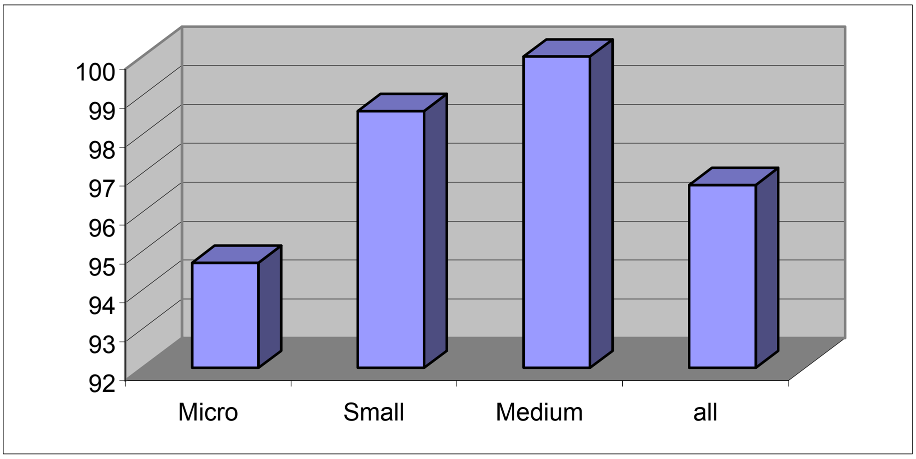

Figure 53: Galicia - Usage of e-mail among SMEs

Source SXI+D 2000.

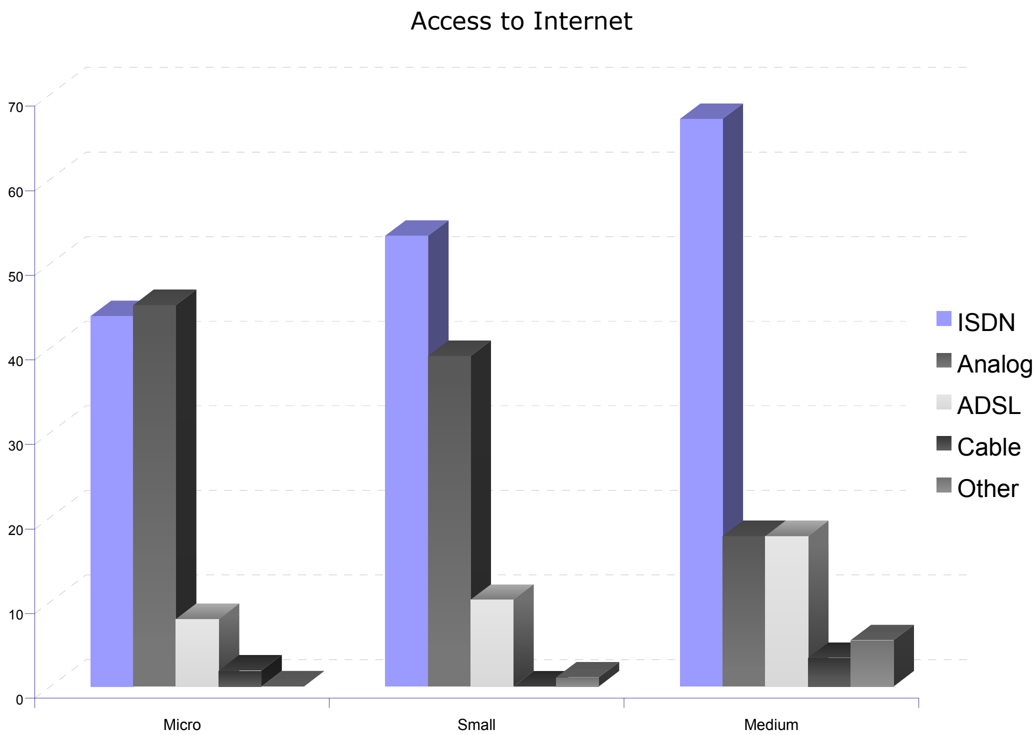

Figure 54: Galicia - Type of connections used for accessing Internet

Source: Observatorio TIC 2001.

3.7 Software Applications

As almost every SME has at least one PC working with Windows 98, it is possible to assume that this big subset of enterprises use it for making office tasks: write letters, inquires, offers, etc. This means, office software packages.

It is more important to analyse other type of software applications related to the management of the companies. The 74,33% of the companies have an integrated management software package (70,24% of micro, 76,06% for small and 81,16% for medium size. Source Observatorio TIC 2001). It was found that 80% of the companies within the commerce and service sectors use such applications (80,16% for commerce and 84,83% for services) while the construction sector has the lowest usage (only 59,66%). For these purposes, the smaller SMEs use standard software packages, sometimes customized to the requirements of the company. Among the larger SMEs, the standard software reduces its presence, and the custom made is the predominant (see figure below).

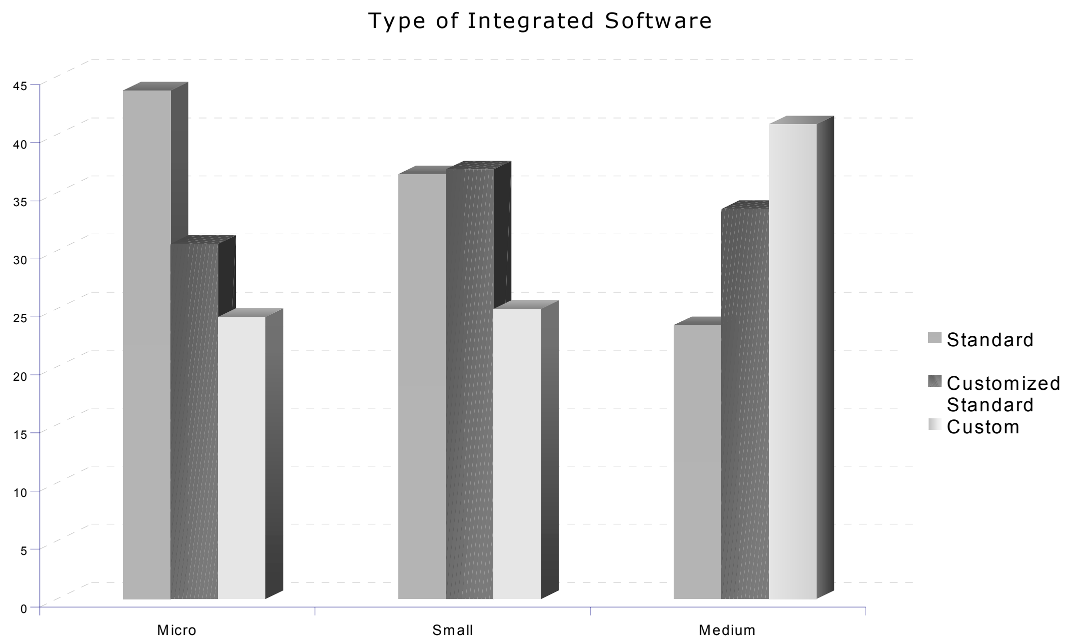

Figure 55: Galicia - Type of software used by the companies in management

Source ObservatorioTic 2001

The next figure shows the answers given when companies that have integrated software were asked about the modules included in the package. Modules of sales and accounting are commonly used meanwhile other processes of the company are the least computerized. The presence of modules related to the production (for example, warehouse) is more clear in larger companies, maybe because it is not needed in small enterprises.

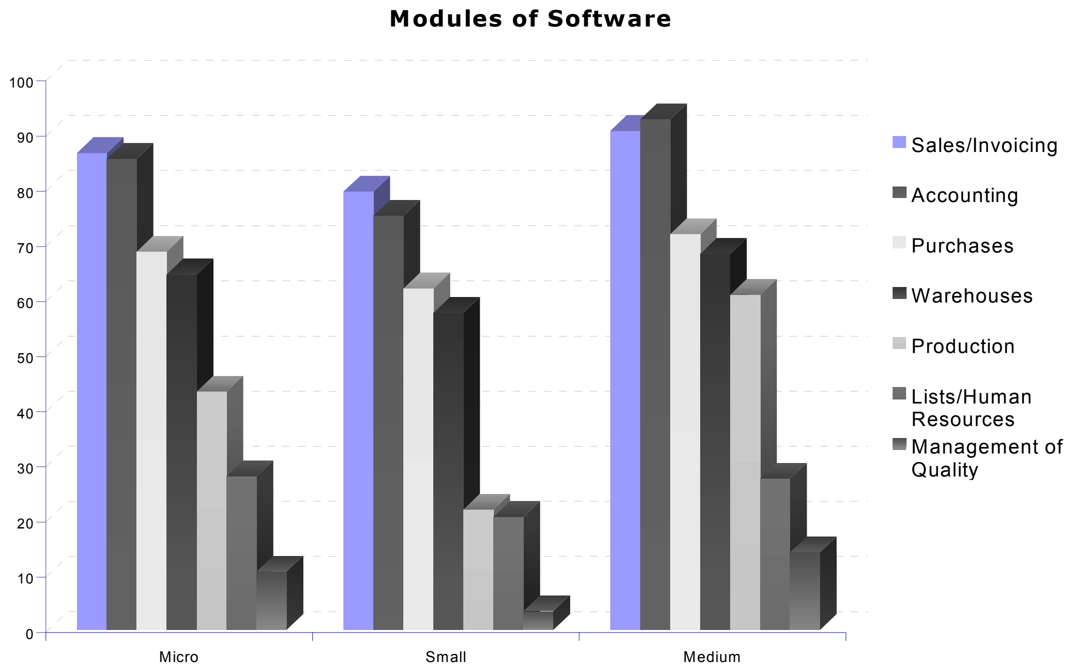

Figure 56: Galicia - Modules of software used by the companies

Source: ObservatorioTIC 2001.

3.8 Training

The ICT training within small and medium companies is still very low, with more training offered to regular IT employees. However, as can be seen from the figure in the section, only the clerks have adequate skills in computing within the overall workforce. Maybe this is due to the fact that usually they are the ones who work everyday with computers.

The internal training inside the companies is still in the infancy in Galicia. There are a few specialized companies in ICT training focussed in the professionals of this sector, but they are relatively new (few years) and, although they had a spectacular growth, they are still far from providing what is necessary in this area. There are also a plethora of small local companies that offer courses addressed to non-ICT workers (clerks) about user skills of Internet and office packages (like Microsoft office) but usually the cost of these courses is assumed by the employee because employees have to stay competitive due to the high unemployment or because they are students who want to enter the labour force.

The necessity for high level trained workers in ICT is a priority for the government and has been detected by the universities. In Galicia there are two Faculties of computer engineering (one in the University of Vigo and another one in the University of A Coruña), one of telecommunication engineering and, recently, the university of Santiago is offering a special type of diploma for high level students for training them in ICT technologies. In the ICT services companies the necessity of internal training is clearly recognized, but sometimes the price for this training (generally very high) and the great demand (and pressure) for their services do not allow them to do the right scheduling.

Also here exists a nation wide foundation which has the objective of increasing the internal training offered by the enterprises and the unions, but unfortunately the ICT training shares the budget with all of the specialities.

We do not have a clear study about the necessities of ICT training in companies and the correspondence between supply and demand. It will be proposed as an action to be done to the Foro for the Information Society of Galicia.

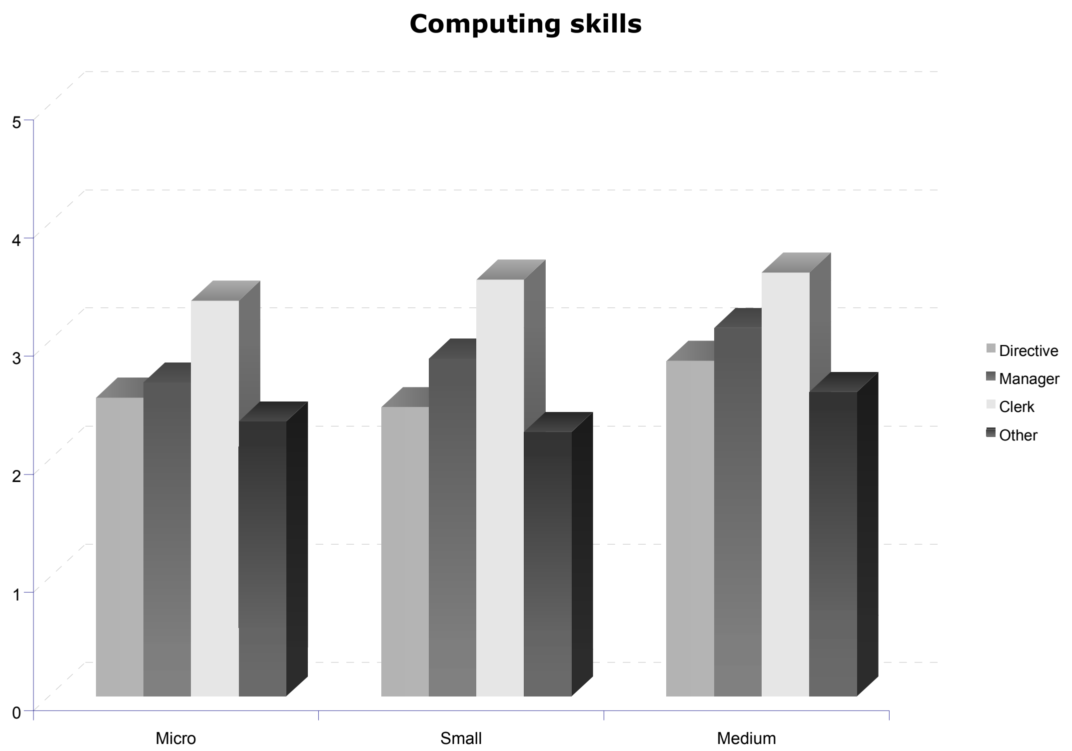

Figure 57: Galicia - Computer skills in the companies (rated from 0 to 5)

Source: Observatorio TIC 2001.

POMERANIA

3.9 Hardware and Usage

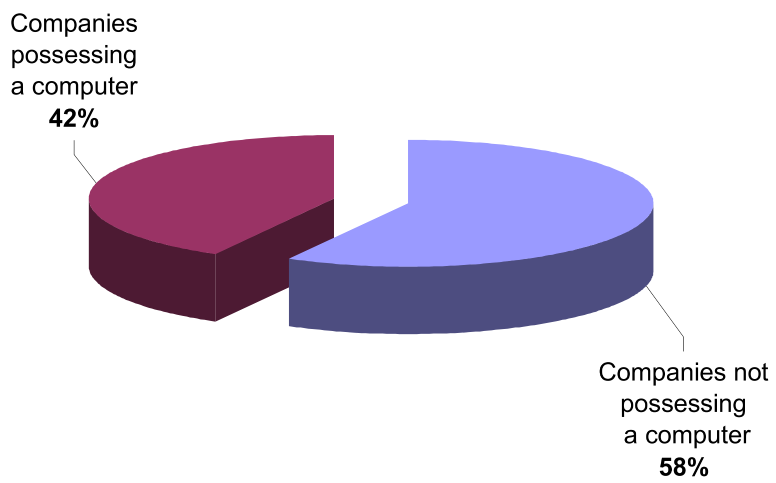

Figure 58: Pomerania - State of computer possession in Poland

Source: Demoskop

The above figure depicts how many Polish companies employing up to 49 people possess a computer. Unfortunately as many as 58% constitute companies which do not possess a computer.

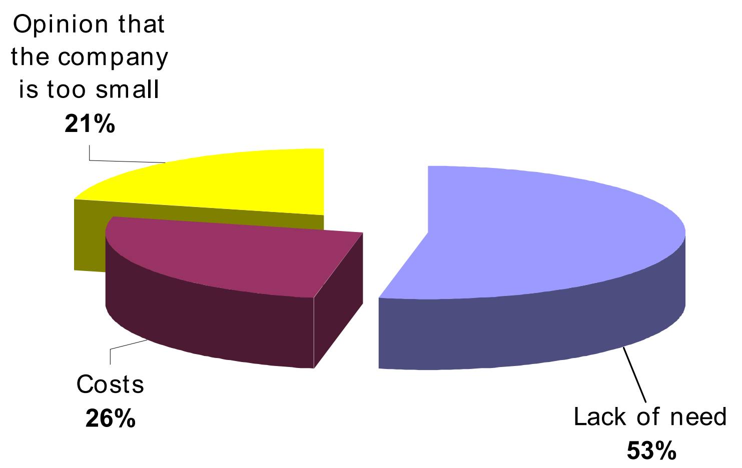

Figure 59 : Pomerania - Reasons for not possessing a computer in Poland

Source: Demoskop

The figure above depicts reasons that were stated by respondents as to why their company does not possess a computer. Some of the reasons stated are: lack of need 53%, high cost 26%, opinion that the company is too small to have ICT 23% [Demoskop].

In the following tables and graphs enquired Pomeranian companies possessing computers are listed by number of employees characterised with the number of employees, the sector in which they belong and the age of the company e.g. how long it has been active in the market.

Number of employees	**Percentage of companies**
up to 5	32,4
6 – 20	56,7
21 – 50	5,4
51 – 250	5,4

Table 26: Pomerania - Company –Employee breakdown among companies that responded

Source: own study based on the survey

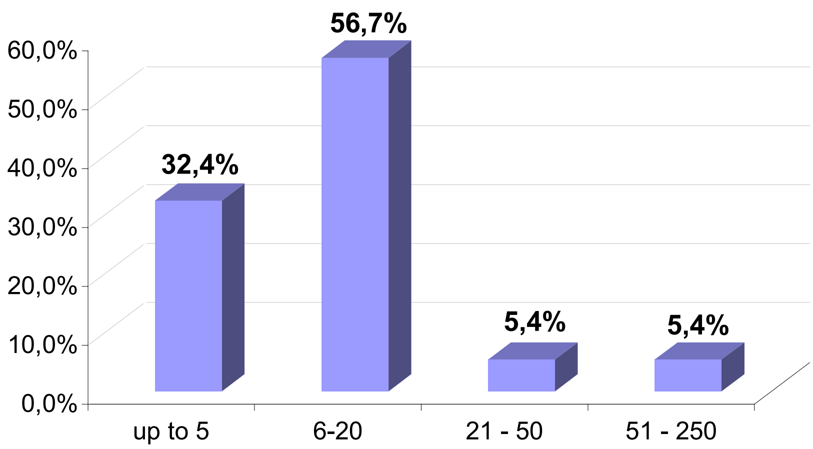

Figure 60: Pomerania - Company –Employee breakdown among companies that responded

Source: own study based on the survey

Among the enquired companies 32,4% constituted companies employing up to 5 employees, 56,7% employing from 6 to 20 and 5,4% companies with employment between 21 and 50 employees. Medium size companies (51 – 250 employees) constituted only 5,4% of the enquired companies and big companies were not enquired.

Main sectors, which were represented by the enquired SMEs, are presented below. It is worth pointing out that a large percentage of the companies polled belonged to the services sector and another large percentage were trading companies.

Main branches	Percentage of respondents
Commerce	48,4
Services	40,3
Production	11,3

Table 27: Pomerania - Companies by Main Area of Activity

Source: own study based on the survey

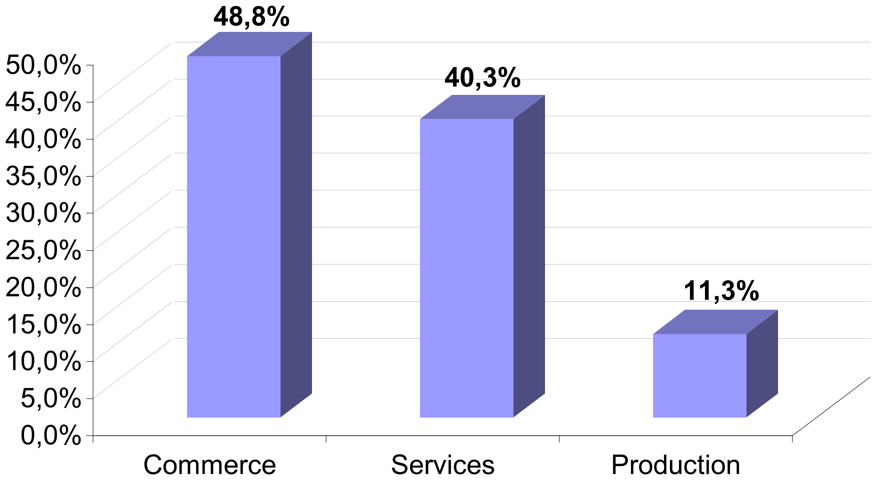

Figure 61: Pomerania - Companies by Main Area of Activity

Source: own study based on the survey

Number of years	Percentage of respondents
up to 10 years	73,6
11 - 15 years	18,8
more than 15 years	4,5

Table 28: Pomerania - Length of company life

Source: own study based on the survey

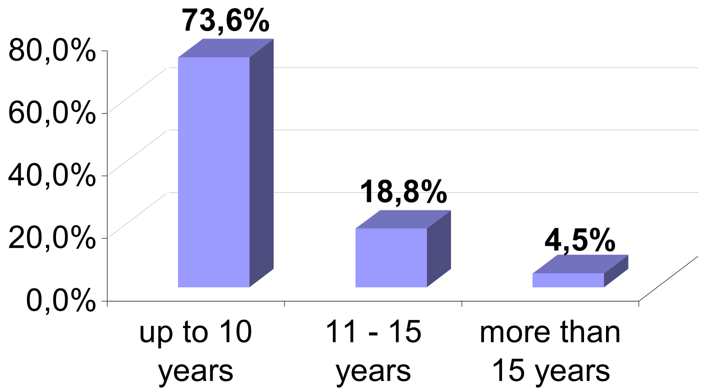

Figure 62: Pomerania - Length of company life

Source: own study based on the survey

Enquired companies were mainly young companies or very young companies. 73,6% of respondents represented companies existing for up to 10 years. The group of companies existing between 11 and 15 years comprised 18,8% of respondents while companies older than 15 years constituted only about 4,5%. From existing (IBDiPP) statistics it is worth noting here that in the year 2000 the average length of company activity after 1989 was 5.7 years.

Number of computer workstations	Percentage of respondents
2 - 5	54,3
6-10	8,7
11-20	22,8
21-30	8,5
31-50	3,1
>50	2,6

Table 29: Pomerania - Number of computer workstations in a company

Source: own study based on the survey

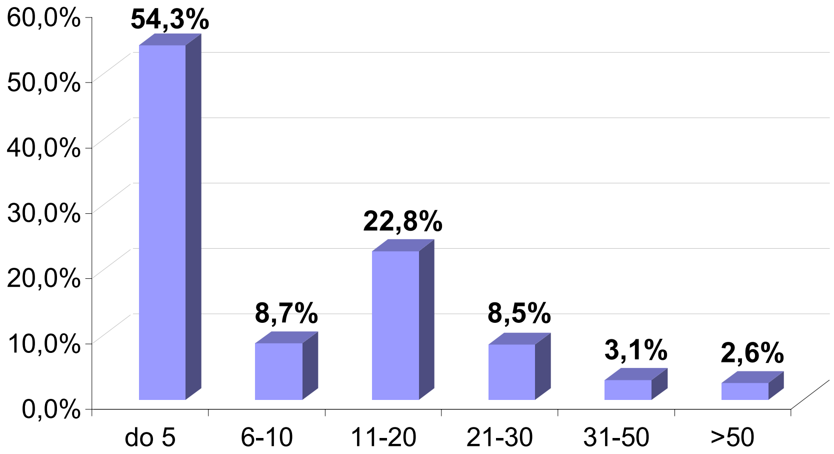

Figure 63: Pomerania - Number of computer workstations in a company

Source: own study based on the survey

According to the data collected over 60% of enquired companies did not possess more than 10 computers. A little more than 22,8% of enquired companies possessed from 11 to 20 computers and about 14,2% of the enquired possessed a bigger number of computer workstations. The number of computer workstations was proportional to the number of employees.

Percentage of employees using computers	Percentage of respondents
Up to 10%	4,4
11-20%	2,2
21-50%	11,1
>50%	82,2

Table 30: Pomerania - Number of employees using computers

Source: own study based on the survey

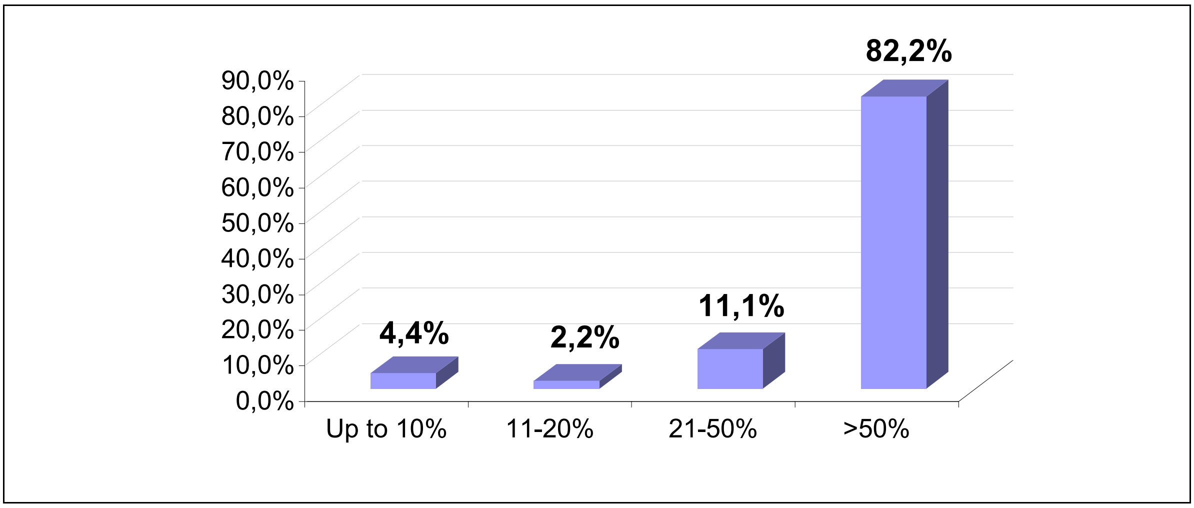

Figure 64: Pomerania - Number of employees using computers

Source: own study based on the survey

In conclusion, it can be emphasised that in the researched population of SMEs from the Pomeranian Region the biggest groups form companies:

- employing up to 20 employees (89,1%),
- possessing up 20 computers (85,8%),
- in which over 50% of employees use a computers (82,2%).

3.10 Communications

Among all enquired companies possessing computers (42%) fewer than a half possesses an Internet access (20,3%) [Demoskop].

Way of connection to Internet	Percentage of respondents
Analogue Dial-up	50,1
Permanent access SDI TP S.A.	32,2
Permanent link	8,8
ISDN	4,8
Other way	1,6
Satellite link	1,4
Call back	1,1

Table 31: Pomerania - Type of Internet Connection in enquired Companies

Source: own study based on the survey

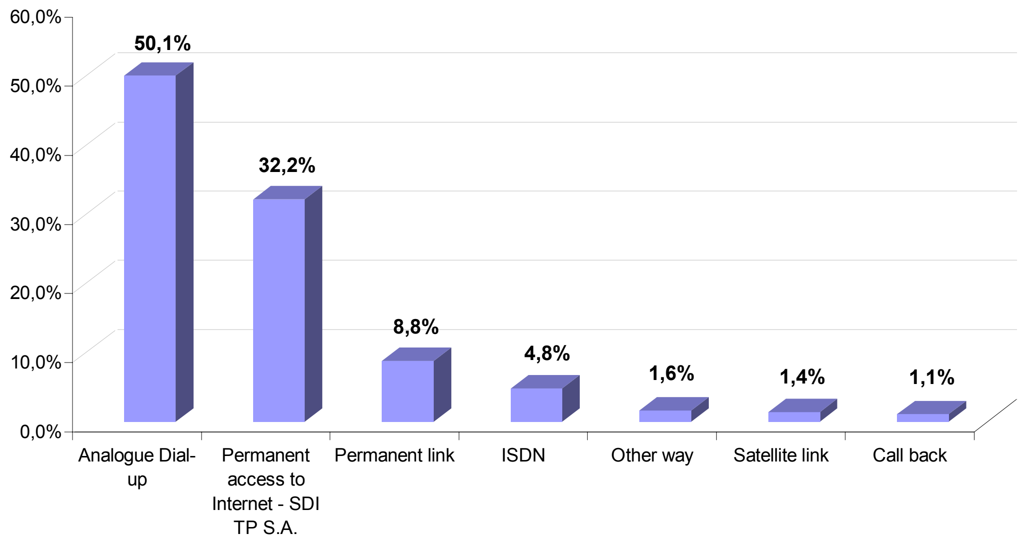

Figure 65: Pomerania - Type of Internet Connection in enquired Companies

Source: own study based on the survey

Above a half of enquired SMEs uses a slow Internet access. Only 32,2% of SMEs use a fast (SDI) Internet access. The majority of companies buy the service from the former monopolist TP S.A.

Number of workstations	Percentage of respondents
< 5	77,8
6-10	7,1
11-20	6,5
21-30	4,6
31-50	2,2
> 50	1,8

Table 32: Pomerania - Number of computers connected to Internet

Source: own study based on survey

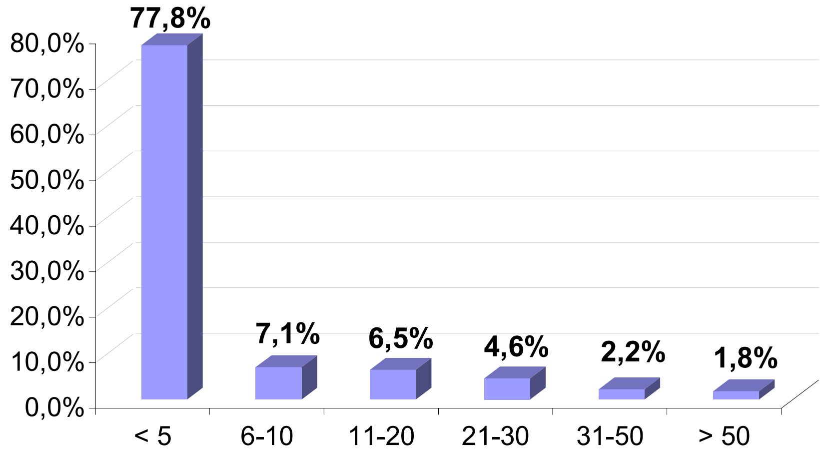

Figure 66: Pomerania - Number of computers connected to Internet

Source: own study based on the survey

The interpretation of the research result how many computers are connected to Internet is difficult, because as many as 77,8% companies restricts this number to 5 computers. The question is whether it is a big or a small number. Taking into consideration the fact that about 85% of companies possess up to 20 computers (in this 54,3% up to 5 computers) and 89,1% of the population form the companies employing up to 20 employees, the received result confirms a relatively big interest in Internet access.

Percentage of employees	Percentage of respondents
Up to 20%	15,6
21-50%	17,8
51-80%	28,9
>80%	37,7

Table 33: Pomerania - Number of employees using Internet, among those using computers

Source: own study based on the survey

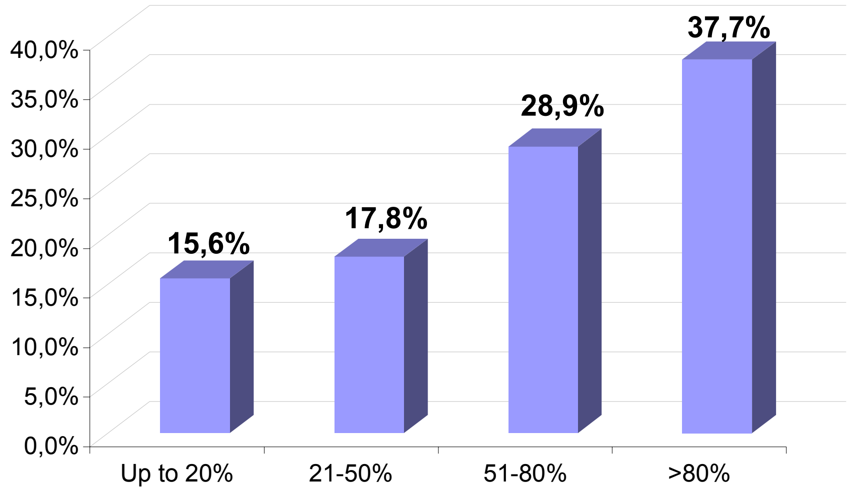

Figure 67: Pomerania - Number of employees using Internet, among those using computers

Source: own study based on the survey

In the 82,2% of enquired population of SMEs in the Pomeranian Region above the half of employees use computers, and among those above 50% use Internet in 66,6% companies.

3.11 Software Applications

With reference to the software connected with ICT in SMEs it is necessary to separate the software for servers from this for work stations. In case of work stations the Microsoft is dominant (operation system WIN95/WIN 98, browser: IE/NetScape, e-mail customer: Outlook Express/NetScape. In case of WWW servers LINUX/Apach is the dominant one. With reference to the management software majority of SMEs focus on use of Finance&Account software (including mainly: accountancy, salaries, storage, invoicing, social insurance). Software of ERP, SCM, CRM type is rarely used, although the interest in this software development in companies is often observed.

3.12 Training

Insufficient knowledge of Internet usage in company makes a barrier for Internet implementation in it, although the fact of realising this barrier (43%) should be recognised as a factor helping to overcome it. The readiness to enjoy the help and hints is declared by 58% of representatives of SMEs without an access to Internet (Demoskop). The variety of educational initiatives in the form of conferences, publications, trainings and consulting are realised in different ways by institutions and companies. Internet companies index registered 172 offers and among those 10 were directly and strictly connected with the Pomeranian Region.

4 ICT Infrastructure

CYPRUS

4.1 IT Companies

There is a number of IT companies operating in Cyprus, most of them having fewer than 9 employees each, offering a wide range of solutions and services in the island. The local IT companies are divided in three major areas:

i. System Integrators (Hardware and Software vendors). In this area we have approximately 20 companies
ii. Software Vendors. In this area we have in excess of 45 companies
iii. Hardware Vendors. In this area we have more than 75 companies

As it can be seen the majority of these companies are involved in the hardware business, which includes wholesalers and retailers. There is no local manufacturing in Cyprus apart from assembly plans for mainly PCs. All other hardware are brand names imported from overseas. In the last 5 years there has been a major move from custom made software, developed by the various software companies on the island for both the private and the public sector, towards ready made packages from overseas and particularly from the Greek Market. However, major customers on the island such as the Government of Cyprus, semi-Governmental organisations, still rely on either bespoke software or heavy customisation of ready-made packages. The majority of packaged software is implemented to cover the operations of the retail and wholesale sectors, like stock control, accounting, office automation mini-ERP like systems and more.

Most of the large organisations like banks and semi-governmental organisations have their own Information Technology departments. Large organisations use sophisticated software applications like CRMs, ERPs, HR packages and other complex software specific to their operations. Usually the services of IT consulting companies are sought in implementing such systems.

4.1.1 IT Expenditure

It is estimated that the total expenditure on IT Software, Hardware and Services has reached in 2001 to a total of 160 million Euros. This is an increase of approximately 10% from year 2000 figures. The majority of expenditure was from Government, Semi Government and Banking institutions. It is estimated that the market will reach 182 million Euros by the end of 2002.

In the hardware arena there were 42.000 new computers of which the majority were sold from the local assembly plans of PCs. The period 2000 – 2001 has seen the move towards ERP and CRM based technologies as well as other technologies such as Office Automation and the Internet.

Though Services and Software have experienced the largest increase in expenditure the analogy to hardware expenditure is still below European standards. The market also suffers from the lack of skilled personnel, high prices of hardware, the continuous drop of the Stock Exchange since late 1999 and long procurement cycles from the Government and Semi-Government institutions. [Source: Cyprus Information Technology Enterprises Association (CITEA)]

4.2 Telecommunications Infrastructure

Currently, as mentioned earlier, the telecommunications infrastructure industry in Cyprus is regulated in such a way that allows only one entity, the Cyprus Telecommunications Authority (CYTA), to build and provide the infrastructure necessary for telecommunication purposes for the whole country. The industry will soon be deregulated as part of the process of aligning Cyprus' law according to European directives and a full liberalisation by 01/01/2003 is anticipated.

4.2.1 Infrastructure Within the Island

The Cyprus Telecommunications Authority has been placing particular emphasis on Network Development. To this end, the transmission network was fully digitised prior to 1999. Since October 1999, the switched network was also fully digitised following the removal of the last crossbar analogue telephone exchange. The public switched telephone network (PSTN) is operating in full (100%) digitisation. The total digitisation allows CY.T.A. to introduce new intelligent services for all the PSTN customers. Currently services offered on the Intelligence Network platform are prepaid GSM and premium rate services.

CYTANET, is CYTA's set of Internet solutions and services, including communication backbone, Internet connectivity, and support. CYTANET provides Point of Presence (PoP) in all major cities of the island. These points offer various connectivity options. They offer PSTN Connection up to 56000bps, ISDN Connection up to 64000bps, GSM Connections (9600bps), leased lines with a variety of speeds, and A-DSL connection. CYTA's island network is described in the following figure:

Figure 68: CYTA's Internet Infrastructure

Source: www.cytanet.com.cy (date: 5/1/2002).

4.2.2 Global Connectivity

Operator Assistance, Toll-free calling and global ISDN, the latter supporting all bearer services, as well as a variety of teleservices and supplementary services, further supplement the Telephony Services.

Several submarine fibre optic cable systems are currently in service connecting Cyprus with:

- **The West**: The *Greece-Aphrodite 2* cable interconnects with *ARIANE 2*, of which CYTA is a major co-owner, and stretches from Crete in Greece to Marseilles, France. It constitutes one of the two major digital backbone facilities connecting Cyprus to Europe, the American continent and the rest of the world.
- **The East**: Cyprus is connected with Israel, Lebanon and Syria via repeaterless cable systems of SDH technology

- **The South and beyond**: There is also a connection to Egypt
- **The East and West**: A state-of-the-art cable system, *Israel and Italy-LEV* was put in operation in January 1999 and is used to interconnect Cyprus to Israel on the East and Italy on the West, with Cyprus maintaining a major role in the regional network.

As a major co-owner and administrator of cable systems, CYTA facilitates the transfer of capacity on submarine fibre optic systems on both IRU and lease basis. Owners of capacity in major international cable systems landing in Cyprus have access to considerable reserve capacity in submarine cables, which connect Cyprus to rapidly developing neighbouring countries.

This far-ranging fibre optic cable network is supplemented by an equally impressive satellite telecommunications network, which delivers enhanced and high quality international connectivity. CYTA is a co-owner of INTELSAT, EUTELSAT, INMARSAT and ICO, and, in addition, has access to Russian and other satellite systems. One earth station site owned and operated by CYTA has a total complement of more than 20 antennae. (Source CYTA)

4.3 ISPs

There are currently sixteen ISPs (some of them are not active) that serve Cyprus that offer a wide area of service. They provide PSTN dial-up connections of up to 56bps, ISDN connections of 64kbps or 128kbps, A-DSL connection, and fixed line connection through leased lines and ATM frame relays.

The figure below illustrates the market share of the main ISP's in Cyprus:

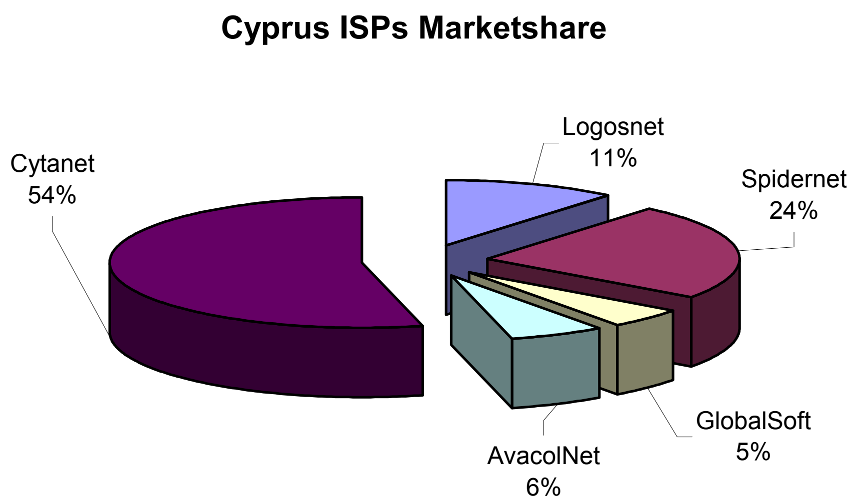

Figure 69: Cyprus ISPs Marketshare

Source: CYTA (February 2002)

The minimum charge for the user for accessing the Internet is lower than the local cost of a telephone call and it is 1,3 cent (0,02 Euro) per 4 minutes. The prices vary for subscription to Internet and are as low as CY£6,5 (11,28 Euro) for a simple PSTN connection and up to CY£30 (52,05 Euro) for A-DSL connection (1,5Mbps). It is pointed out that, for the time being, a DSL connection is offered only in city boundaries.

GALICIA

4.4 IT Companies

As in the case of Cyprus, there exists a plethora of ITC companies in Galicia. They offer mainly services although there are few companies that offer their own products of telecommunications as Intelsis (recently bought by an Italian company) that produces network products, Egatel used in Digital TV, etc. Also, a few companies produce software mainly focused on the management of specialized sectors (hospitals, energy, etc). Also, through nation wide companies, it is possible to get any product or service that is not covered by the local companies.

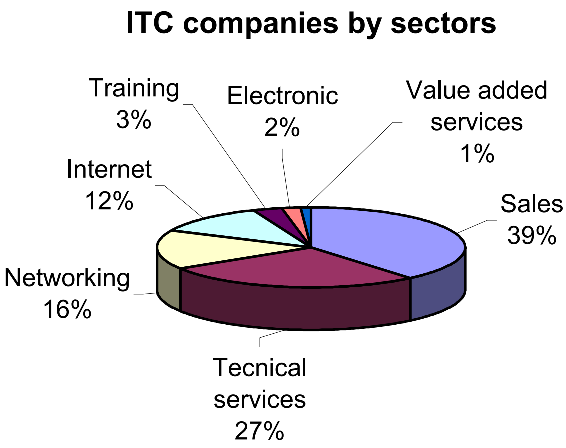

Figure 70: Galicia - ITC companies by sectors

Source: Galicia 2002. Xunta de Galicia.

4.5 Telecommunications Infrastructure

According to the data from the local government, there are 200.000 km of fibre optics installed in Galicia by the operators. As said before, Telefonica is the dominant operator (more than 170.000 Km) and the other companies (R, Retevision, Comunitel, Jazztel, etc) are installing their infrastructure mainly in the more populated zones (big cities and the west coast) as can be seen in the figures about the ADSL availability above and in the infrastructure of Retevision below. Where these new operators have not got infrastructure they use the fibre from other companies as Renfe (the railroad company) or Union Fenosa (a company dedicated to electrical energy production and distribution).

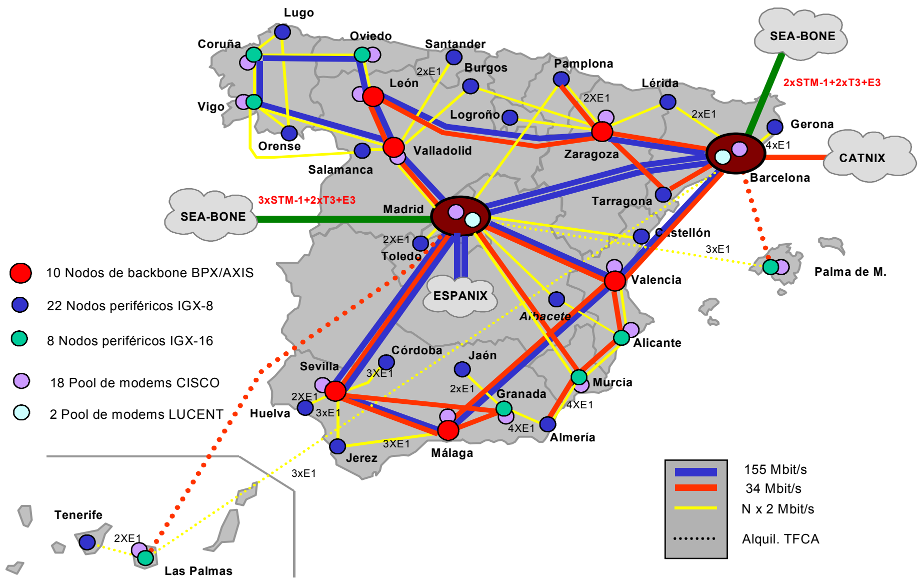

Figure 71: Galicia - Nation wide infrastructure of Retevision – Source Retevision

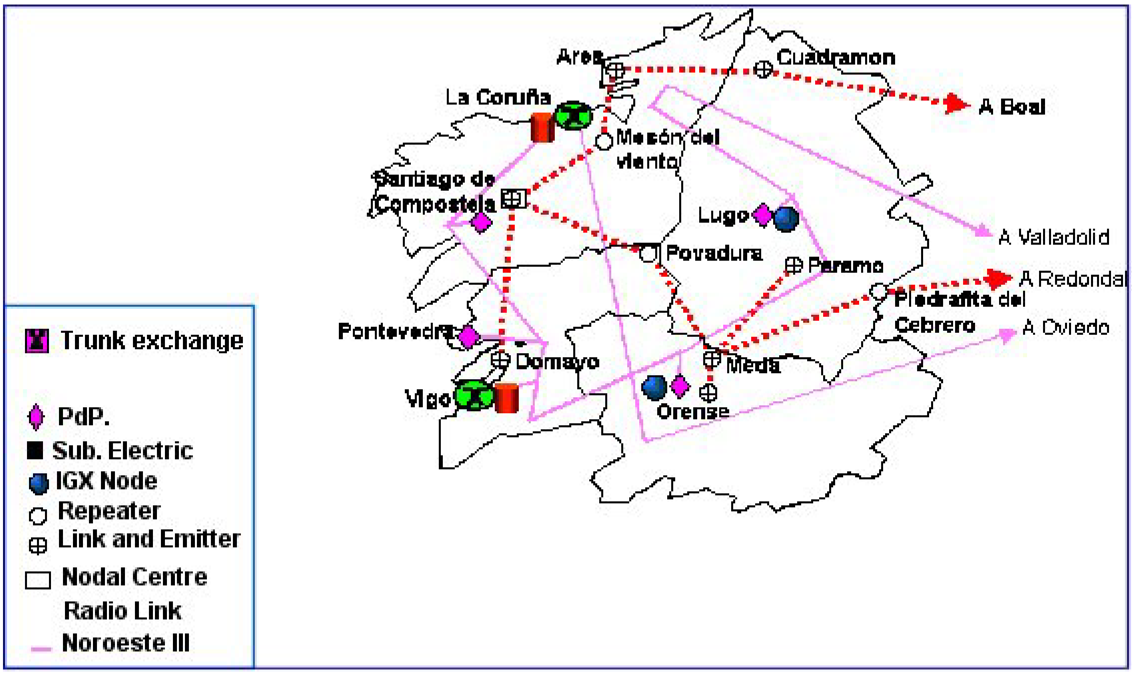

Figure 72: Infrastructure Retevision in Galicia

Source Retevision

Due to the constant grow of Internet data traffic, the Foro for the Information Society in Galicia is promoting the construction of a neutral point which will be installed at Cesga (Supercomputing Center of Galicia). In this point the traffic between the different operators and the government networks will be changed when they have not left Galicia. The neutral point (named Galnix) will joint initially the research network, the local government network and 5 operators and will be operational during the first quarter of year 2002.

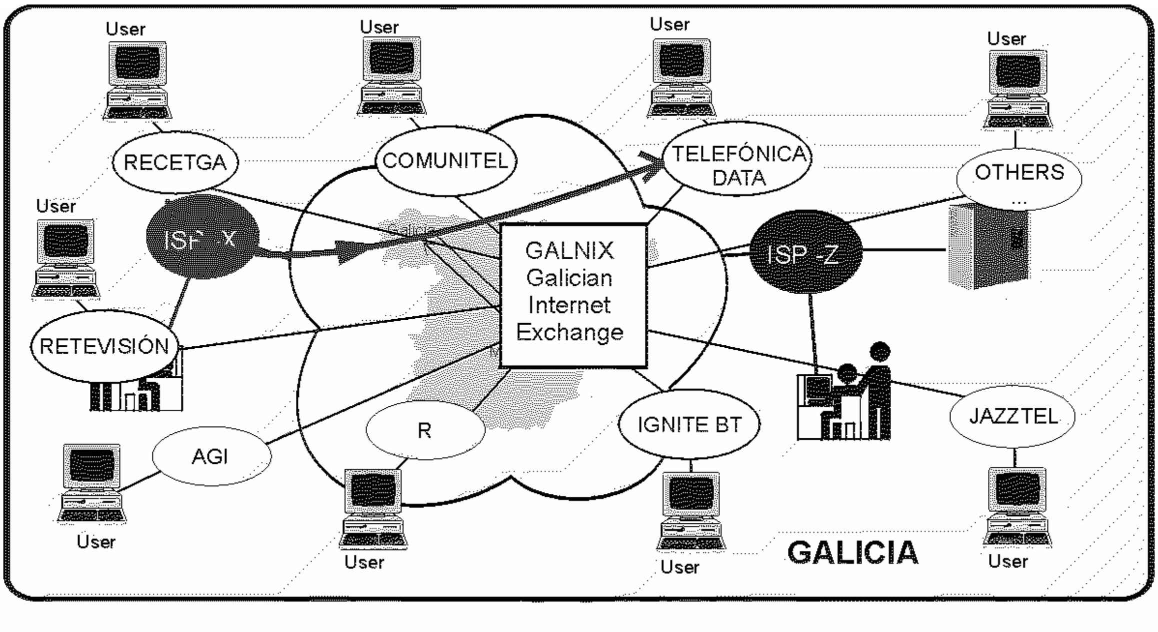

Figure 73 : Calicia - Galnix schema

Source: CESGA.

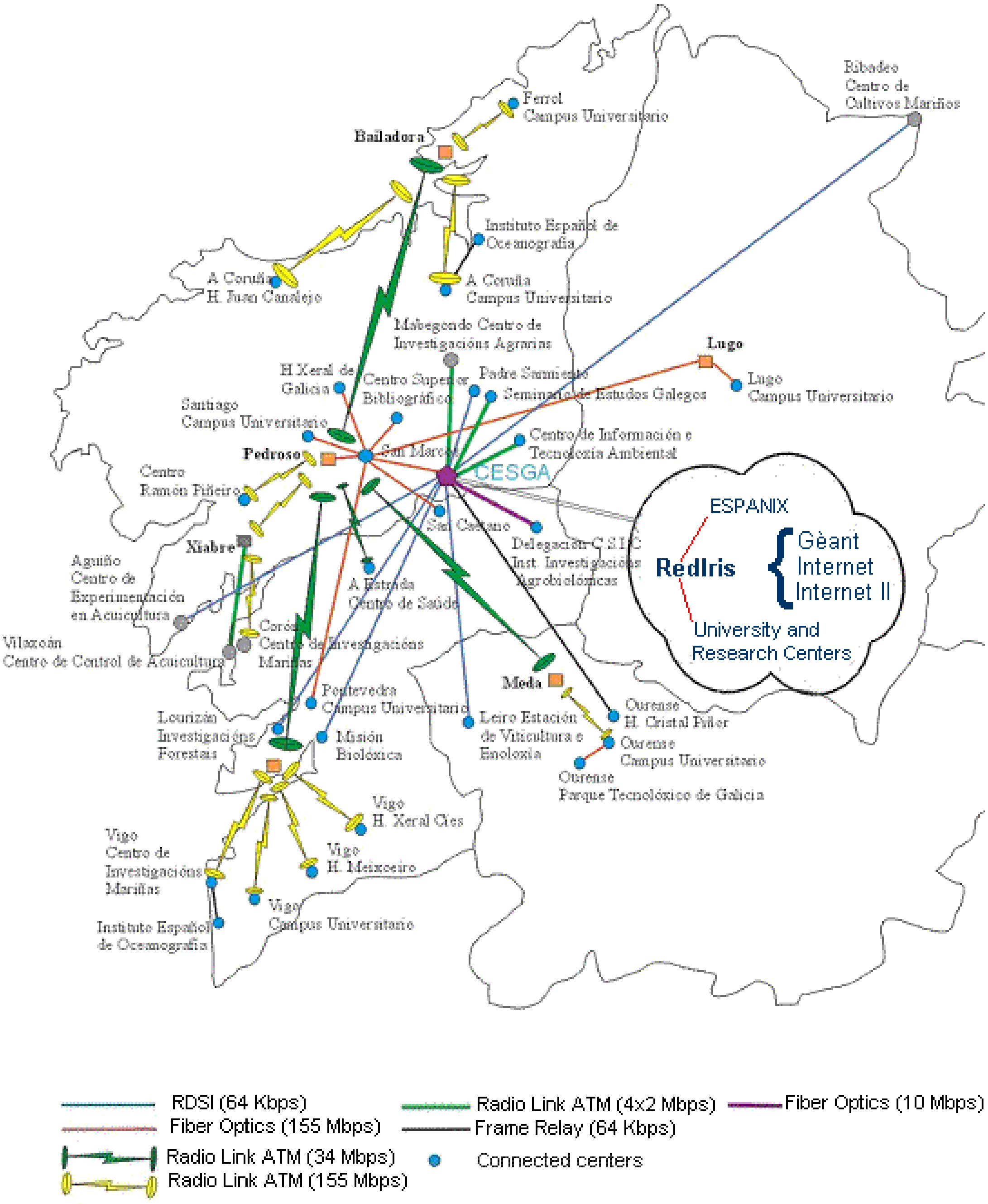

Figure 74: Galicia - RECETGA network

Source: CESGA.

Actually, almost any transport technology can be contracted in the big cities (fibre optic, radio networks, data mobile phone, trunking) for using the most advanced protocols (ATM, SDH, LBMS, etc). In the rural areas, this means far from the big cities, it is easy to contract broadband lines based on ADSL or Frame Relay in several zones, but there are still several places where only ISDN is available. Even more, there are several rural areas where access to the Internet is not possible because the wireless for rural telephony is based in old technologies (more or less, 60000 people).

Most of the international connections to the Internet and even the inter-regional connections are based on traffic interchanges in Madrid, where there exists a neutral point between the main operators working for several years.

There is also an important network for research and development named RECETGA. It links all the universities and research centres in Galicia using fibres and radiolinks and it is connected to the nation wide research network Rediris. Through it, RECETGA will be joint to the new European research network GEANT at 2.5Gbps.

4.6 ISPs

In Galicia there are 32 ISPs registered in ESNIC, these means, those that have their own pool of IP addresses. This big quantity of ISP was produced by Infovía, a national wide service which was provided by Telefónica, the dominant operator. Using this general infrastructure, any company can provide access to the Internet having only the leased line with an international carrier (usually Telefonica). So, they really work as *virtual ISPs*, because they don´t need their own telephony infrastructure. Actually, there exist other national and international companies that offer Internet connectivity as Wanadoo, Terra (a company of Telefonica), El Mundo (a newspaper), Iddeo, etc.

Since a couple of years, the cost for accessing the Internet is decreasing a lot, due to the flat fees that several companies are introducing because of the push of the National Government. Today, where available, it is possible to contract one ADSL connection to Internet (2Mbps) at 70€ monthly being connected all the day. Cheaper fees can be contracted for special hours, mainly between 18:00 and 8:00 in the morning targeted to the citizens (as cheap as 6€ monthly plus 80Cents per hour).

Also, there are many companies which offer free e-mail service through the WEB or even free access to the Internet (paying only the telephone call) but without quality guarantees. These companies receive from the telephony operator a percentage of the price per minute of connection. Examples of these services are El Mundo or Canal21. They are focused in the low market sector which have no access to the Internet from home. Also, in Galicia there is a strong presence of public access services as cybercafes because the network equipment was paid by the local government a couple of years ago. The prices of these services are very low (close to 1€ per hour) and include other pay-per-use services, such as printing.

POMERANIA

4.7 IT Companies

The number of IT Companies changes and depends on the general economic condition. Currently only in the Tricity (Gdansk, Gdynia, Sopot) from the Pomeranian Region 35 companies are active in IT industry, which employ from 2 to 1500 employees. These companies offer their services in eleven different categories, which consist of 45 detailed offers. Among the companies active in this market are those which started in 1985 as well as the ones operating since the year 2000.

Since 1991, which is the year of Internet begin in Poland, the Scientific and Academic Computer Net (NASK) originating from the academic circles, has been the entity managing the domain register in .pl domain.

4.8 Telecommunications Infrastructure

4.8.1 Country Infrastructure

The current telecommunications services market is demonopolised but companies are obliged to acquire a licence which is issued by the Office of Telecommunication Regulation (URT). As long as to the year 1991 Telekomunikacja Polska S.A. (TP S.A.) was the national monopolist in the field of telephones and teletransmission. It still retains the dominant position in the market. In 1996 TP S.A. as the first opened a common accessible backbone net (X.25 and Frame-Relay) and dial-up Internet access nodes (33,8 kbps) at the price of a local telephone call fee. The data transmission market is commonly believed to become more and more mature. A significant role play a few with national range, which possess widespread backbone nets. Mostly the backbone nets use SDH, ATM, Frame-Relay, X.25 protocols. In bigger cities of Poland an access to net via radio technology LMDS is possible, only in Gdansk and Gdynia in the Pomeranian Region.

Thanks to the gradual deregulation of the telecommunication market taking place since 1991 telecommunication infrastructure has been created in the market competition environment. According to the Office of Telecommunication Regulation data 618 companies have obtained a licence on data transmission and telephone services, whereas only a small number (11) play a significant role.

The biggest national optic fibre nets are owned by:

- TP S.A. with the SDH/ATM backbone with bandwidth of most parts at the speed of 622 Mbps and the most important part at 2,5 Gbps and with the backbone DWDM, being the provider for many smaller operators,
- Energis Polska together with Polish Railways have built the SDH/ATM and DWDM net along railways since 2001 and the scheme is presented in the following figure:
- Polish Energetic Lines render optical fibres stretched on high voltage energetic lines for Telenegro creating national SDH 2,5 Gbps and DWDM backbone.

Figure 75: Pomerania – Nation wide ENERGIS backbone net along railways

Source: Energis Polska

A significant role plays the net POL34 (backbone scheme in the following figure), which was created in 1997 for the scientific circles connecting academic nets in 16 Polish towns, which connects 36 scientific entities in Gdansk -Sopot -Gdynia. Its backbone consists of SDH/ATM (155 and 622 Mbps).

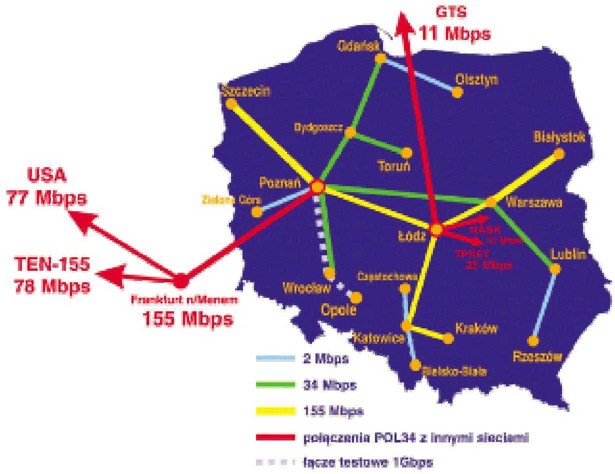

Figure 76: Pomerania – Nation wide Backbone net for scientific circles POL34

Source: POL34

Three GSM net operators existing in Poland developing a net of base stations reached the 90% coverage of the country each. Two of them has started GPRS service in 2001, all currently offer an access to Internet at the speed of 9,6 kbps.

Other national and abroad companies have built on a smaller scale modern data teletransmission nets focusing on increasing the number of access nodes including analogue dial-up, ISDN, ADSL and radio LMDS.

4.8.2 Global Connectivity

Currently 10 telecommunication companies declare to have connections of their backbones with foreign operators. The parameters of these connections have been systematically improved, and some companies conduct investments which are planned to be finished in 2002. In the table below the agregated bandwidth of international connections of selected biggest operators are presented:

No	Operator	Internet international connections
1	TP S.A.	Total 620 Mbps
2	Energis	Total 600 Mbps
3	Internet Partners	320Mbps+34Mbps
4	POL34	155Mbps+11Mbps

Table 34: More important Internet connections between Poland and the world

Source: the companies at the end of 2001

4.9 ISPs

According to the Office of Telecommunication Regulation (URT) the ISP licence was obtained by 446 companies in Poland and 33 out of those are registered in the Pomeranian Region. According to the data of www.providerzy.pl service which keeps the register of active ISPs in Poland, the number of ISPs has been growing fast and on the 14th of February, 2002, 52 companies were active in the Pomeranian Region.

Type	Poland	Pomeranian Region	%
Fixed-line telephone operators	169	6	3,6
Mobile telephones operators	3	3	100
Internet services providers	446	33	7,4
Total	**618**	**42**	**6,8**

Table 35: Pomerania - Licence for IT services rendering

Source: URT

Among the currently offered methods of access to the Internet in Poland the following can be distinguished:

		AVAILBILITY	
		POLAND	**POMERANIA**
a)	Dial-up connections		
	- classical – analogue,	Yes	Yes
	- ISDN,	Yes	Yes
	- via mobile phones	Yes	Yes
b)	permanent connections		
	- permanent link,	Yes	Yes
	- radio links LMDS,	Big cities	Gdansk, Gdynia
	- ADSL links (Neostrada)	Yes	Yes
	- ISDN (SDI)	Yes	Yes
	- housing estates nets	Yes	Yes
	- access via cable TV	Few big cities	No
	- access via power industry nets (in phase of experiment)	Experimental	No
c)	Others		
	- GPRS,	Yes	Yes
	- Oneway satellite links.	Yes	Yes

Table 36: Type of Internet Connection Available in Poland and Pomerania

Source: own study

The Internet access offers of three selected operators active in the Pomerania Region are presented below. A short technical characteristic of their offers including prices follows.

Telekomunikacja Polska S.A.

The dial-up access to Internet is reached according to the PPP protocol. Dialling-up respectively: 0 20 21 22 (PTSN) or 0 20 24 22 (ISDN) a user pays for the connection equally to or even less than for the local telephone connection. The local connection fee is 0.35 PLN (0,0989 EUR) for 3 or 6 minutes' connection depending on the time of the day. The access nodes are located in 5 towns in Pomerania.

SDI provides quick transmission and a constant access to the resources beside undisturbed posssibility of telephone usage. This offer is dedicated especially to: small enterprises, shops and people working or learning at home. The data trasmission works at the maximum speed of 115,2 kbps. While using the telephone the speed decreases to 70 kbps. SDI customers receive a constant address IP thanks which SDI enables to link a server. The single-time installation fee is 856,00 PLN (235 EUR) and a monthly subscription is 139,10 PLN (38 EUR).

NEOSTRADA is a solution which consists of three elements: a fast, wide band access to Internet (based on ADSL technology), e-mail address and a place on server for the user's own web site. Neostrada uses a telephone link of the subscriber to provide constant fast connection with Internet in the direction to the subscriber at the speed of up to 2Mbps depending on the version. Thanks to ADSL technology apart from using the same cable connection the parallel usage of telephone is possible. The user pays a constant subscription fee, regardless of the number of hours spent in the net. The subscription fee depends on the speed.

Connection speed:	Single-time activation fee: (Euro)	Monthly subscription fee: (Euro)
256 kbps	85,-	73,-
512 kbps	266,-	117,-
1 024 kbps	641,-	244,-
2 048 kbps	641,-	352,-

Table 37: Prices of Neostrada services

Source: www.tpsa.pl

Internet Partners

Internet Partners is one of the largest commercial Internet groups in Poland. They offer domestic and international interconnections of high data transfer. Domestic IP backbone and local access networks are present in the largest Polish Cities. They have ATM 2,4 Gbps fibre link to transeuropean GTS-EBONE node in Berlin with a special 320 Mbps bandwidth channel dedicated to Internet. There is another STM-1 connection with Prague with 34 Mbps Internet channel.

IP Standard is an offer for a leased line Internet connection. Range of service covers: 24 hours maximum length of reaction time, access to the proxy-cache server, international routing via EBONE network, spare SMTP, address translation (NAT), IP address pool, Dial-up access account, ADSL modems. The cost of leasing the line from other operators is covered by subscriber and is not included.

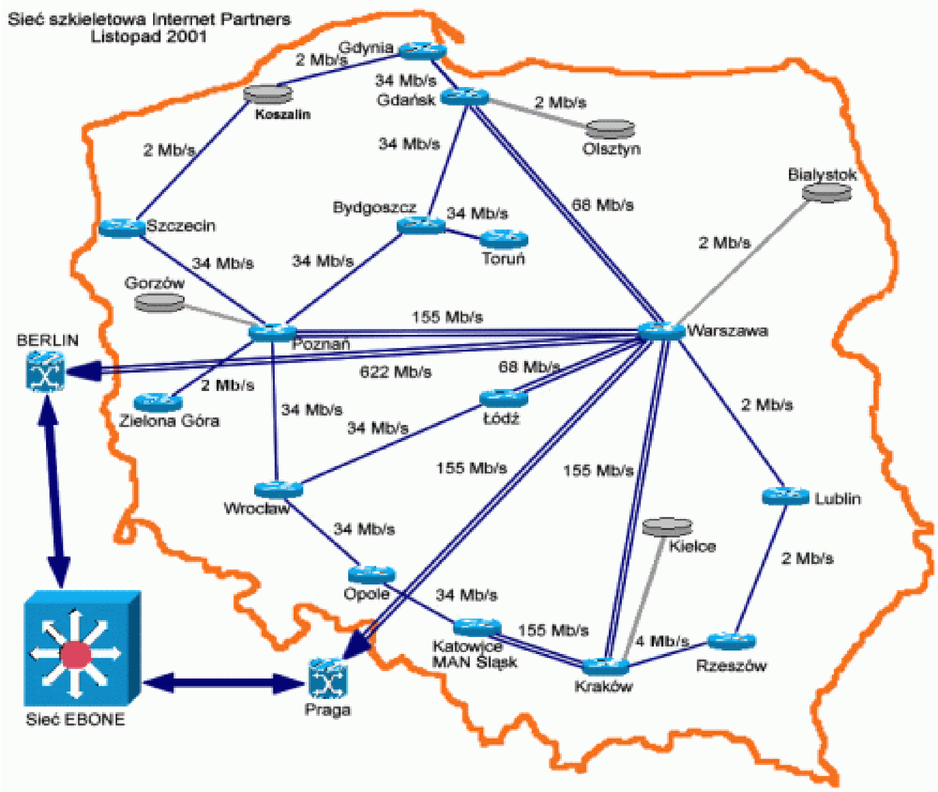

Figure 77: Pomerania –Internet Partners Nation wide backbone network

Source: Internet Partners

Connection speed:	Single-time activation fee: (Euro)	Monthly subscription fee: (Euro)
128 Kbps	1002,-	294,-
256 Kbps	1002,-	382,-
512 Kbps	1002,-	558,-
1024 Kbps	1002,-	823,-
2048 Kbps	1002,-	1175,-

Table 38: Prices of IP Standard services

Source: www.ipartners.pl

Crowley Data Poland Sp. z o.o.

Crowley Data Poland Ltd. has been an operator of data transmission cordless net, offering a commercial wide band access network LMDS (*Local Multipoint Distribution System)* linking customer's location with the ATM backbone built of lines with bandwidth of 155 Mbps. The access nodes are located in big towns, in Gdansk and Gdynia in the Pomeranian Region.

DATASTAR is an offer of a constant access to Internet comprising connection of the customer's location with backbone by radio at the connection speed from 64 kbps to 2 Mbps.

Connection speed:	Single-time activation fee: (Euro)	Monthly subscription fee: (Euro)
64 kbps	335,-	176,-
128 kbps	402,-	235,-
256 kbps	603,-	352,-
512 kbps	837,-	441,-
1 024 kbps	1341,-	588,-
2 048 kbps	2011,-	882,-

Table 39: Prices of Datastar services

Source: www.datastar.com.pl

5 Government

CYPRUS

The ministry of Finance is very actively involved in Information Technology matters. The Department of Information Technology Services (DITS) is under the ministry of Finance and its main responsibilities are (Source DITS Questionnaire 2002):

- Provide IT Consulting services to the public or semi-government organizations;
- Study, submit and apply IT policies and strategies in the public sector;
- Prepare tender specifications for the acquisition of automation equipment and/or services from various vendors
- Acquire, through a tendering process, automation equipment, software applications and services for the development of information systems in the public sector;
- Manage the implementation of the government automation plan (short term and master plan) and additional projects;
- Implement all the government automation plan systems; solely or by outsourcing certain portions to private IT vendors;
- Observe and inspect the development of the master plan for the automation of the public sector that is being implemented by foreign and/or local vendors;
- Operate, maintain, and support the above systems after their delivery;
- Develop information systems for temporary or short term needs (e.g. national elections);
- Support all the "off-the-shelf software" that are bought by various governments sectors;
- Represent Cyprus in various international IT conferences.

The Cyprus Planning Bureau, an independent government agency, is the central coordinator of the promotion of the information society and for the formulation of strategies and action plans in the island. Activities associated with the promotion of the action plan usually take the form of seminars and conferences held at a national level and organized/sponsored in association with other bodies. The ministry of Finance together with the ministry of Communications and Works undertake the promotion of Information Technology. Additionally, the Cyprus Telecommunications Authority (CYTA), the Research Promotion Foundation, which is an independent non-profit organization, the Cyprus Computer Society and the University of Cyprus, also undertake a major part of the promotional activities associated with Information Technology. The Cyprus Planning Bureau is responsible for e-commerce promotion.

5.1 Information Systems Strategy

The Government of Cyprus has established an "Information Systems Strategy", a master plan for the computerization of all government ministries, departments and independent services. Originally conceptualised in 1987 this Information Systems Strategy plan, which was revised and approved by the Computerization Executive Board in 1997, defines a policy framework in three main areas: management policies; technical policies; and strategic information systems. Within the overall government Computerization Plan, at the highest level, ministries, departments and independent government agencies are expected to create their own Information Systems Strategies, and Implementation Programs. At the lowest level, individual development projects will create their own project plans and system documentation. It is estimated that between 1998 and 2001 the expenditure on the Government's Information Systems Strategy reached 64 million Euros.

5.1.1 Current Status of Information Systems Strategy

In line with the "Information Systems Strategy" undertaken by the government various information systems projects are being developed for the support of the internal operations of government ministries and departments. A very important aspect of the Strategy, and a pre-requisite for the accession of Cyprus to the European Union, is the harmonization of information systems with the relevant EU standards.

The strategic information systems are the mechanisms for providing core information to the public service. They can be distinguished into strategic application systems to support key areas for the operation of government services and information technology infrastructure systems to provide a common IT framework across all government departments. The following information systems have already been accomplished (Source: DITS Questionnaire January 2002):

- Application systems (Individual systems for ministries):
    - Ministry of Labour and Social Insurance
    - Ministry of Interior
    - Ministry of Finance
    - Ministry of Commerce, Industry and Tourism

- Ministry of Communications and Works
    - Ministry of Agriculture, Natural Resources and Environment
- Infrastructure systems:
    - Office automation
    - Government's data transfer network
    - Government's Internet access provider

5.1.2 Future Plans

Within the overall government Computerization Plan the following projects are due for implementation in 2003 (Source: DITS Questionnaire January 2002):

- Creation of customer service centres in the public sector and deployment of the necessary information systems
- Implementation, within 2002, of a new e-government initiative in order to bring administration closer to citizens and businesses through the use of Internet by stimulating access to and use of basic on-line government services
- Information Systems Interface
- Government Data Warehousing
- Government Portal and Gateway
- Health Information system

5.2 E-Strategy

Cyprus as a candidate country has joined the eEurope+ Action Plan. eEurope+ is an action plan extended to EU candidate countries and is parallel to eEurope, where the EU-15 states have set the ambitious goal for Europe to become the most competitive and dynamic knowledge-based economy in the world within the next decade. It recognised the urgent need for Europe to quickly exploit the opportunities of the knowledge-based economy and in particular the Internet. This parallel action plans aim to allow players in the EU and the Candidate Countries to co-operate, exchange experiences and best practices and thereby help the effective integration of Europe. The Action Plan includes:

- *Cheaper Internet*: Cheaper, faster Internet is one of the preconditions for Internet uptake
- *E-research:* Faster Internet for researchers and students
- *Safe Internet:* Secure networks and smart cards
- *E-education*: European youth into the digital age
- *E-working*: Working in the knowledge-based society

- *E-accessibility*: Participation for all in the knowledge-based economy
- *E-commerce*: Accelerating e-commerce
- *E-government*: Electronic access to public services
- *E-health*: Health online
- *E-transport*: Intelligent transport systems
- *E-content*: European digital content for global networks

The Government's ICT expenditure up to now was CY£33.000.00 (17.5 Million Euros) and it is planning to spend CY£12.000.00 (7 million Euros) for the year 2002. The above figure is not final because the expenditure for the on-line government services and the adoption of 'eEurope+" have not been estimated yet. The relevant expenditure studies for the above projects are going to be ready in February 2002.

At present the government's electronic presence is confined to the supply of information to the general public through Internet sites. All ministries have already developed their own web site and there are also more government sites in place at the moment (VAT, Airports, Customs etc). The government's official main entry websites are http://www.cyprus.gov.cy and http://www.pio.gov.cy. From these sites links are available to the rest of the governments websites. Most of the websites were developed or are under development via the government's website system project. Websites for all ministries and their departments are colour coded and each website has the same structure for easy recognition by the citizen. In each website there is a service desk, as seen in the figure below, via which future online services will be offered.

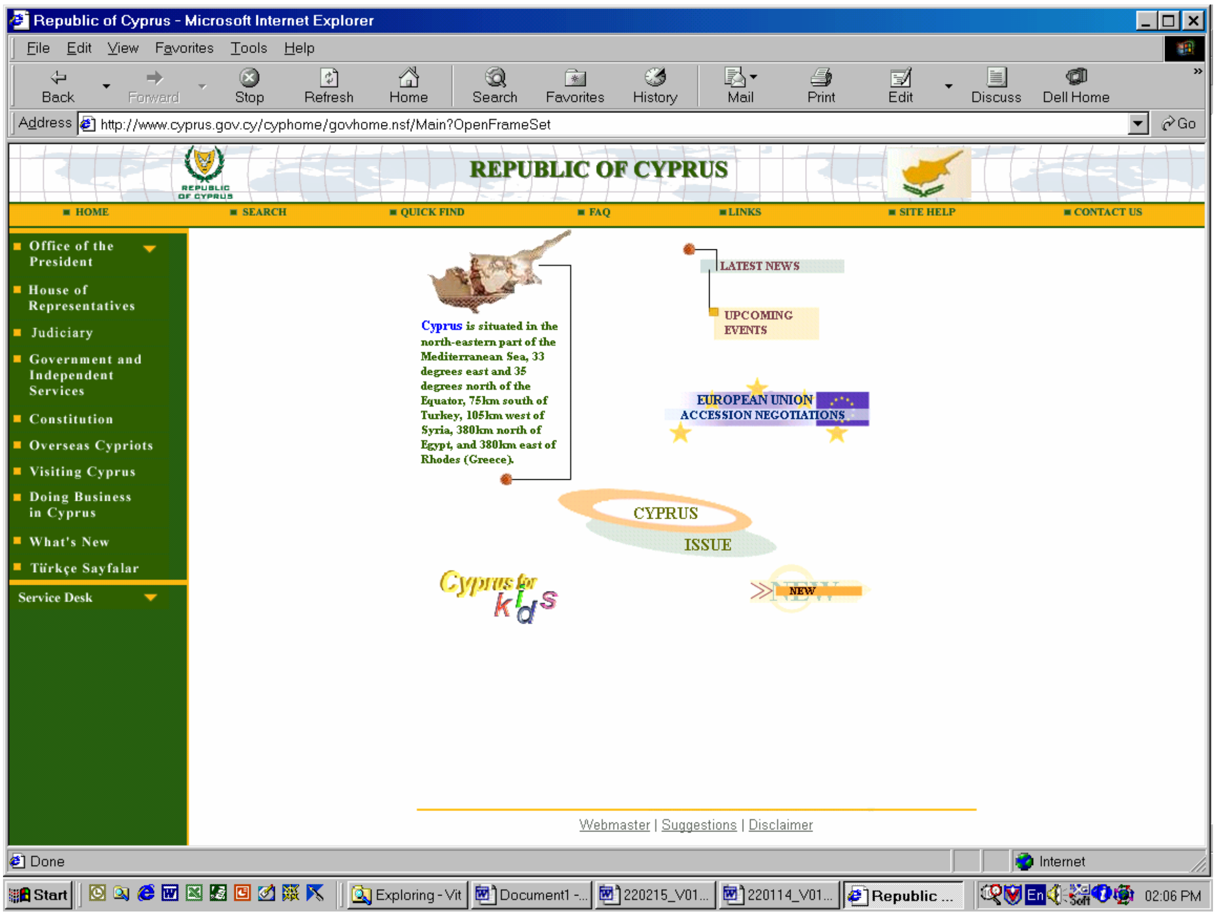

Figure 78 Main Website of the Government of Cyprus

Source: www.cyprus.gov.cy

The government is getting ready for the Internet age by installing the Government Internet Node (GIN). The system will provide a gateway between government systems and the public, as well as enable intra-government communication in an open, flexible and secure manner. It will provide secure electronic links with overseas government offices, the general public and the commercial sector. Via the GIN the government will provide effective and reliable services to its citizens 24 hours.

By 2004 the government is expected to provide the following electronic services to its citizens:

- *Information services*: supply information that concerns legal, administration, cultural, environmental and traffic matters.
- *Downloading applications*: Most of the applications/forms/documents will be available for downloading.
- *Submit documents and payments (taxes etc) electronically*: All the manual services that can be provided online will be transacted though the Internet.

- *Management communication with citizens*: The online presence will enable internal and external information (e.g. public queries) to be distributed in an efficient and effective manner thus enhancing the government's service and responsiveness. Information that is not possible to be distributed today will be available online. Government services will be accessible in any place, at any time, in a quick, flexible and secure manner.

At present the government' s objective, within the overall government Computerization Plan, is to complete the high priority strategic application projects in the public sector administration. After the completion of the above projects, the government is to web enable all the application programs in the public administration (an action plan will be developed with objectives, time-scheduling etc). In addition, the government continues to implement websites for providing administration information to the public (Source: DITS Questionnaire January 2002).

The government's main target is to implement the eEurope+ Action Plan for E-Commerce, which in addition to the targets mentioned above, are as follows (Source: DITS Questionnaire January 2002):

- Work closely with EU Member States with the aim to develop a common methodology and approach in the collection and presentation of relevant benchmarks
- Increase consumer confidence in e-commerce by working closely with consumer groups and industry
- Adopt e-commerce legislation and promote self-regulation, establish electronic marketplaces (e-marketplace) for public procurement (e-procurement)
- Encourage and assist SMEs to 'Go Digital' and embrace the new opportunities and have access to global markets
- Establish the necessary infrastructure for the use and mutual recognition of electronic signatures
- Introduce the use of Internet in public places such as museums, libraries etc.

A part of the Cyprus Government's e-strategy is also the formulation of an e-strategy specific to e-Commerce. For this purpose the Government of Cyprus asked for bids from the private sector on a project for the Formulation of a National Strategy and a Legal Framework for e-Commerce. This project, through the tender process, was awarded at the beginning of 2002.

5.3 Legal Framework

On August 8th 2000, consultants to the Ministry of Communications and Works of the Government of Cyprus completed work on the new telecommunications legislation, which would lead to liberalization of the wider telecommunications market, harmonizing the sector with the European Acquis. The legislation has yet to be approved by Parliament.

Consistent with the above, **Cyprus** expressed its commitment to comply with the European Union Acquis by December 31, 2003 (this including a transition period of 1 year). The program aims at ensuring technical compatibility between different systems with the European Commission standards, and at encouraging competition within a sector relating to the liberalization of service provision in the field of telephony, satellite services, mobile phones and subjects relating to the economic supervision of telecommunications and the separation of regulatory from operational functions. **Cyprus** has asked for the technical assistance of the EU for the implementation of some parts of the Acquis so that there is a smooth transition from the present monopolistic situation to full liberalization. (Source: Department of Information Technology Services of the Government of Cyprus)

There are a number of constraints in the current Legal Framework in relation to ICT. There are no laws governing security, e-payments, electronic signatures and a lot more issues, which are essential for the proper operation of transactions via the Internet. The Formulation of a National Strategy and a Legal Framework for e-Commerce project will address these issues and propose the necessary Legal Framework to the Cyprus parliament.

GALICIA

The Information and Communications Technologies is one of the biggest priorities both of the central government and the local government. During the last ten years the local regional government has been pushing this sector. The first step was a White Book about Telecommunications where a clear strategy was established in order to provide Galicia with the most modern telecommunications infrastructure, being the first region of Spain with universal access to ISDN (this means, more than 90% of the people). Actually, a new White Book is in discussion and is expected to be finished during this year.

The local government is strongly committed to support the introduction of new IT technologies in the enterprises, fomenting the investments through direct subventions or low rate loans.

Also, it has done important investments in telecommunications and information technologies during the last ten years. Actually it has an important private network, which joins all the administrative buildings and hospitals (see figures). In the relations with the citizens the government has used the technologies as a support tool, adding all type of technologies when available. In 1995 it started to provide information through the Internet, increasing dramatically the number of access since then and the number of services adding the personalization of the data using electronic signature and certificates.

Also, it has developed a custom made software application for managing all the administrative processes and which has been exported to other regions in Galicia and has been a model for several governments in Spain and abroad.

Other local administrations, such as councils and province governments, are also committed with the new technologies. Maybe the most advanced are the council of A Coruña and the Diputación de A Coruña (http://www.dicoruna.es). This last one even allows the payment of tax through the Internet. Other municipalities are adding services on the Internet and the Xunta of Galicia is promoting it through a vertical portal (http://www.eidolocal.es).

In the central government new technologies are a principal topic as well. In year 2000 the actual government launched the *Info XXI* initiative (http://www.infoxxi.es) for the period 2001-2003 and with more than 300 projects. This initiative matches the action plan approved in Feira in year 2000 about eEurope. The guidelines of this project are:

i. Pushing the ICT sector, finalizing the liberalization.
ii. Pushing of the Electronic Administration
iii. Universal access to the Information Society, both citizens and enterprises.

Figure 79: Main Website of the Xunta de Galicia

Source: Xunta de Galicia Website (www.xunta.es)

Before this plan was active, the most important departments of the central government were working in the provision of services over the Internet. For example, the Tax Administration (http://www.aeat.es) and the Fábrica Nacional de la Moneda y el Timbre (http://www.fnmt.es) provided several services for paying taxes over the Internet since three years ago. The number of services is increasing every day, having almost all of them available on the Internet. The success of this initiative is important. The government was presented with more than 500.000 individual declarations last year using this method (these declarations only include the ones associated with the citizens, not with enterprises for which we have no data). Also the National Social and Health Service is providing services to the enterprises and the citizens using the same technology since last year, although this department had previously another service for servicing the big companies based on old X.500 and X.25 technologies.

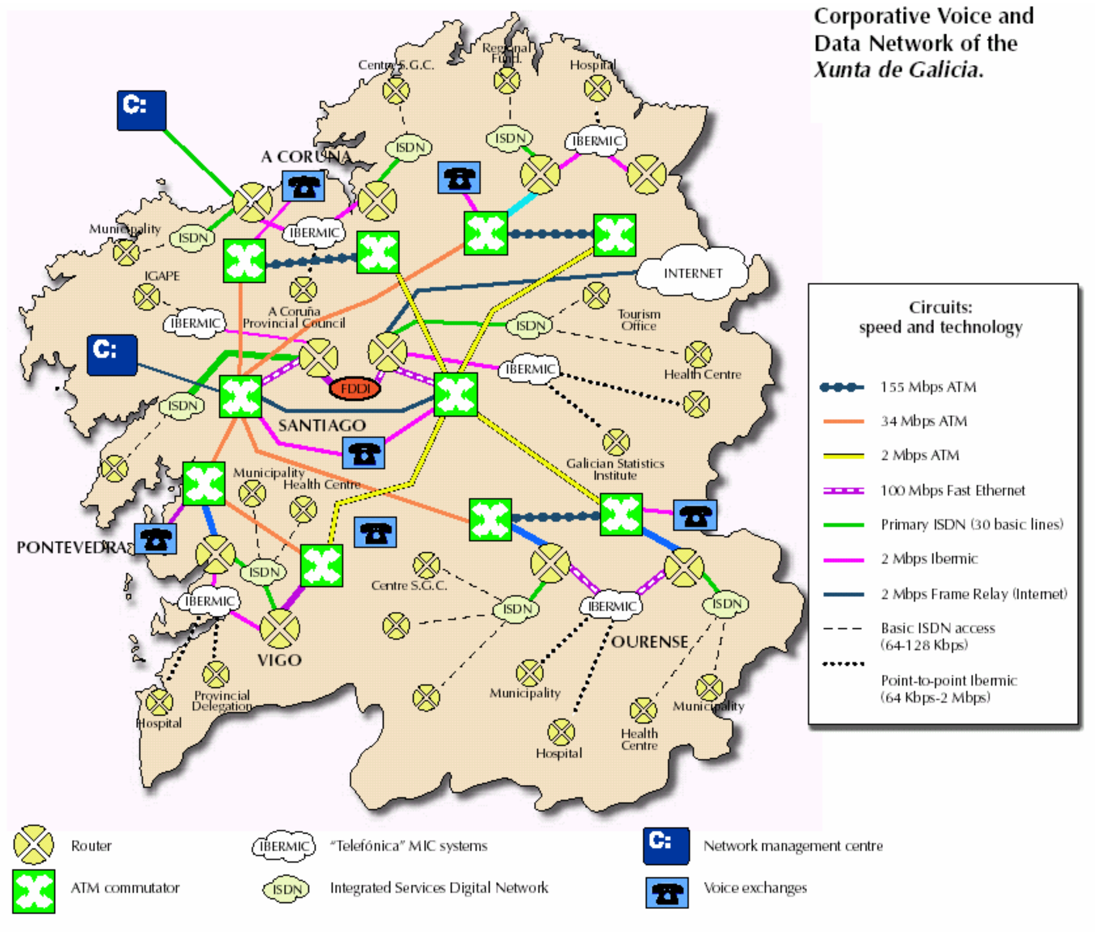

Figure 80:Corprative Voice and Data Network of the Xunta de Galicia

Source: Xunta de Galicia

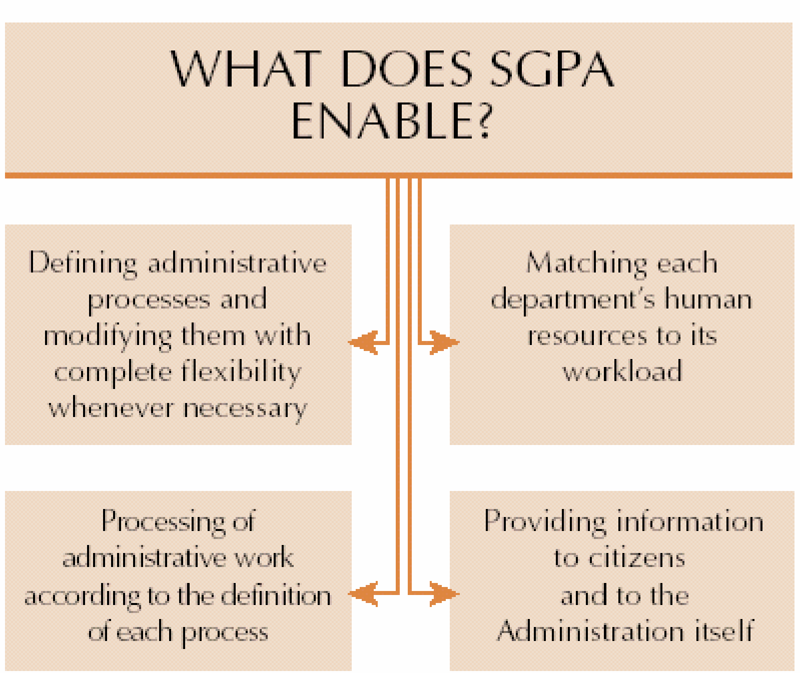

Figure 81: Galicia - SGPA

Source: Xunta de Galicia

POMERANIA

5.4 Information Systems Strategy

The government strategy of IS development in Poland can be divided into three stages: up to 1989, from 1990 to 1998, from 1999. The first stage is characterised by central decisions, which effected in very important solutions relating to IS (some of them are still continued). As a result of the structural reform in the period from 1990 to 1998 the government and the Parliament focused on socio-economic changes (among others two self–government reforms), while the decisions on IS were dispersed in several ministries and at regional and community councils level. Unfortunately great activity and significant investments did not bring a cumulative effect. In the third stage since 1998 wide social dialogue on Information Society development (including the Parliament forum) had disciplined the government to consequent actions. However, shortly after the work was finished the new Parliament elections were held and their consequence was the change of the government. The new government began the duties at the end of 2001 and took the introductory steps, but financial decisions have not been taken yet.

5.5 E-Strategy

The main characteristics of the e-Strategy is presented below:

5.5.1 Standpoint of the Parliament

The resolution of the Parliament of the Republic of Poland of 14th July, 2000 on the matter of building foundations of the Information Society in Poland. The Parliament stated in the resolution, that the current state of law and the policy of the government do not form sufficient conditions to exploit possibilities of the Information Society development in full.

In connection with the above resolution the Parliament appealed to the government to present promptly the assumptions of the information society development in Poland. The Parliament also expressed its opinion that government should consider the following aspects in their study:

- principles of common access to and usage of Internet
- plan of IT education development for children and youth
- plan of IT education development for adults, taking into consideration their need to acquire new qualifications in the transforming economy

- plan and priorities of IT systems development in administration
- plan of trainings supporting use of information society services, among others :
    - for development of SMEs,
    - for the rural areas development,
    - in health prevention,
    - in transport,
    - in enlarging accessibility to cultural values.

The Parliament obligated the government to undertake urgently the legislation process enabling the development of e-Economy, including among others, to work out the design of resolution on electronic signature, electronic document, information security, data security as well as on security and principles of agreement conclusion via Internet and telecommunication net.

5.5.2 Standpoint of the Council of Ministers

The standpoint of the Council of Ministers relating to the resolution of the Parliament of the Republic of Poland of 14th July, 2000 on the foundations building of the information society in Poland. The government conscious of changes the world economy undergoes, of globalisation process in particular and arising economy based on knowledge, appreciates the role of transformation of society from the industrial to the information one. Paying much attention to the full realisation of the Parliament of RP resolution on the matter of foundations building of the information society the Council of Ministers obliged to:

- work out the programme document "Objectives and Directions of Information Society Development in Poland" in November, 2000,
- work out "ePoland Strategy of Information Society Development in Poland for years 2001 – 2006"

These works will comprise such basic elements as: quality and quantity analysis of needs in the range of information access, its scope, means of its transmission and publication as well as necessary expenditures to reach the priority objectives stated in these programmes. Financial expenditures will be presented with regard to financing sources including the possibilities of the state budget.

According to the government opinion the information society will be shaped in Poland by market powers accompanied by economic, legal and administrative mechanisms to guarantee a common access to information, assure honest competition, enable the interested subjects to use the present and future possibilities of IT and create new solutions in the sphere of techniques and work organisation.

The close and efficient co-operation between the legislative and executive organs is necessary to fulfil above tasks.

"Objectives and Directions of Information Society Development in Poland" - State Committee for Scientific Research (November, 2000)

The report was worked out on the basis of 7 expert's reports prepared by a team led by Prof. Janusz Filipiak in AGH in Cracow.

The aim of the study was to describe the following subjects:

- common access to information in order to secure citizens a full access to IT services,
- IT education to prepare Polish society to technical, social and economic transformations connected with the creation of the Information Society,
- changes in employment structure, the aim of which is to prepare Polish society for new conditions on the labour market and new work methods. Taking advantage of chances connected with the changes to fight the unemployment risen as a result of restructurisation of industry and agriculture.
- law and IT crime to suit the legislation to the demands of fast technical progress and information society era. Implementation of telemetric techniques to work out new law acts.
- e-Document and e-Economy in order to suit the national economy to the demands of the global e-Economy by implementing regulations relating to e-Economy,
- public orders in order to strengthen the public orders system, to improve the realisation of IT systems for public sector entities. Improvement of the public order system by implementation of IT networks.
- computerisation of administration to create the transparent and citizen friendly public administration structures to meet the open information society with the help of IT tools. Improvement of administration work by the use of IT. Creation of the conditions for permanent and balanced regional development including modern IT and its monitoring
- IT market development in order to develop modern industries and increase their innovations to improve the competitiveness of Polish economy with global e-Economy
- Science and culture to assure the support for science sector of e-Economy and information society in order to take better advantages of chances and minimize the threats. Development of science sector infrastructure.

„e-Economy" in the sector of SMEs" – The Ministry of Economy, Department of Commerce and Services (February 2001)

One of the basic tools necessary to form the directions and to realise the government policy in the field of e-Commerce usage by SMEs is the constant monitoring and observation of actions pursued by specialised institutions, such as Polish Agency for Enterprise Development. Independently from the above any economic activity conducted with the help of the electronic means has to be under official state report. This requires to undertake the suitable studies by National Statistics Office.

e-Commerce development influencing the growth of the whole Polish economy has a great meaning to improve the competitiveness of Polish SMEs. Problems appearing in the e-Economy due to their interdisciplinary character require to undertake actions and to consolidate the efforts of all governmental organisations. The conduction of specialist research is necessary to enable the precise identification of barriers met by SMEs during implementation of electronic methods in their activities, followed by the choice of suitable means to be undertaken.

Unless the suitable help for SMEs is secured to allow them to adapt to the dynamic changes in the market and unless they are encouraged to use e-Commerce tools, they will face a serious risk of being unable to meet the competition of technologically stronger companies.

„e-Poland –Strategy of Information Society Development in Poland in years 2001 – 2006" – Ministry of Communication (May, 2001)

This document was mainly inspired by the European initiative – „eEurope – An Information Society for All". The aim of this initiative was to accelerate activities relating to transformation of European society into global Information Society. Initiative eEurope is an accelerating and strengthening factor in the integration of member countries. Thus during the conference in Warsaw in May, 2000 the EU candidate countries declared their readiness to prepare a plan of activities eEurope+ and to create their own national e-Programmes.

The strategy of building Information Society assumes to achieve the following objectives:

- to prepare Polish society for fast technical, social and economic changes connected with the creation of information society,
- to suit law regulations to the demands of fast technical progress and information society era,
- to prepare Polish society for challenges of the new labour market and new work methods,

- to adjust national economy to demands of global e-Economy by introducing suitable law regulations,
- to create with the help of IT tools the transparent and citizen friendly public administration structures to meet the open information society.
- to create suitable environment for permanent and balanced regional development by applying modern IT,
- to develop modern industries and increase their innovativeness in order to improve the competitiveness of Polish economy,
- to secure the support of e-Economy from the science sector in order to take better advantages of chances which the model of information society offers,
- wide promotion of Polish culture and its economic successes.

The realisation of the above mentioned objectives should be pursued by:

- suitable adjustment of law regulations and their fast implementation,
- co-ordination of activities of subjects at all levels of public administration sector,
- stimulation of activities of private sector and non-government organisations according to the subsidiary principle,
- defining metrics which allow to calculate and verify the realised tasks,
- initiating actions requiring the use of public funds.

The document ePoland assumes that reaching high dynamics of socio-economic development is not possible to reach without development of telecommunication infrastructure. Furtherly, securing a common, cheaper, faster and safe access to Internet is necessary and can be realised by for example decreasing fees for Internet access, creation of friendly environment for strong competition of Internet providers or by improvement of access to Internet resources in the whole country.

Investment in people and their skills is another very important factor, that is why there is the creation of multimedia didactic materials, improvement of constant education systems and teletraining are so significant. Stimulation of better usage of possibilities offered by Internet and securing safety and high level performance in electronic commerce as well as increasing the SMEs share in e-Commerce and improving public order system via IT net are of great importance.

The latest services based on Internet should be accessible not only for cities dwellers. It is necessary to activate IT development in the rural regions. The aims of such activities are, among others, supporting the development of information society in the rural areas, supporting and co-ordination of local self-governments initiatives enabling co-operation between operators and local authorities as well as support of capital investments in these areas.

It also important not to forget about the problems connected with digital radio and TV while discussing the shape of future society.

5.5.3 The Pomeranian development strategy

The Strategy – approved by the regional authorities on July 2000 covering all aspects of the life in the region, is the document, whose main aim is to work out the vision of Pomeranian Region till the year 2010. "Pomerania of the year 2010, according to the strategy assumptions, will be the region of new and exploited opportunities and co-operation in partnership. It is the region of strong and diversified economy and clean environment. It is also the region transforming into swift development based on skills and knowledge".

Pomerania's chances lay in sustainable but diversified development, in pro-human orientation, protection of market mechanisms, partnership between the public and private sectors, and territorial diversification of action tools and objectives.

The following priorities and accompanying them objectives were stated in the strategy:

Human capital enhancement based on knowledge and active stance
Objectives:

- increase mobility and spur enterprise among the region's population,
- develop the education system,
- stimulate active citizenship and pro-community attitudes

Economy restructuring and modernisation
Objectives:

- establish the regional innovation system,
- develop the SME sector,
- modernise traditional sectors of the economy,
- develop services, transport and tourism,
- enhance attractiveness to investors,
- support and gradually transform structurally weak rural areas

Infrastructure expansion and modernisation to consolidate the competitive position and inner consistency of the region

Objectives:

- accelerate modernisation of the Tri-City metropolis,
- prevent neglect of fringe areas,
- expand and modernise port infrastructure,
- develop telecommunications,
- modernise and develop power industry

Provision of high living standard

Objectives:

- create safe and attractive living conditions,
- improve environmental living standards,
- manage natural resources in a rational manner,
- improve the effectiveness of nature landscape,
- protective measures,
- support cultural diversity in the region,
- retain the historic heritage

Development of the province's cross-border partnership relations

Objectives:

- enhance the role and significance of the Pomeranian province within the Baltic Region,
- develop inter-regional co-operation,
- create a positive image of the province on international and inter-regional forums.

5.6 Legal Framework

5.6.1 Constitution of the republic of Poland

art. 54

According to this article: "every citizen has the right to obtain economic, political or cultural information and to disseminate information".

art. 32

The basic task of the state is to prevent the society from a division into parts of those who have and those who do not have an access to information regardless of their race, religion, social status, earnings level or place of residence. Legal equality of access to information refers not only to citizens in the state but to assure equal treatment and full participation to Polish citizens and economic subjects in the world, including EU as well.

Bill on the electronic signature of 18th September, 2001 (Bill Diary 2001, No130 pos.1450). Bill comes into force on 16th August, 2002.

The bill defines conditions of electronic signature use, legal consequences of its use, principles of certification services and rules of supervision of subjects offering these services. Electronic signature – data in electronic format, which together with other data added to or logically connected with, are used to identify the person signing electronically.

Bill of 21st July, 2000 Telecommunication Law (Bill Diary 2000 No 73 pos.852 with later amendments)

The bill of 21st July, 2000 - Telecommunication Law defines performance and controlling principles of the activity based on rendering telecommunication services and exploitation of telecommunication nets. The aim of the bill is to create conditions to secure an access to telecommunication services on the whole territory of the Republic of Poland, to secure the telecommunication users' businesses, to support the equal and effective competition in telecommunication services market (TP SA monopoly will have been ended) and to develop modern telecommunication infrastructure, as well as telecommunication, information and audio-visual services integration, and to secure order in resources of: numeration, radio wave frequency spectrum (art.1).

President of the Regulation of Telecommunication Office – acting on the base of the bill Telecommunication Law – is the proper organ for telecommunication licences and frequency administration as well as the control organ of meeting compatibility requirements ref. to electromagnetic compatibility (art.109 of Telecommunication Law). President of RTO is the central organ of government administration. His duties comprise in particular: execution of tasks referring to regulations of telecommunication and frequency management, to control meeting compatibility requirements ref. to electromagnetic compatibility, co-operation with the respective minister in preparation of legal acts, assessment of the telecommunication services and hardware markets, to create the environment for development of national radiocommunication services through securing the Republic of Poland necessary frequency allocations by access to orbital resources.

art. 112

President of the Regulation of Telecommunication Office exercises his tasks through the Regulation of Telecommunication Office. The Office consists of regional branch offices, among others, Pomeranian Branch office acts in Pomeranian Region with its site in Gdansk. The activity rules of the Office defines its statutes. The activity rules of the Office regulates the statues, which was given by the Prime minister on 27th December, 2000 (Bill Diary 2000 No 120 pos. 1290m with later amendments).

Bill on Protection of Personal Data of 29th August 1997. (Bill Diary 1997, No133 pos.883 with later amendments)

art. 1

The bill defines the principles of personal data processing and physical person's rights, whose personal data are or can be in future processed in databases.

art. 8 and 12

The organ for the protection of personal data is the Inspector General for the Protection of Personal Data. His main duties consist in particular of the control of consistence between the data processing and the law regulating their protection, initiating and undertaking ventures in the field of protection of personal data improvement, keeping register of personal data bases and answering the enquiries on registered personal data bases as well as issuing administrative decisions and considering claims related to execution of legal regulations on personal data protection. He exercises his duties with the help of the General Protection of Personal Data Office, whose structure and tasks are defined by its statues.

Bill proposal on it and e-commerce services delivery

The bill defines the principles of IT services providing and e-Commerce execution. The regulations should also define the rules of personal data protection of a physical person using IT services and the rules of responsibility for such services delivery. According to the bill, IT service is defined as any service rendered within certain economic activity of the service provider on individual order of the service consumer.

IT services comprise in particular:

Services aiming at agreement conclusion, consisting of information offer in the net or other transmission of economic character:

- Services of information transmission in the net,
- Services of information storage,

- Services consisting of providing with means enabling access to information, its search and acquiring.

6 Education

6.1 INTRODUCTION

CYPRUS

The purpose of this section is to describe the level of the current ICT penetration in both the public and the private sector of education, including elementary, secondary and higher education. A number of sources were used to gather information like personal interviews, past articles from the daily press, and a survey that was carried out specifically for this purpose in order to gather information and assess the availability of ICT infrastructure in education.

The level of the current ICT penetration in the public primary (elementary) and secondary (gymnasiums and lyceums) schools is described. Information was obtained from the Ministry of Education of the Government of Cyprus. Also, the results of a survey conducted among the public higher education institutions (trietary education) on the island and the University of Cyprus give a clear view of the current ICT infrastructure in the public higher education. There are currently eight (8) public higher education institutions and the University of Cyprus. Information was gathered from 90% of them.

Furthermore, due to the relatively small number of private institutions on the island, we were able to conduct a survey among all the private elementary and secondary schools, as well as higher institutions and colleges in order to measure the availability of ICT infrastructure in the private education. This survey includes questionnaires that were completed, providing us with information about the level of the current ICT penetration in the private education. At the time of the survey there were twenty-four (24) private elementary and thirty-two (32) private secondary schools, as well as twenty-one (21) private higher education institutions and colleges. A 42% of the total number of the private schools and other educational institutions responded to the survey.

6.2 Elementary Education

6.2.1 Public Sector

The approach of the public primary (elementary) education in introducing Computers and Information Technology is to integrate them with the courses that are taught traditionally rather than introducing separate computer classes. A 4.5 million EURO budged was approved for this year for the introduction of one PC for each classroom by the end of 2003.

6.2.2 Private Sector

Computers in the private elementary education are mostly used for the support of computer or other courses. When used, the ratio of students per PC is in average 2:1. The schools offer compulsory computer related courses, mainly in the senior grades. The ICT curriculum taught in private elementary education includes introduction and familiarity with computers, elementary word processing applications, and Internet browsing. On average, all computers have Internet access, and a 50% of the teachers have good knowledge of computers and the Internet.

6.3 Secondary Education

6.3.1 Government's Master Plan

The Government of Cyprus has a three-year (1999-2003) Master Plan called "Orama" (Vision) for the introduction of ICT and Computer Science in secondary education. The ultimate goal of the plan is to produce computer literate students. It also aims to provide one PC per student, that PC being either at home or at school.

The plan has eight objectives:

i. Obtain the required infrastructure in schools to meet the needs of the curriculum and facilitate access to the Internet for students and teachers.
ii. Enable electronic communication of schools with research centres.
iii. Familiarise all teaching personnel with new technologies and applications.
iv. Review and assess the curriculum in order to take advantage of the new technologies.
v. Ensure that all graduates will have a basic level of computer literacy.

vi. Create the enabling environment to ensure that all the labour force will have a basic level of computer literacy through lifelong learning.

vii. Create a certificate recognized by the European Union that will confirm that the possessor has basic computer capabilities in terms of IT and telecommunications.

viii. Create a network of centres to provide information and training of new technologies and their applications.

6.3.2 Private Sector

In the private secondary education computers and Information Technology are widely used, encouraging the students to gain familiarity. The majority of the private schools use Information Technology in order to support their courses. There are currently thirty-two (32) private secondary schools. The completed survey was returned by 44% of the total number of the schools.

6.3.3 PC Penetration

PC penetration in all public secondary schools is quite high. There are currently 36 Lyceums with 2610 PCs (purchased in September 2001), a ratio of 9 students per PC, 10 Technical Schools, with 610 modern PCs and a ratio of 7 students per PC and 63 Gymnasiums with 15 students per PC ratio. Lyceums and Technical Schools have 2 to 4 computer labs whereas gymnasiums will have 2 to 4 computer labs by 2003. In 95% of the cases there is a 1:1 student to computer ratio in Computers courses. In the 2nd half of 2002 the Ministry of Education is planning to purchase 5000 new PCs to equip further the Secondary and Primary Education. With these new PCs, it is expected to get a ratio of 7 students per PC in Lyceums and Technical Schools, 14 students per PC ratio in Gymnasiums, and 23 students per PC ratio in Primary Schools.

PC penetration in the majority of the private secondary schools is quite high. Based on the survey that was carried out among the private secondary schools, the 44% of the schools that have responded to the survey have 528 modern PCs, a ratio of about 8 students per PC. Private secondary schools have, on average, 1 to 2 computer labs. There is a 1-2:1 student to computer ratio in Computers courses.

A comparative graph between public and private secondary schools concerning PC penetration, based on the numbers above, is the following:

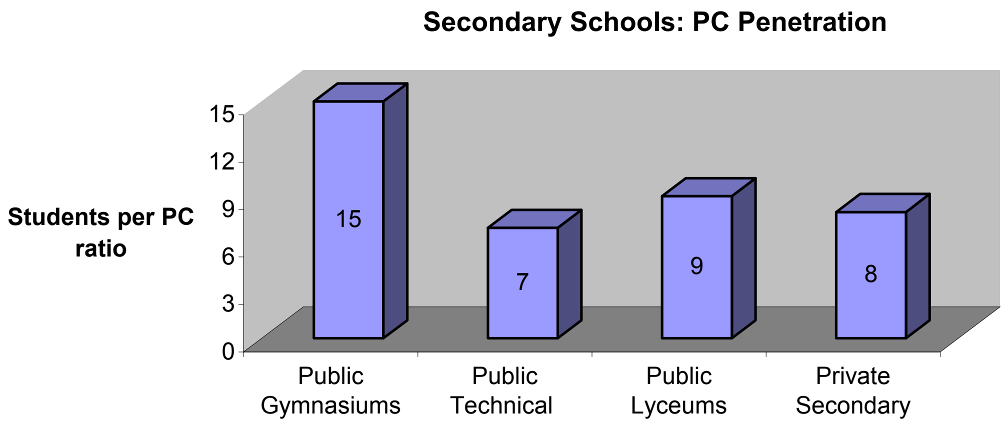

Figure 82: Cyprus – PC Penetration in Secondary Schools

Source: Own composition based on questionnaire send to all private Secondary Institutions and information from the Ministry of Education of the Government of Cyprus

6.3.4 Internet Access

All computer labs in public secondary schools have access to the Internet via CYTA's ISP provider, Cytanet, with the exception of some gymnasiums that although they have designated accounts they have not used them yet. The connection is primarily dial-up with ISDN and where that technology is not possible to implement a normal PSTN line is used. Cytanet has prepared a website that contains a list of all the gymnasiums, lyceums, and technical schools and a link to each institution's individual website. Many public secondary schools have already published their websites. The site created by Cytanet is http://www.education.cytanet.com.cy/school.html and it is only in Greek.

In the private sector, a 72% of the private secondary schools that have responded to the survey have Internet access in all the computer labs. The rest of the schools have, on average, Internet access in 45% of the PCs in the computer labs. Furthermore, a 95% of the private secondary schools that have responded to the survey have already published a web site.

6.3.5 ICT Courses

In public education, all lyceum students (ages 16-18) take a computer course at the 1st grade of the lyceum, and about 30% take it as an elective course at the 2nd and 3rd grades. All 3rd grade gymnasium students (ages 12-15) are currently taking a computer course. During the next academic year (2002-2003) a computer course will be introduced to all 2nd graders and the year after to all 1st graders.

In private secondary schools, the students of 28% of the schools that have responded to the survey take computer courses at all grades. The remaining students of the 72% of the interviewed schools take compulsory computer courses, mainly at lower grades. About 42% of all the students take computer courses as an elective, mainly at the senior grades.

6.3.6 ICT Curriculum

The ICT curriculum taught in public secondary education includes all aspects of Computer Science, from familiarization with PC components, to Operating Systems, Applications such as Word Processing, Programming Languages, Use of Internet and Creation of Websites, Basic System Analysis concepts, etc. The curriculum does not aim in familiarizing students with particular applications, such as Microsoft Word for example, but to give the proper knowledge that will allow students to apply it in any environment.

The ICT curriculum taught in the private secondary education includes introduction to computer science, familiarity with operating systems, introduction to software packages, like word processing, spreadsheets, and databases, programming languages, like Visual Basic, C, and Pascal, and Internet familiarity, like browsing, e-mail, and ftp.

6.3.7 ICT Policy-Barriers In Elementary-Secondary Education

ICT Policy

The Minister of Education and its counsellors by very close interaction with the directors of primary education, secondary education, technical education and with the University of Cyprus form the policy for ICT education in public schools. The policy is formed according to guidelines from the European Union, through the various directives it adopts and through close collaboration with Ministry of Education of Greece.

Each school in the private elementary and secondary education sector forms its policy according to guidelines and consultancy obtained by IT specialists. The objective is to follow the European Union's standards and guidelines as published by the Ministry of Education of Greece and other European countries

ICT Barriers

The main barriers of ICT penetration in the public education system are:

- The recruitment of Computer Scientist to fulfil the open positions and their on-going training. Currently, demand exceeds the supply, despite the fact that the government is considered a competitive employer, especially in the education sector.
- The training of elementary school teachers to adopt and use computers in their classrooms. Currently all teachers are scheduled to attend classes at the government's Pedagogical Institute, whose purpose is the on-going training of teachers.
- The lack of a homogeneous centralized mechanism for purchasing lab equipment.
- The lack of technical infrastructure in the government to support the schools labs. Even though no concrete plans exist, the support of the labs will either be outsourced to the public sector, or be included in the purchasing agreements of the government.

The main barriers of ICT penetration in the private education system are:

- Persuade the untrained teachers to learn about computers and the Internet.
- Encouraging some staff to use IT regularly as a teaching aid.
- Cost for training of teachers.
- Cost of maintaining and upgrading computer systems.
- Funding.
- Support from vendors.

6.4 Higher Education

6.4.1 Public Sector

Information about the level of the current ICT penetration in the public higher education institutes and the University of Cyprus was retrieved, by distributing an number of questionnaires to the concerned institutions which were then completed and analysed. There are currently eight (8) public higher education institutes and the University of Cyprus. Information was gathered by 88% of them.

6.4.2 Private Sector

There are currently twenty-one (21) private higher education institutions and colleges. Information was gathered by a 67% of the total number of the institutions

6.4.3 PC Penetration

PC penetration in the majority of the public higher education institutions is quite high. A 87.5% of the public higher education institutions that have responded to the survey have 74 modern PCs, a ratio of 11 students per PC, and the University of Cyprus with 230 modern PCs, a ratio of 8:1 students per PC. Public higher educational Institutions have 1-2 computer labs, with a 1-2:1 student to computer ratio in Computers courses. The University of Cyprus has 14 computer labs, with a 1:1 student to computer ratio in Computers courses.

PC penetration among the private higher education institutes and colleges is also quite high. There are currently twenty-one (21) private higher education institutes and colleges with 67% of those that have responded to the survey having 513 modern PCs, a ratio of 9 students per PC. Private Institutes and Colleges have about 1 to 3 computer labs. There is a 1-2:1 student to computer ratio in Computers courses

A comparative graph between public and private Higher Education concerning PC penetration, based on the numbers above, is the following:

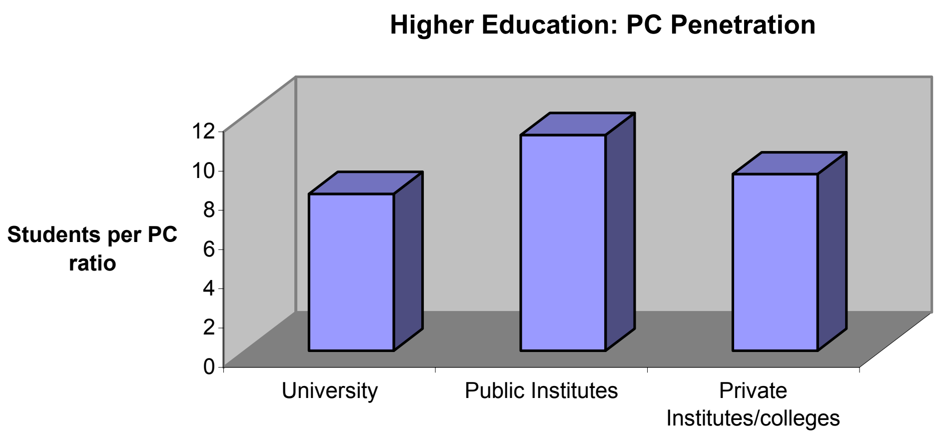

Figure 83: Cyprus – PC Penetration in Higher Educational Institutions

Source: Own composition based on information from the University of Cyprus, private and pulic higher educational institutions

6.4.4 Internet Access

In the public sector, the higher education institutions have Internet access in a 24% of the PCs in the computer labs. In the University of Cyprus all computer labs have Internet access. Furthermore, among all public institutions only the University of Cyprus has published a web site.

In the private sector, a 77% of the private higher education institutes and colleges that have responded to the survey, have Internet access in all the computer labs. The rest of the institutions have, on average, Internet access in a 48% of the PCs in the computer labs. Furthermore, a 80% of the private higher education institutes and colleges that have responded to the survey have already published a web site.

6.4.5 ICT Courses

In public higher education institutions, a percentage of 33% vs. a 36% in the corresponding private education institutions introduce Computers and Information Technology by integrating them with in the courses that are taught traditionally. The integration is done be using the Internet for information gathering and using word processing for homework. The remaining 67% of public and 64% of private institutions have introductory computer courses for all the students. Additionally in private education the remainder 36% of institutions that do not offer introductory computer courses offer instead a computer related courses.

In the University of Cyprus, 62% of the non-computer related departments have their students taking a compulsory introductory computer course in the 1st year of education. Also, the University of Cyprus offers a full 4-year course in computer science through its Department of Computer Science.

6.4.6 ICT Curriculum

The ICT curriculum taught in public higher education institutions includes introduction to computer architecture, familiarity with operating systems, and introduction to software packages, like word processing, spreadsheets, and presentations.

The ICT curriculum taught in the University of Cyprus includes an introduction to computer science in the non-computer related departments, such as introduction to operating systems, software packages, like word processing, spreadsheets, and presentations, and Internet familiarity, like browsing, and e-mail. The Department of Computer Science offers courses like Programming languages (C, C++, Java), Databases, Computer Architecture, Computer Networks, Software Engineering, and E-commerce.

The ICT curriculum taught in private Institutes and Colleges includes introduction to computers, familiarity to operating systems, introduction to software packages like word processing, spreadsheets, and Internet familiarity like browsing and e-mail. The ICT curriculum taught in computer related courses include all aspects of computing, including programming languages, Databases, Computer Architecture, Software Engineering, and Computer Networks.

6.4.7 ICT Policy-Barriers In Higher Education

ICT Policy

The IT board of each institution forms the policy for ICT education in public higher education institutions and the University of Cyprus. The policy is formed according to standards and guidelines of the European Union and the United States, adapted to the special needs of each institution.

The policy for ICT education in private institutions and Colleges is formed by the institution's IT board. The policy is formed according to standards and guidelines adopted mainly by British and U.S. institutions, considering their particular needs in functioning properly, and having in mind the efficiency, flexibility and ability of upgrading the selected computerized systems.

ICT Barriers

The main barriers of ICT penetration in the public higher education system are:

- The lack of a homogeneous centralized mechanism for purchasing IT equipment.
- Cost of maintaining and upgrading computer systems.

The main barriers of ICT penetration in the private Institutes and Colleges education system are:

- Financial resources.
- Limited-constrained budget.

GALICIA

6.4.8 Primary and secondary schools

The region of Galicia is wider than Cyprus, so there are many more public primary and secondary schools (see table for public centres). Also, there are 332 private institutions. The Information Communication Technologies are a basic line of action of the regional government following the eEurope initiative. The Xunta de Galicia has a special plan for connecting all the public centres to the Internet. At the end of year 2001, all of the secondary schools and 726 primary schools were connected to Internet using ADSL type of connections where available or ISDN. This plan is called SIEGA (Information System of the Galician Education). Through this plan, more than 12.000 computers have been distributed to the schools, between 1998 and 2001, for the creation of computer rooms with local area networks and material related to the curriculum and administrative processes. This number is very low, since it represents a rate of 22,46 PC/pupil, and it is very far from the eEurope objective. However, some schools have bought their own computers, so maybe the actual ratio is better, but it cannot be verified, as there is no exact data.

In the private sector, the situation is completely unknown because the regional government does not have any statistics about these institutions. Due to the lack of these data, the eMinder project in Galicia has decided to promote an action for collecting such statistics for both the public and the private sectors.

	Type	Number
EEI	Infants Schools	305
CEIP	Primary and Infants Schools	699
CRA	Rural Schools	18
CEP	Primary Schools	38
CPI	Integrated Public Schools	70
IES	Secondary Schools	264
CEE	Special Education	13
EPA	Adult Special Education	11
	Other	28

Table 40: Galicia - Number of education centres by typology

Source: Xunta de Galicia

	Public	Private
Infants	38016	16821
Primary	98797	41792
Secondary (less 16 years)	88625	33603
Secondary (more 16 years)	23367	3994
Pre-university	20770	4019
TOTAL	269575	100229

Table 41: Galicia - Number of pupils by type of education

Source: Xunta de Galicia

6.4.9 Universities

There are three universities in Galicia (as mentioned above): University of Santiago de Compostela, the oldest, University of A Coruña and University of Vigo. The three universities are connected to the Internet by RECETGA as explained before and all of them have an important telecommunications infrastructure (for example, the university of Santiago has an intranet based on fibre optic cables around Santiago de Compostela).

In the Universities of Vigo and A Coruña there are faculties of Computer Sciences. Vigo also has one high school of Telecommunications. Apart from these regulated studies, all of the universities have a plethora of small courses on offer for their pupils on computers and software tools: operating systems, office packages, statistical software, Internet, etc. Also, the registration and other administrative processes can be performed using the Internet and in the near future also the academic curricula can be consulted using this medium.

There are also experiences for e-learning (*virtual Campus)* mainly as a complement to the classic classroom courses.

We don't have any available studies about the knowledge of Information and Communication technologies and the penetration of the Internet within the Universities, but one has to assume a high level of knowledge because a number of complex procedures in the University environment are performed by computer or through the Internet. Also in several faculties the computer is an obligatory tool for the pupils for fulfilling their class work (e.g. Physics, Mathematics, Engineering, etc).

University	Professors	Students
Santiago de Compostela	2.149	40.080
Vigo	1.532	29.754
A Coruña	1.179	26.035
Total	4.860	95.869

Table 42: Galicia - Number of ungraduated students and professors

Source: Xunta de Galicia

RECETGA

RECETGA (Rede de Ciencia e Tecnoloxía de Galicia) provides communications services of the highest quality standards to the scientific, and R&D communities of Galicia. RECETGA provides service through more than 40 nodes spread all over Galicia.

RECETGA is cooperatively managed by CESGA and the telecommunications regional authority of Galicia, the "Consellería de Cultura, Comunicación Social e Turismo". This network is based on ATM technology. RECETGA permits access to the services provided by CESGA, interconnects research centres, and allows access to the Internet.

Net Users:

- Research Centres of the Xunta de Galicia.
- University System of Galicia.
- Consejo Superior de Investigaciones Cientificas in Galicia (CSIC).
- Other Public and Private R&D institutions.

RECETGA's Specifications.

- ATM Technology backbone net with SDH transmission hierarchy.
- Integration of all available access technologies.
- Physical transmission media: Radio links, fibre optics, Laser, ISDN, Frame relay.
- Bandwidth: Backbone net of 155Mbps with redundant connections and an access net of up to 155 Mbps
- Traffic: QoS (Service Type according to demand: CBR, ABR, VBR, UBR).
- Net Management: centralised management system based on CABLETRON and real time warnings and alarms as failure detection systems

On Line Services

- Access to Supercomputing
- Scientific Visualization and Animation
- Telematic based Education (Tele-education)
- Multiconferencing
- Access to Internet
- Research Centre Interconnection
- Libraries
- Common Network Services: e-mail, news, ftp, web hosting, proxy, cache, etc.

POMERANIA

6.5 Introduction

The transformation process started in Poland in 1989 effected many law regulations, which became the basis for changes in education and intensified work on reform. The legislation changes enabled the development of non-public schools and advantageous structural changes in above primary education, which made the percentage of young people learning in secondary schools increase and the number of higher education school students double.

According to the new law regulations the Polish educational system comprises of kindergartens, primary schools, lower /grammar schools/ and upper secondary education and post secondary schools (apart from high schools), educational entities, constant education entities, teacher's improvement entities and others.

Self-government organs, government educational administration, directors of educational entities, employers, labour councils, social and religious organisations as well as teachers, pupils and their parents are the authors of the new educational policy. The number of schools according to the above classification and their leading organs in Poland and in the Pomeranian Region is depicted in the table below.

Leading organ	Primary education	Lower secondary education	Secondary education	Second. technical and vocational education	Postsecondary schools	High education	Adult education
Poland							
Central Administration Entities	48	48	2	199	24	113	72
Local Government Entities	17314	5702	1709	7511	899	0	1644
Social Organisations	187	181	180	173	343	0	301
Religious Organisations	47	58	80	30	8	15	9
Other organs	147	132	185	153	1054	159	687
TOTAL	**17743**	**6121**	**2156**	**8066**	**2328**	**287**	**2713**
Pomeranian Region							
Central Administration Entities	5	2	0	12	1	8	Lack of data
Local Government Entities	846	326	119	480	59	0	Lack of data
Social Organisations	13	12	19	4	16	0	Lack of data
Religious Organisations	4	4	7	0	0	0	Lack of data
Other organs	11	11	28	12	75	2	Lack of data
TOTAL	**879**	**355**	**173**	**508**	**151**	**10**	**Lack of data**
%	5,0	**5,8**	**8,0**	**6,3**	**6,5**	**3,5**	

Table 43: Number of schools according to their leading organs

Source: National and Gdansk Regional Statistics Offices (GUS,US)

The reform of the Polish educational system (introduced in the school year 1999/2000) is based on two additional bills. The new educational system lays emphasis on individual thinking, practical knowledge, better access to knowledge and its adjustment to the needs of the labour market. The reformed educational system is based on principles similar to ones in the countries of European Union and is to be fully implemented as from the school year 2004/2005 (see figure below).

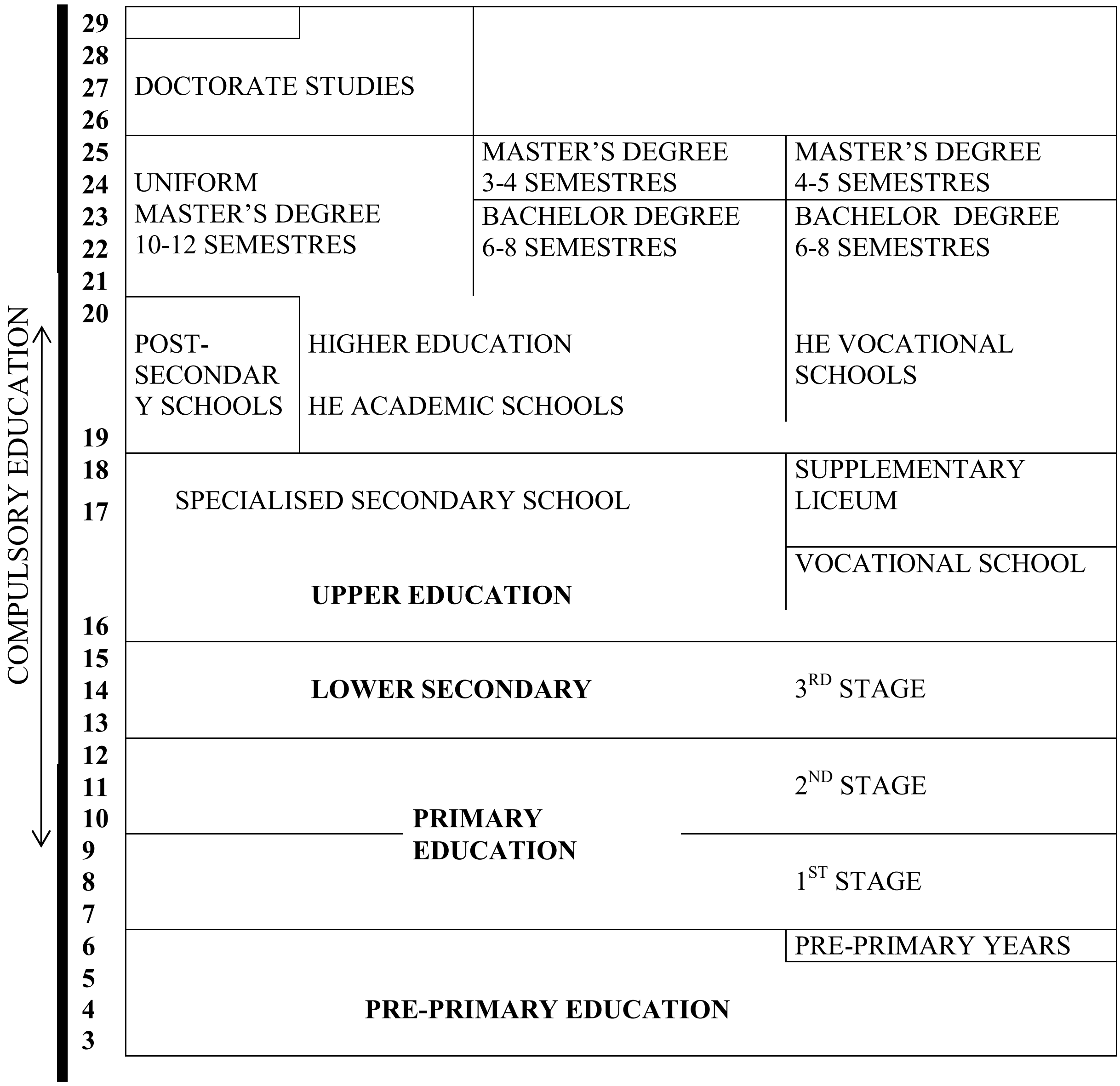

Figure 84: POLAND - STRUCTURE OF THE EDUCATIONAL SYSTEM AFTER THE REFORM (1999/2000)

Source: own study

According to the new programme foundations for reformed schools, pupils of grammar schools (lower secondary education level) should gain the practical knowledge of computer usage. The organisational problems connected with equipping schools with computers and Internet access have nearly been brought to an end.

In the years 1998 – 2000 computer laboratories were organised in 5800 grammar schools, which constitutes 95 % of the total number. A computer laboratory is equipped with a local network consisting of about 10 personal computers, with an Internet access and some system, office and educational software.

It is possible to draw the conclusion, that young people in general have the conditions to gain the basic skills and knowledge in computer techniques.

6.6 Primary and Secondary Education

In Poland, like in other European countries, numerous activities aiming at preparing pupils to live in a global information society have been undertaken. They aim at assuring the possibility of ICT usage in learning and problem solving, communication improvement in the educational system, equalising chances for young people from small towns and those located far-away from cultural centres, initiating further development of computer education and in particular making Internet access more common. To achieve the above goals the Ministry of Education decided to support schools by, among others, equipping them with Internet laboratories. These activities have been pursued since 1998 and have comprised, among others, by the following projects:

- Internet laboratory in each community (1998);
- Internet laboratory in each grammar school (1999);
- Internet laboratory in each grammar school (2000).

Projects **Internet laboratory in each commune** and **Internet laboratory in each grammar school** assumed to equip one school laboratory with 10 multimedia computer workstations joined into one local network enabling access to the Internet, providing them with software allowing pupils (according to the new programme foundations for a reformed school) to achieve computer education aims and assuring the possibility to use IT, as well as preparing 3 teachers in each school participating in the project to realise tasks of computer education.

In 1998 - in the first year of project realisation - one school in each community received a computer laboratory. 2480 schools were equipped with laboratories then. In the following year 813 grammar schools received the same type of laboratories. The next 2494 grammar schools became equipped with computer laboratories consisting of 10 workstations with Internet access and software.

In Poland the present high cost of telephone connection, in comparison with the EU level, constitutes a significant barrier in introducing new educational methods using the Internet.

6.7 Higher Education

Higher education has the longest tradition in teaching ICT in Poland. All kinds of higher education institutions have been teaching IT subjects since the 1970-ties (some even ealier). In the 1980-ties. the State Committee for Scientific Research (KBN) started to build the academic network connecting all high schools in the country. In Pomeranian Region the network TASK functions and the Gdansk Technical University is its administrator.

7 Conclusions

CYPRUS

7.1 Technology Infrastructure

The ICT infrastructure of Cyprus is among the most advanced in the region. This means that the country has the ability to support the technical side of almost every kind of ICT related application with the exception of secure electronic payments and electronic signatures. Another clear conclusion is that there is a shift among the general population from PSTN dial-up Internet connections to ISDN and ADSL connections. The same though is not observed in the SMEs. The reasons for that are not very clear and may vary from lack of necessary investment, lack of knowledge of the benefits of the new technologies. In addition there is a shift in the investment from hardware to software and services.

7.2 Citizens

According to the survey that was conducted for the purposes of this project within mainly the urban population aged 16 to 65 the level of PC penetration among the citizens is quite high (51%), that is, one out of two households own a PC. Penetration is especially high among people of younger age (16 to 20). Internet access, currently at a level of 41%, is satisfactory.

ICT penetration in education is also satisfactory and is increasing with rapid rates. The government of Cyprus with its "Orama" (Vision) Plan is aggressively importing ICT in all aspects of public education. Private schools are also characterized by high ICT penetration. The majority of all levels of the education form their ICT-related policy according to standards and guidelines of the European Union adapted to their special needs. The main barriers of ICT penetration in education are: Training of teachers, encouraging some staff to use IT regularly as a teaching aid, funding and the cost of maintaining and upgrading computer systems. The challenge is to design training programmes for teachers in order to adapt to the new IT orientated curricula and the integration of the curricula with relevant technology-based training.

7.3 SMEs

From the 300 SMEs that were surveyed it can be observed that SMEs in Cyprus are slowly shifting from the more traditional ICT applications like, stock control/accounting, office tools, payroll, customer databases and communication to more integrated and modern applications such as Enterprise Resource Planning (ERPs) systems and more sophisticated Customer Management tools such as Customer Relationship Systems (CRMs).

The level of web presence (49%), mainly static websites, is adequate, with half of the companies having their own websites and with another 44% of the rest with plans to have their own web presence within the next two years.

Lastly, the government is trying to encourage training among the SMEs in technology related fields by funding or subsidizing training courses.

7.4 Government

The government of Cyprus is committed to promoting Information Technology through the adoption of eEurope+ plans and directives. It has already made solid steps towards that direction, like its "Orama" plan for education and a project currently under way for the Formulation of a National Strategy and Legal Framework for an e-Commerce Study. It is also implementing its Web Sites System, which at the current state offer information to the citizens, but will evolve at some point into providing services as well. Within the Government's short-term plans it is also the web enabling of all of its strategic systems and providing services to the citizen and the corporate world via the Internet.

GALICIA

7.5 Technology Infrastructure

In Galicia, the ICT infrastructure is adequate for supporting any kind of e-business. There are good communications, enough and well trained IT companies and payment and electronic signature infrastructures in urban areas. Due to the liberalization of the market (even though Telefonica is still the dominant provider) new telecommunication companies are installing their own infrastructure. However, the most advanced technology and the new providers are only available in the most populated cities and municipalities (mainly in the coastal area). The rural areas, far from the big cities, have still poor infrastructures. These areas are almost digitised and the rate of ADSL enabled telephone lines is high in the most developed provinces (close to 93% in A Coruña and 98% in Pontevedra).

7.6 Citizens

From the various statistical data that was gathered, the PC penetration (35% of homes) is higher than expected, but below the desirable level. The young people are entering very fast as Internet users. The Internet users are mainly below 25 years old, being the core users between 20 and 35, this means, new workers and university students that will push the Information Society in the near future.

However, the availability of computers in the schools seems to be low, far from the general objectives of the eEurope initiative. Almost all of the public schools are connected to the Internet, but the rate of PC per pupil is very low. Unfortunately, there is no data about the private schools, which represent an important fraction of institutions, mainly in the cities.

7.7 SMEs

The penetration of ICT in SMEs in Galicia is surprising very high (close to 95% of the companies have at least one computer and 70%(!) have access to the Internet, mainly for staff and administrative workers). They use the fastest technology available that they can buy and are moving very fast to ADSL technology.

Almost all of the companies have sales, invoicing and accounting software, meanwhile the usage of other modules is still very low. Internet is mainly used to communicate with other companies and the administrations and for looking for information, but other usages are still very low.

7.8 Government

Both the national and regional governments are committed with the new technologies since the 90's. They are involved in the eEurope initiative and are promoting the ICT usage among the SMEs and citizens using several mechanisms. Both governments are migrating their administrative services to the Internet (for example, taxes, information services, etc). There is a nation wide initiative (InfoXXI) for promoting the ICT among the administrations, the companies and the citizens which include all of the aspects of the Information Society.

The penetration among other administrations (provinces and municipalities) is assumed to be very low due to the lack of data about them. Except the big cities, no one is migrating their interfaces with the users to Internet.

POMERANIA

7.9 Technology Infrastructure

1) Public access to Internet is available in the whole area of the Pomeranian Region (TP S.A. is the dominant operator).
2) The cost of connection to Internet using the PTSN network is lower than the cost of a local telephone call, however it is very high in relation to earnings.
3) In urban areas the offer of access to Internet is wider, while in the rural areas the situation is worse.
4) There are areas where the access to Internet is limited only to PTSN network.
5) The growing competition among operators in towns and a very fast development of backbone network IP act in favour of development. Decrease of costs of access to Internet is an expected result.
6) A relatively big number of companies from IT sector (especially in the Tri-City) offer a wide range of services.

7.10 Citizens

1) The low level of households equipment with PCs (20%) is alarming.
2) However, a high awareness of Internet and PCs among all age groups is a favourable factor of development as 70% of enquired people use a PC and Internet outside home.
3) The possibilities of satisfying needs connected with ITC of citizens in the Pomeranian Region are restricted by many factors: the main way is the recession, high level of unemployment, decrease of earnings and due to all these factors pauperisation of the society.

7.11 SMEs

1) Good accessibility to telecommunications networks characterises SMEs in the Pomeranian Region (mainly to PTSN, GSM).
2) SMEs declare good equipment with PCs and possessing an e-mail address is popular.
3) Possessed by SMEs web sites are at low level of advancement (mainly a short description of the comapany, its address and contact phones).
4) SMEs do not inform about lack of financial resources for purchasing new technologies and products/services.
5) Potential high awareness and acceptance of new technologies, though lack of more advanced knowledge is observed.
6) The current state of economy e.g. recession, delays in payments, weak financial condition of SMEs, high costs of loans constitute barriers to the increase of new technologies usage by SMEs.

7.12 Government

1) Big number of governmental institutions (central, regional, local) are present in web site information services.
2) Advancement in legislation referring to IT is an optimistic factor.
3) e-Strategy exists but lack of its realisation activities is observed.
4) Government declarations referring to ICT are a strong point, though there is a lack of ICT financing system. Market mechanisms have been started and the governmental supervision over correct market development has been introduced.

Pomeranian educational entities at all levels have IT curriculum at their disposal and undertake activities to realise them. ICT infrastructure in Pomeranian Region has been developing systematically. There are visible effects of market economics rules activated in the Pomeranian Region. Pomeranian citizens are relatively open and creative in ICT domain. This situation promises basic preparation of Information Society in the future.

7.13 General Conclusions

The graph that follows shows a comparison of the main ICT indicators concerning citizens, PC ownership and Internet Access among the three regions involved in the e-MINDER project:

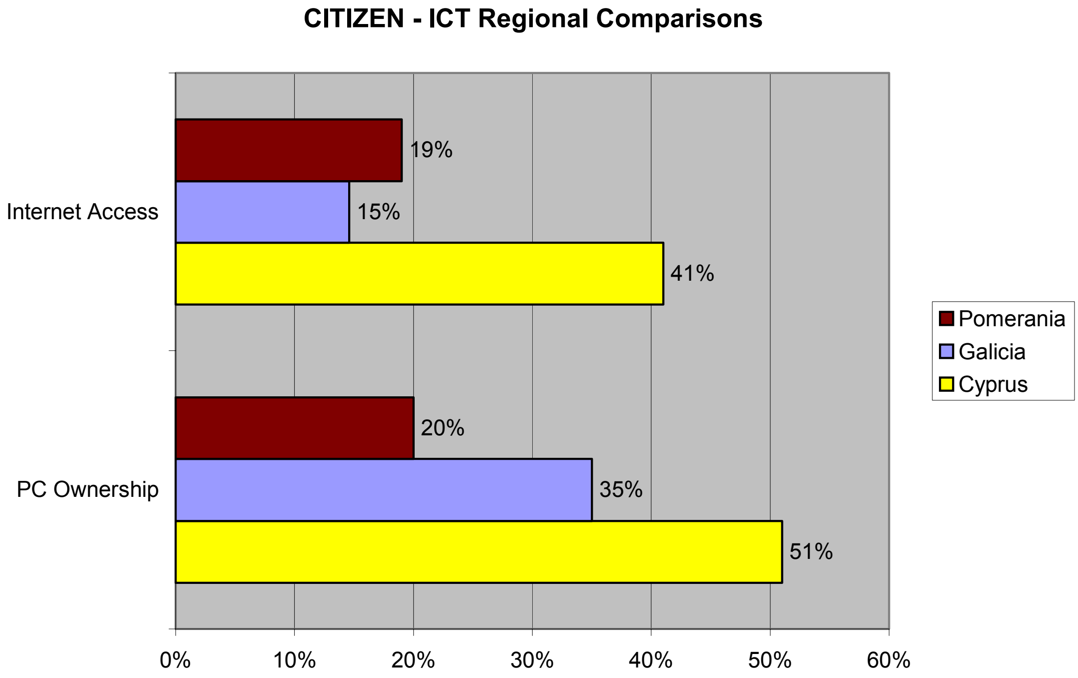

Figure 85: Citizen - Regional Comparison of key ICT indicators

Source:Data contained in this report

The regional comparisons for the SMEs can be seen in the following figure:

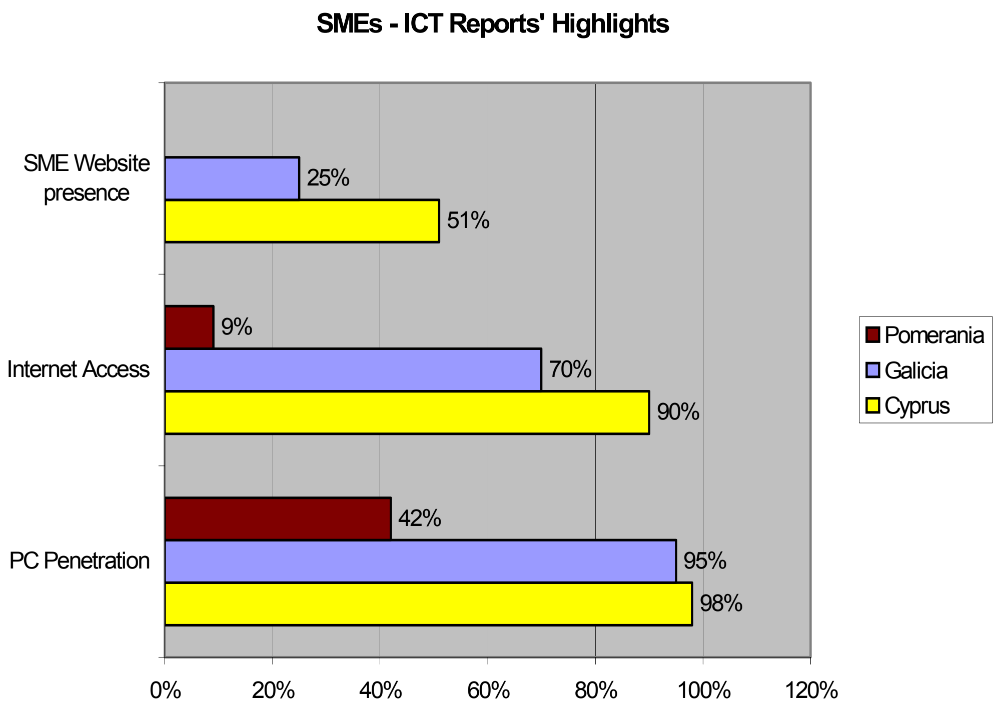

Figure 86: SME - Regional Comparison of key ICT indicators

Source:Data contained in this report

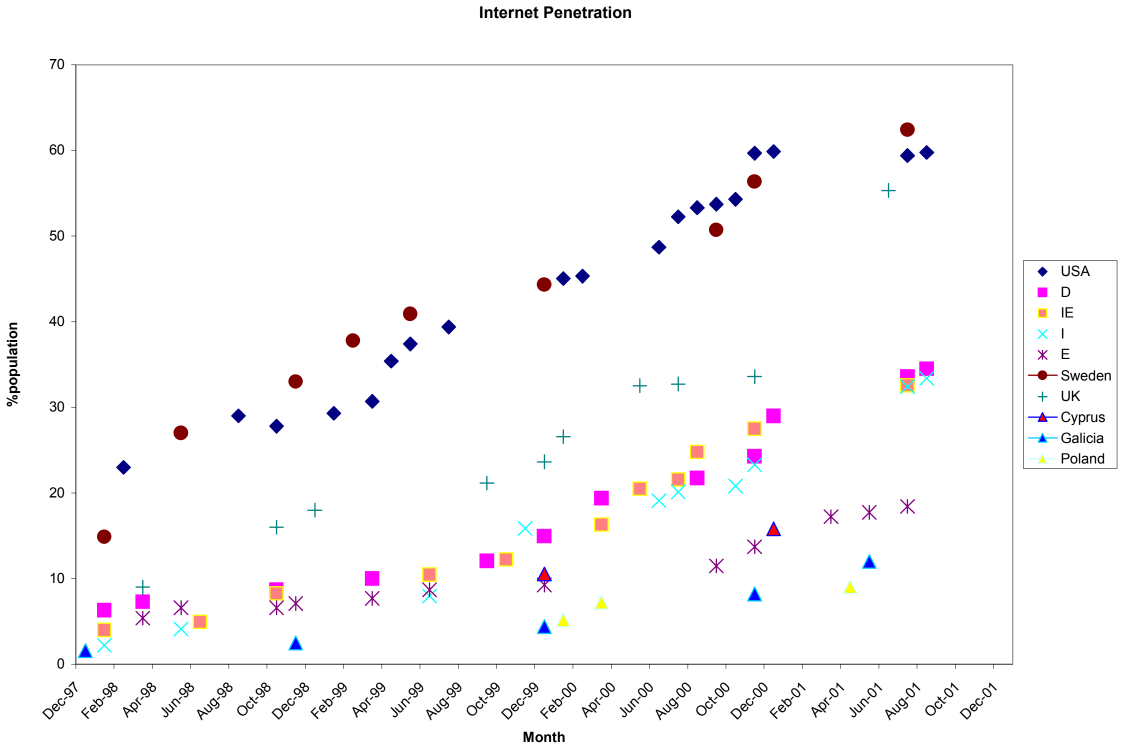

Figure 87: Internet penetration in several ODEC countries compared to the penetration in Cyprus, Galicia and Pomerania

Source NUA: http://www.nua.ie (Date December 2001)

During the initial surveys performed for the purposes of this report and from the data collected from existing surveys, the e-MINDER project has detected the lack of availability of several statistics (PC penetration in schools both public and private and local administrations, mobile phone, etc) specific for each region. An extra regional effort has to be done in the future in order to have a clear measure of the Information Society's penetration in the region.

8 References

EURO INFO CENTRES – EICs (2002) e-Europe Policy & e-Europe+ Action Plan, at http://www.go-digital.info/europe_init.php?init=eeurope

OECD - Organisation for economic co-operation and development (1998) DSTI/ICCP/AH/M(98)1/REV1.

9 CYPRUS

CYTA - Cyprus Telecommunication Authority

Department of Information Technology Services of the Government of Cyprus

Department of Statistics of the Government of Cyprus

Ministry of Education of the Government of Cyprus

University of Cyprus

VIT Ltd, CYTA, University of Cyprus (2002) *Cyprus Socio-Economic Survey*.

10GALICIA

Ae Kraków

Aimc At Http://Www.Aimc.Es

Aimc-Egm: Asociación Para La Investigación De Los Medios De Comunicación: http://www.aimc.es

Centre For Sociological Researchers

CESGA: Centro de Supercomputación de Galicia

Cyprus Government Official website: Www.Cyprus.Gov.Cy

Cyprus Private And Puplic Higher Educational Institutions

CYTA: CYPRUS TELECOMMUNCATION AUTHORITY, 2002

Demoskop

Emabassy Of The Us In Poland

Energis Polska

European Project Sensitic: Http://www.sensitic.org

Galicia 2002. Xunta De Galicia.

Gdansk Regional Statistics Offices

Global Emarketing

Gus: National Statistics Office (Pomerania)

Http://Www.Nua.Ie (Date December 2001)

Institute For Private Enterprise And Democracy

Institute For Research On Market Economy

La Caixa 2001, La Caixa, R Cable, Retevisión

La Caixa, Mundo-R, Telefonica, Communitel Corporations

Main Communication Services: Polish Telecommunication(Telekomunikacja Polska S.A.)

Ministry Of Economy, State Committee For Scientific Research, Ministry For Communication, Office Of Telecommunications Regulation (Urt).

Ministry Of Science And Technology Of Spain.

National And Regional Goverments

Non-Profit Observatories And Organizations

Nua, Eito, Eurostat

Observatorio Tic 2001: Http://www.observatoriotic.org

Regional Government Of Galicia, Mainly The Ministry Of Universities And Education, Ministry Of Presidency

Retevision

Smg/Krc (Net Track)

Spanish Telecommunication Authority

Sxi+D

Taylor Nelson Sofres

Urt: Office Of Telecommunications Regulation (Pomerania)

VIT Ltd, CYTA, University of Cyprus (2002) *Cyprus Socio-Economic Survey*.

Vodafone

Www.Datastar.Com.pl

Www.Ipartners.pl

Www.Tpsa.pl

Xunta De Galicia Website (Www.Xunta.Es)

11Glossary

Asymmetric Digital Subscriber Line (ADSL) enables voice and high-speed data to be sent simultaneously over telephone (copper) line. It can be configured to deliver up to six megabits of data per second (6000K) from the network to the customer that is up to 120 times faster than dialup service and 100 times faster than ISDN. The service is 'always available,' end-users don't need to dial in or wait for call set-up.

Application Service Provider (ASP) A provider of business applications on a pay and use basis. It allow companies to lease or rent hardware/software applications or operations - everything from maintaining an e-commerce site to handling payroll.

Authentication a method to verify the buyer's identity before payments are authorized.

Administration-to-Citizen/Citizen-to-Administration (A2C/C2A) Type of e-Commerce activity where one of the partners is a local, regional, national or international administration, the other is a citizen, and there exist economic transaction(s) or exchange of information in the process.

Business-to-Administrator/Administrator-to-Business (B2A/A2B) Type of e-Commerce activity where one of the partners is a local, regional, national or international administration, the other is a business entity, and there exist economic transaction(s) or exchange of information in the process.

Business-to-Business EC (B2B) Type of e-Commerce activity where the transacting parties are two or more business entities, or the transacting parties are members of the same company/organization/business.

Business-to-Consumer EC (B2C) Type of e-Commerce activity where one of the transacting parties is a consumer and the other a business entity.

Business-to-Employee/Employee-to-Business (B2E/E2B) Type of e-Commerce activity where one of the partners is a business entity, the other is an employee of the same business entity, and there exist economic transaction(s) or exchange of information in the process.

Cable modem: connects to the coaxial wiring of a cable television and to the user's PC via s standard Ethernet connection. The coaxial cable used by cable TV provides much greater bandwidth than telephone lines, a cable modem can be used to achieve extremely fast , always-on access to the world wide web.

Consumer-to-Consumer (C2C) Type of e-Commerce activity where the transacting parties are two or more citizens and there exist economic transaction(s).

Customer Relationship Management (CRM) is the business process, which enhances and enlarges the relationships between the customers and the business in a profitable way for both parties.

Digital signature is a phrase (like Andreas N. Georgiou) and it is a method of authenticating the source of a document and/or its author. It is based on PKI (Public key encryption) and uses digital certificates, whereby the issuing company vouches for you and gives you a unique identification that can be verified by a merchant prior to accepting an order.

Extranet is a private network that uses the Internet protocol and the public telecommunication system to share securely part of a business's information or operations with suppliers, vendors, partners, customers, or other businesses.

Frame relay allows speeds of up to 2Mbps. Frame relay technology, is used on wide area networks (WAN) and also in private network environments with leased lines over T-1 lines. Frame relay is faster than traditional networks because, it was designed for today's reliable circuits and performs rigorous error detection.

Firewall a network node consisting of both hardware and software that isolates a private network from external networks (i.e. Internet). Its primary purpose if for security and is designed to keep unauthorized outsiders from altering or accessing unauthorised information on a networked computer system.

General Packet Radio Service (GPRS) is an enhancement of the GSM core network that introduces packet data transmission and provides users with "always on" connectivity and greater bandwidth. It runs at speeds up to 115 kilobits per second, compared with current GSM (Global System for Mobile Communications) systems' 9.6 kilobits.

Global System for Mobile Communications (GSM) is a standard for digital mobile telephones and the speed of connection using a GSM phone is 9600 bps. This limit is imposed by the GSM air-interface standard.

Integrated Services Digital Network (ISDN) is an international communications standard for sending voice, video, and data over digital telephone lines. ISDN requires special metal wires and supports transfer rates of 64 Kbps. Most ISDN lines offered by telephone companies give you two lines at once, called B channels. You can use one line for voice and the other for data, or you can use both lines for data to give you data rates of 128 Kbps, four or five times the data rate provided by today's fastest modems.

Internet Service Provider (ISP) private companies supplying local and regional connections to the Internet and providing individuals and businesses with Internet access for a fee.

Intranet web technology in conjunction with a LAN to enable communication among employees, access of databases and exchange of documents and files.

Leased Lines - These allow continuous Internet connectivity and come in a variety of speeds and are used to link a user or network to an ISP or another network.

Public switched telephone network (PSTN) is the ordinary telephone network based on copper wires carrying analog voice data. This is in contrast to newer telephone networks base on digital technologies, such as ISDN and FDDI. Speed and bandwidth is generally restricted to about 55 Kbps (56,000 bits per second)

Secure electronic transaction (SET) a set of cryptographic protocols jointly developed by Visa, MasterCard, Netscape, and Microsoft and designed to provide secure Web credit card transactions for both consumers and merchants.

Secure socket layer (SSL) a special communication protocol used by web browsers and servers to encrypt all communication online and makes secure web transmissions obvious to end users.

12Figures

13List of Tables