

The Development of eServices in an Enlarged EU: eGovernment and eHealth in Cyprus

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PREFACE

Policy context

At the European Council held in Lisbon in March 2000, EU-15 Heads of Government set a goal for Europe to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion. The renewed Lisbon goals of 2005 emphasize working for growth and jobs, and include plans to facilitate innovation through the uptake of ICT and higher investment in human capital.¹

Information and Communication Technologies, and related policies, play a key role in achieving the goals of the Lisbon strategy. In 2005, the new strategic framework for Information Society policy - i2010² - identified three policy priorities: the completion of a single European information space; strengthening innovation and investment in ICT research; and achieving an inclusive European Information Society.

All three priorities, and especially the last one, consider public services to be a key field for the application of ICT, because of the impact that ICT-enabled public services could have on economic growth, inclusion, and quality of life. Within this framework, policy actions have been taken in fields such as e-government³ and e-health.⁴ Public services have also been included as application fields for ICT in the 7th Framework Programme for Research and Development⁵ and in the ICT policy support programme of the Competitiveness and Innovation Programme (CIP).⁶

Research context

IPTS⁷ has been researching IS developments in acceding countries⁸ since 2002.⁹ The outcomes of this prospective research, which aimed to identify the factors influencing Information Society developments in these countries and the impacts these developments have on society and the economy, point to the need for better understanding the specific contexts in each member state for the take-up of e-applications, in particular eGovernment, eHealth, and eLearning. These key application areas have an impact not only on the relevant economic and public service areas but also on the development of the knowledge society as a whole.

Taking the above into account, IPTS launched a project to support eGovernment, eHealth and eLearning policy developments managed by DG INFSO and DG EAC. The research, which was carried out by a consortium led by ICEG EC in 2005, focused on the three application areas in the ten New Member States¹⁰ that joined the European Union in 2004, in order to build up a picture of their current status and developments in the field, the most important opportunities and challenges they face, the lessons other member states may learn from them, and the related policy options. National experts from each country gathered the relevant qualitative and quantitative data for analysis, in order to develop a meaningful assessment of each country's current state, and trajectory, and to find out the main factors. This allowed them to derive the relevant conclusions in terms of policy and research.

¹ http://ec.europa.eu/information_society/eeurope/i2010/index_en.htm

² "i2010 – A European Information Society for growth and employment" COM(2005) 229

³ "i2010 eGovernment Action plan" COM(2006) 173

⁴ "e-Health - making healthcare better for European citizens" COM (2004) 356

⁵ See <http://cordis.europa.eu/fp7/ict/> and Official Journal L 412 of 30/12/2006

⁶ Official Journal L 310/15 of 9/11/2006

⁷ Institute for Prospective Technological Studies, one of the seven research institutes that make up the Joint Research Centre of the European Commission

⁸ Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, and Turkey

⁹ For a list of complete projects and related reports see <http://fiste.jrc.es/enlargement.htm>

¹⁰ Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia and Slovakia

The IPTS team designed the framework structure for the research, the research questions and methodology. This team and the consortium coordinator jointly guided the national experts in their work through workshops, extended reviews and editing of the various interim reports. Data sources such as international and national survey data, literature, policy documents, and expert interviews were used to capture the most recent situation of the country.

In addition to national monographs describing eGovernment, eHealth and eLearning developments in each country, the project has delivered a synthesis report, based on the country reports, which offers an integrated view of the developments of each application domain in the New Member States. Finally, a prospective report looking across and beyond the development of three chosen domains was developed to summarize policy challenges and options for the development of the Information Society towards the goals of Lisbon and i2010.

eGovernment and eHealth in Cyprus

This report was produced by the consortium member from Cyprus, the University of Cyprus. It presents the results of the research on eGovernment and eHealth in Cyprus.

First, it describes government and health system in Cyprus and the role played by eGovernment and eHealth within this system. Then, the major technical, economic, political, ethical and socio-cultural factors of the eGovernment and eHealth developments, as well as the major drivers and barriers for them in the country, are assessed. These provide the basis for the identification and discussion of policy options to address the major challenges and to suggest R&D issues for facing the needs of the country. The report reflects the views of the authors and does not necessarily reflect the opinion of the European Commission. Its content has been peer reviewed by national experts, ICEG EC, and IPTS.

In this study, **eGovernment** (European Commission COM (2003)567) is defined as the use of information and communication technologies in public administrations, combined with organisational change and new skills, to improve public services and democratic processes and strengthen support to public policies. Thus, it encompasses the dimensions of public administration, democracy, governance and policy making.

Furthermore, the vision of eGovernment in the EU for the next decade as a tool for better government in its broadest sense should be taken into account when considering the scope of eGovernment developments. This vision places eGovernment at the core of public management modernisation and reform, where technology is used as a strategic tool to modernise structures, processes, the regulatory framework, human resources and the culture of public administrations to provide better government, and ultimately, increased public value.

The creation of public value is a broad term that encompasses the various democratic, social, economic, environmental and governance roles of governments. Concrete examples of these roles are: the provision of public administration and public services (health, education, and social care); the development, implementation and evaluation of policies and regulations; the management of public finances; the guarantee of democratic political processes, gender equality, social inclusion and personal security; and the management of environmental sustainability and sustainable development.

eHealth is defined as the use of modern information and communication technologies (ICTs) to meet the needs of citizens, patients, healthcare professionals, healthcare providers, and policy makers. It makes use of digital data, transmitted, stored and retrieved electronically, for clinical, educational and administrative purposes, both at local sites and at a distance from them. Hence the study looks into the use of ICT in public health policy and prevention of disease, information services to citizens, integrated patient management and patient health records, and telecare and independent living services applications.

From early 2008, all reports can be found on the IPTS website at:
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TABLE OF CONTENTS

PREFACE	I
LIST OF ABBREVIATIONS	IV
INTRODUCTION: COUNTRY FEATURES	1
General data	1
Economic situation.....	1
Demography indicators, population developments	5
General government indicators.....	5
General health sector indicators	6
General ICT usage indicators	7
I. DESCRIPTION OF CURRENT GOVERNMENT AND HEALTH INSTITUTIONS AND SYSTEMS	11
1.1 Structure of the public administration	11
1.2 Citizen/business/civil organizations involvement into governance and decision making	14
1.3 Recent policy and institutional reforms and policy strategies, adopted by government for modernizing, in the area of public administration.....	15
1.4 Healthcare system	17
II. DESCRIPTION OF EGOVERNMENT / EHEALTH DEVELOPMENTS.....	21
II.1 The institutional structures, actors and the resources and funding for eServices	21
II.2 Current strategies, policies, action plans and projects	26
II.3 The legal framework supporting the eGovernment and eHealth applications	35
II.4 The ICT infrastructures	37
II.6 The usage of technologies and eGovernment and eHealth services	52
II.7 The impacts of eGovernment / eHealth developments on the public sector and the healthcare systems and on Information Society	54
III. ASSESSMENT OF THE CURRENT DEVELOPMENTS AND TRENDS, SPECIFIC TO BOTH EGOVERNMENT AND EHEALTH.....	57
III.1 Analysis of current state and trend of eGovernment and eHealth developments based on selected indicators	57
III.2 Major factors affecting the evolution of the eGovernment and eHealth developments.....	58
III.3 Drivers and barriers to eGovernment and eHealth developments.....	61
IV. ANALYSIS OF THE POSSIBLE POLICY OPTIONS.....	65
V. THE MAJOR FUTURE TECHNICAL AND NON-TECHNICAL R&D CHALLENGES SPECIFIC TO E- GOVERNMENT AND TO E-HEALTH.....	69
VI. CONCLUSIONS.....	73
BIBLIOGRAPHY	77

LIST OF ABBREVIATIONS

ADSL	Asymmetric Digital Subscriber Line
CAF	Common Assessment Framework
CAPA	Cyprus Academy of Public Administration
CEMR	Council of European Municipalities and Regions
CITEA	Cyprus Information Technology Enterprises Association
CLRAE	Council of Europe's Congress of Local and Regional Authority of Europe
CNDP	Cyprus National Development Plan
CPC	Commission for the Protection of Competition
CYTA	Cyprus Telecommunication Authority
DITIS	Collaborative Virtual Medical Team for Home Healthcare of Cancer Patients
DITS	Department of Information Technology Services
ECTRA	European Committee for Telecommunications Regulatory Affairs
eID	Electronic Identification
EUTELSAT	European Telecommunications Satellite Organization
EUnetHTA	European Network on Health Technology Assessment project
EU	European Union
EU15	European Union 15
EU25	European Union 25
FDI	Foreign Direct Investment
FWA	Fixed Wireless Access
GCP	Government Computerization Master Plan
GDN	Government Data Network
GDP	Gross Domestic Product
GIN	Government Internet / Intranet and Extranet
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HCIS	Healthcare Information Support
HIO	Health Insurance Organisation
HMS	Health Monitoring System
ICT	Information and Communication Technology
IST	Information Society Technologies
IS	Information Society
IT	Information Technology
ITU	International Telecommunications Union
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LOGON	Local Government Network
NGO	Non Government Organizations
NHS	National Health Scheme
NHIS	National Health Insurance Scheme
NRP	National Reform Programme
PC	Personal Computer
PFI	Private Finance Initiatives
PPP	Public Private Partnerships
PSI	Public Sector Information
RDBMS	Relational Database Management System
R&D	Research and Development
RFP	Request for Proposal
RPF	Research Promotion Foundation
SME	Small Medium Enterprises
WLAN	Wide Local Area Network

INTRODUCTION: COUNTRY FEATURES

General data



Capital:	Nicosia
Surface area:	9,251 sq. km
Population:	749,200 by year 2005
Nominal GDP:	6.7% by year 2005
GDP growth rate:	3.8% by year 2005
GDP at market prices:	3,417.5 million Euro (2005)
Inflation rate:	2.2% by year 2005
Government debt/GDP:	70.3% (2005)
Unemployment rate:	5.3% by year 2005
Illiteracy rate:	97.6% by year 2005 (as of population 15+)
Public balance (government deficit or surplus/GDP):	-2.4% (2005)

Economic situation

Economic growth

Cyprus has an open, free-market, serviced-based economy developed step by step over the years into a modern economy, with dynamic services, industrial and agricultural sectors and advanced physical and social infrastructure. The economy of Cyprus has performed relatively well during the last few years in spite of the challenging external environment. With an average annual GDP growth rate of 3.8% in 1994-2004 (Table 1), Cyprus was among the best performers in Europe. The growth was supported by a stable private consumption growth, and a small, though non-negligible, contribution from investment and public consumption. However, the susceptibility of the economy to external shocks has been evident in the volatility of exports, which in large part are due to the impact from tourism, and the current account balance. After a slowdown in 2002-03 growth has accelerated and reached 3.8% in 2005.

Table 1: Key Macroeconomic Indicators (predicted)

% annual change	1994-2003	2004	2005
GDP	3.9	3.8	3.8
CPI	3.1	1.9	2.2
Unemployment Rate	3,2	3.6	3.9
Employment	1,8	1.9	1.9
Nominal Earnings	5,9	3.6	4.8
Productivity growth	2,1	1.9	2.1
Current Account	2,6	5.6	5.5

Source: Convergence Programme of the Republic of Cyprus 2005-2009, Ministry of Finance, December 2005

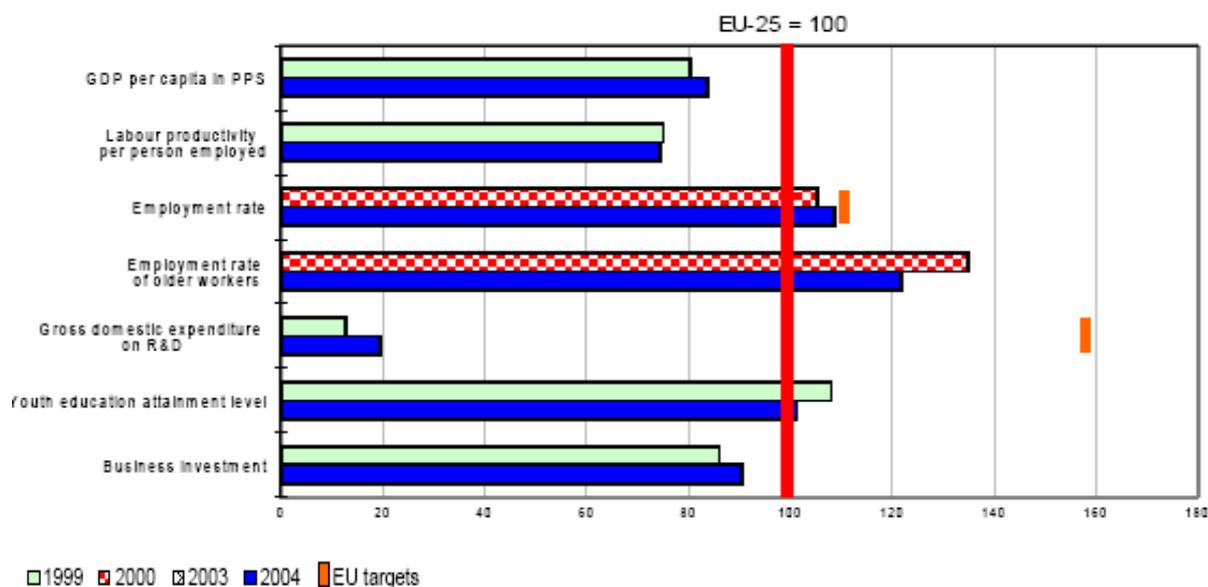
In 2004, Cyprus's GDP per capita stood at 83.6 % (Table 2) of the EU average, the highest of the ten new Member States. Since the mid-1990s real wage growth has outpaced productivity increases, even though productivity growth has been slightly above the EU average, leading to some loss of price competitiveness. Nevertheless, unemployment is low at 5.3% in 2005. The total employment rate has encountered an increase from 68.9% in 2004 to 69.1% in 2005 which is close to the Lisbon target.

Table 2: Cyprus and EU-15 Key Macroeconomic indicators comparison for 2004

	CY 2004	EU-25 2004
GDP per capita in PPS	83.6	100.0
Labour Productivity per person employed	74.5	100.0
Employment rate	68.9	83.3
Employment rate of older workers	49.9	41.0
Cross domestic expenditure on R&D	0.37p	1.90pe
Youth education attainment level	77.6	76.6
Comparative price levels	99.3p	100.0
Business investment	15.3	16.9
Long-term employment rate	1.4	4.1
Volume of freight transport relative to GDP	76.5	104.7e

Source: The Commission's Assessments of National Reform Programmes for Growth and Jobs – Cyprus, 2005

Table 3: Cyprus and EU-15 key Macroeconomic indicators graph



Source: The Commission's Assessments of National Reform Programmes for Growth and Jobs – Cyprus, 2005

Inflation has remained subdued—averaging some 3% over 1994-2003—despite large increases in oil prices and large swings in exchange rates, and reached 2.9% in 2005. Annual increases in nominal wages averaged 5.9% over the 1994-2003 period, reflecting productivity improvements and tight labour market conditions in some sectors. A rising number of foreign and Turkish-Cypriot workers is expected to exert a moderating effect on wages in the coming years, as was the case in 2004 when nominal earnings rose by less than 4%.

The strong economic performance can be accredited to sound economic policies as well as the existence of a dynamic and flexible entrepreneurship and a highly educated labour force. A credible monetary policy, underpinned by a fixed exchange rate arrangement, provided macroeconomic stability and helped to pin down inflation expectations. Following the worsening of the government finances in 2002 and 2003, a revamped programme of fiscal consolidation has been central to the successful efforts of the Government to bring about economic stabilization.

Cyprus is closer to the more advanced western European countries than many of the nine other countries with which it joined the European Union in May 2004. On a purchasing power basis, per capita incomes stood at 81% of the EU25 average in 2004. Incomes are also on a par with or exceed those of more established EU members, such as Greece (81% of EU25 income) and Portugal (77%).

Public sector balance

Even though the general government deficit was reduced significantly from 6.3% of GDP in 2003 to 4.1% of GDP in 2004, the account deficit has remained in 5.5% of GDP in 2005. Transitory as well as more structural reasons are behind the moderately high current account deficit. Accelerating oil prices have pushed imports of oil-related products significantly higher although this trend is expected to be reversed in the medium term. Conversely, higher investment and imports of capital goods have raised the underlying current account deficit. While the transitory factors will dissipate in the medium term, the process of real convergence will tend to maintain the current account deficit at somewhat moderate levels, which can however be financed by non-debt creating flows, in particular if there is success in the efforts to boost productivity and enhance competitiveness.

As can be seen from the Table 4 given below, which depicts the revenue and the expenditure side as a percent to GDP, the bulk of the adjustment emanates from the containment of expenditures below the growth of nominal GDP. On the revenue side, the projections are somewhat conservative, as

extraordinary increases in tax revenues witnessed in 2005 in certain categories of both direct and indirect taxation are not taken into account. Two key measures account for the bulk of the adjustment on the revenue side both of which are planned for 2006: (i) the regularisation of the dividend income policy for semi-governmental organisations estimated at 0.7 percent of GDP in 2006, and corresponding amounts thereafter, and (ii) the one-off issuance of title deeds for buildings erected with minor irregularities estimated to provide an additional 0.3 percent of GDP annually for a period of three years. Also, improved tax compliance, resulting from the enactment of amending legislation concerning self-employed individuals and on account of the recent tax amnesty, is estimated to yield additionally 0.3 percent of GDP by 2007. With the exception of revenues accruing from the issuance of title deeds, the remaining measures will raise revenues on a permanent basis. In view of the aforementioned measures amounting to 1% of GDP, the target for a general government deficit of 1.9% of GDP in 2006 appears attainable.

The longer term challenge for the Cypriot authorities is to anchor recent improvements in fiscal outcomes with deeper current expenditure reforms, particularly of subsidies and the social security system. This would not only place the sovereign in a stronger position to cope with reunification of the island (if and when it happens) and ride out the economic cycle with more ease, but will also support the ability of public finances to cope with the costs of an ageing population. While recent measures to increase the retirement age are encouraging, further pension reforms are needed; demographic projections and subsequent pressures on public finances mirror those typical in the EU.

Table 4: General Government Consolidated Accounts

as a percent of GDP	2003	2004	2005	2006 proj.	2007 proj.	2008 proj.	2009 proj.
Current Revenue	39.1	39.5	41.2	40.0	40.0	39.6	39.1
Current Expenditure	41.4	39.5	39.8	37.9	37.8	36.8	35.8
Interest Payments	3.5	3.2	3.2	3.1	3.0	2.6	2.3
Current Balance	-2.3	0.0	1.4	2.1	2.2	2.8	3.3
Capital Expenditure	4.0	4.1	4.0	4.0	4.0	4.0	3.9
General Government Net Borrowing	-6.3	-4.1	-2.5	-1.9	-1.8	-1.2	-0.6
Primary Balance	-2.8	-0.9	0.7	1.2	1.2	1.4	1.7
Government Gross Debt	69.4	71.3	70.5	67.0	64.0	56.9	53.5

Source: Convergence Programme of the Republic of Cyprus 2005-2009, Ministry of Finance, December 2005

Labour market

Cyprus's economy is supported by a workforce that is relatively flexible in terms of labour market regulations and highly educated – some 30% of the workforce has received tertiary education. Concern is growing, however, over the lack of flexibility in wage policy, which is increasingly important given the cost pressures in the tourist industry and the future ability of Cyprus to withstand shocks in the absence of monetary policy tools.

With the unemployment rate, based on the labour force survey, at 5-5.5% of the labour force, labour market conditions remained tight. Labour shortages (e.g. in the sectors of hotels and restaurants, trade and construction and at the occupational level in technical and low skilled occupations), have been addressed, to a large extent, by an increased supply of foreign workers and Turkish Cypriots. The tight labour market conditions are unlikely to be reversed as the old-age dependency ratio is projected to increase from 17.5% in 2004 to 43.2% in 2050, with both a declining fertility rate and a rising life expectancy contributing to this trend.

Regarding the rate of improvement of labour productivity, performance is quite satisfactory averaging 1.6% for the period 2001-2004. During 2002 and 2003 labour productivity growth deteriorated as a result of the cyclical slowdown in economic growth registering a 1.0% and 1.1% growth respectively,

but still remaining above the EU average. In 2004 labour productivity has improved registering a 2.4% growth. The main reasons for the satisfactory performance in productivity is the relatively high return on investment and the diversification in favour of services which register higher productivity rates than the other sectors of the economy.

Demography indicators, population developments

Based on the demographic projections prepared by the Cyprus Statistical Services until 2050, the population in the government-controlled area is expected to reach 816 406 by 2050 compared to 705 539 in 2002. The percentage of those aged 15-64 to the total population is projected to fall to 61% by 2050, compared to 66.8% in 2002. For those aged 65+, the percentage to total population is projected to increase to 28.5% by 2050 compared to 11.7% in 2002. The above data indicates the ageing effect on the population which will affect the labour force supply. This is expected to be only to a limited extent offset by the inflow of immigrants.

General government indicators

Balance by subsectors of general government

The general government sector in Cyprus comprises of the central government, the local authorities and the social security funds. The central government accounts for the bulk of the general government deficit, with the local authorities responsible for a marginal deficit of 0.1% of GDP as most of their operations and investment programmes are financed by transfers from the central government (Table 5).

The social security system, which is based on a pay-as-you-go principal, has recorded surpluses reaching 3% of GDP in 2004, thus reducing the overall general government deficit. The sizeable surplus of the social security fund is attributed to the fact that, presently, contributions outpace expenditure on pensions.

Table 5: General Government Budgetary Developments by Subsector

in percent of GDP	ESA code	2004	2005	2006	2007	2008	2009
<i>Net lending (B9) by sub-sectors</i>							
1. General Government	S13	-4.1	-2.5	-1.9	-1.8	-1.2	-0.6
2. Central Government	S1311	-7.1	-5.6	-5.0	-4.7	-4.1	-3.3
3. State Government	S1312	-	-	-	-	-	-
4. Local Government	S1313	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
5. Social Security Funds	S1314	3.2	3.2	3.1	3.0	2.9	2.8

Source: Convergence Programme of the Republic of Cyprus 2005-2009, Ministry of Finance, December 2005

Developments in the composition of government expenditure by function reveal that expenditures in the components of general public services and defence have declined as proportions of GDP since 2003. Furthermore, the government budget for 2006 shows continued relative declines in the general public services expenditure component. Total expenditure on education increased from 5.7% of GDP in 2003 to 5.8% in 2004 and is set to remain at the same level of GDP in 2006. In view of the considerable importance the government attaches to raising the level of resources channelled to growth-enhancing expenditure categories such as infrastructure, Research and Development (R&D), computerization, education and health, it is planned that government expenditures on such activities be raised by some of 6% per annum over the medium-term. A further increase in expenditure in these categories will be financed by public and European Union (EU) resources, as well as through Public Private Partnerships (PPP).

Table 6: General government expenditure by function

% of GDP	Year 2003	Year 2004	Year 2005	Year 2006
1. General public services	9.1	8.2	8.2	8.0
2. Defence	3.2	2.4	2.4	2.4
3. Public order and safety	2.0	2.0	2.0	2.0
4. Economic affairs	6.2	6.2	6.0	5.8
5. Housing and community amenities	4.1	4.1	4.1	4.1
6. Health	3.2	3.2	3.2	3.2
7. Recreation, culture and religion	0.5	0.5	0.5	0.4
8. Education	5.7	5.8	5.8	5.8
9. Social protection	11.3	11.2	11.6	10.2
10. Total expenditure	45.3	43.6	43.8	41.9

Source: Cyprus Statistical Services, 2006

In 2004, expenditure on R&D in Cyprus was among the lowest (0.37% of GDP) comparing with the other European Countries (EU25 average 1.93% of GDP). During the last decade, however, research initiatives expanded considerably, both in the broader public sector as well as in the private sector. Substantial progress towards this direction was achieved, with the establishment of the *University of Cyprus* in 1992, the expansion of research activities of two internationally recognised research organisations, namely, the *Institute of Neurology and Genetics* and the *Agricultural Research Institute* and the creation in 1996 of the *Research Promotion Foundation (RPF)*, a national, independent and non-profit organisation, which was assigned the responsibility of promoting scientific and technological research, as well as the support of research activities in Cyprus. Cyprus annual average growth rates of R&D expenditure over the period 2001 to 2004 was quite high (+15%) comparing with annual average EU25 growth rate of 1.3%.¹¹ Assuming that the current increase in R&D spending continues in the years to come and taking into consideration the measures taken by the Government to increase R&D spending, the target of 0.65% of GDP by 2008 set by the Government in the latest National Reform Programme (NRP) is feasible, but still much behind the EU25 level. Unlike in the EU, where the business enterprise sector is the foremost performer of R&D, in Cyprus the government sector still dominates R&D even if in a decreasing manner. It is followed by the higher education and the business enterprises sector. The private and non-profit sector had initially a low share, but its importance in the R&D involvement is growing nowadays. The trend seems to follow the European trend: shifting the importance of involvement from the governmental sector towards the businesses and higher educational institutions. However, this will take somewhat longer time, which may be due exactly to the small size of the country and to the fact that the country seems to be rather oriented towards trade, tourism and financial intermediation than to expensive research activities.

General health sector indicators

Based on the Statistical Service of Cyprus annual report “Health and Hospital Statistics” 2004 the share of expenditure as a percent to GDP increased from 5.7% in 1998 to 6.2% in 2004.

The planned introduction of a National Health Scheme (NHS) by 2008, which foresees no fee at the point of consumption, and the prospective increase of demand for cost-intensive healthcare, especially of the old aged and the ageing population, there is expected to be relatively large increases in healthcare expenditures. However, the introduction of a NHS is also expected to lead to saving, inter alia, through: the implied competition pressure on the public hospitals to become more efficient, the

¹¹ Eurostat Statistics in Focus, Science and Technology, 2/2005, R&D expenditure in the European Union.

efficiency gains through the anticipated improvement of primary healthcare, saving due to the introduction of the concept of the family doctor and the introduction of the global budgeting concept for the NHS. The total impact of these factors on the evolution of health expenditure over the long-term is difficult to assess.

For the purpose of this exercise, projections were undertaken by the Cyprus Government, based on the assumption that healthcare expenditure would exhibit a GDP growth elasticity of 1.1 between 2005-2010, which would decrease thereafter, gradually, to 1.03 by 2050, reflecting efficiency gains through the introduction of the National Health Scheme. Furthermore, based on the agreement between the Government and the social partners on the contribution rate of the Government (4.55% of earnings), employers (2.55% of earnings) and employees (2% of earnings), it was estimated that the Government will cover roughly 52.5% of the total healthcare expenditure (including its contribution as employer) after the introduction of the NHS, planned to take place by 2008.

Based on the above-mentioned assumptions, it is estimated that the Government healthcare current and capital expenditure would rise from the current 3.2% of GDP to 4.3% by 2050.

On the basis of available data for the public and private sector, the following health sector indicators were calculated in 2004:

- 375 persons per doctor, whilst the corresponding indicator for 2003 was 384 persons per doctor and 483 for 1990.
- 227 persons per nurse, whilst the corresponding indicator for 2003 was 235 persons per nurse and 234 for 1990.
- 240 persons per hospital bed, whilst the corresponding indicator for 2003 was 234 persons per hospital bed and 170 for 1990.
- Expectation of life at birth for the period 2002-2003 was 77.0 years for men and 81.4 years for women.

As per the WHO European health for all database in 2006 the following indicators are given for the Cyprus healthcare sector regarding 2003:

- Hospital beds per 100000 citizens 431.
- Number of hospitalized patients per 100 citizens 6.86
- Physicians per 100000 citizens 295

General ICT usage indicators

Table 7 lists basic indicators, relating to the IS in Cyprus in 2004 and 2005. A summary regarding indicators for households and enterprises is given.

Households: There is a noteworthy increase in the percentage of households with access to Internet enabled mobile phones from 29.4% in 2004 to 42.3% in 2005. A reduction of the number of personal computers used at households for accessing the Internet between 2004 and 2005 is registered (Table 7) showing that Internet enabled phones are more preferred than personal computers. The percentage of households that have a computer is 46.4% (desktop computer 43.2%, and laptop computer 12.1%). The mobile phone is widely spread in households, with percentage 85%. Compared to 2004 there is no change in this percentage. From these figures it can be derived that considerable progress has been achieved in some of these areas bringing Cyprus close to the EU15 statistics,¹² showing average penetration rates of 52% for personal computers usage, 80% of mobile telephone access and 48% of internet access in households.

¹² Special Eurobarometer No. 249, e-Communications households, July 2006 survey.
http://ec.europa.eu/information_society/policy/ecomms/info_centre/documentation/studies_ext_consult/index_en.htm#2006

As per Eurostat eSkills statistics (Graph 1) more than one in three (34%) of EU residents have never used a computer, ranging from 8% in the Nordic countries Sweden, Denmark and Iceland to 65% in Greece. Moreover a majority of 57% do not regularly use the Internet. In Cyprus 53% have never used a computer and 74% do not regularly use the internet. It is clear that a lack of eSkills will prevent people in Cyprus from participating fully in the IS including the use of eServices. However as per Eurostat a small increase was observed in Cyprus in the percentage of individuals that ordered products and services via Internet, from 4.3% in 2004 to 5.1% in 2005. These individuals order mainly books, magazines, newspapers and eLearning material

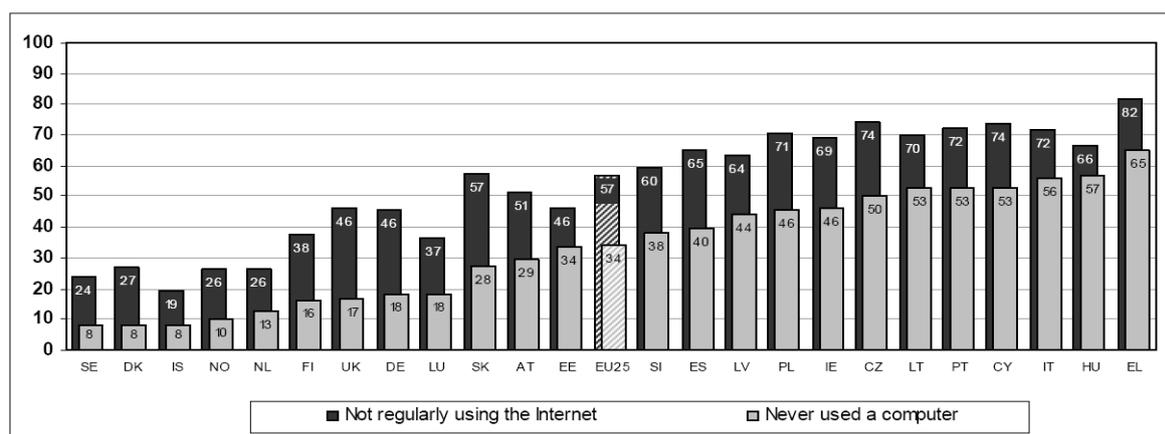
As per Eurostat Community survey on ICT usage and electronic commerce in enterprises eCommerce on the internet in all enterprises in Cyprus in 2004 was 27% for buying and only 4% for selling giving a total of 0.2% of internet sales as a percent of total turnover which is far below the 2.5% of EU25.

Table 7: Information and Communication Technologies Usage in Households

<u>HOUSEHOLDS</u>	<u>2005</u>	<u>2004</u>
	%	%
Households with access to selected Information and Communication Technologies (multiple answers possible)		
Mobile phone	84.9	84.6
Internet enabled mobile phone / "Communicator" type device	42.3	29.4
TV	99.3	99.7
Satellite dish	11.6	11.9
Games console	19.5	20.5
Personal computer	46.4	47.2
Handheld computer (palmtop)	2.3	2.2
Households with Internet access at home	42.3	29.4
Devices used in households to access the Internet at home (multiple answers possible)		
Internet enabled mobile phone (WAP, GPRS)	4.0	3.4
Personal computer	31.5	34.4
Handheld computer (palmtop)	0.8	0.7
Devices that are used by households as a unique way of accessing the Internet		
Only Internet enabled mobile phone (WAP, GPRS)	0.2	0.2
Only personal computer	27.5	30.7
Types of Internet connection used by households to access Internet (multiple answers possible)		
Modem (dial-up access over normal telephone line) or ISDN	27.5	34.1
Broadband connection		
DSL (e.g. xDSL)	4.5	2.4
Wireless connection (e.g. satellite, mobile phone)	3.8	3.6

Source: Cyprus Statistical Services, annual survey 2005

Graph 1: Individuals not using computers or the Internet (2005)



Source: Eurostat, Community survey on ICT usage in households and by individuals.

Enterprises: Based also on the results from the ‘Information and Communication Technologies Usage and eCommerce in Enterprises’ annual survey 2005 (Table 8), conducted by the Statistical Service, the percentage of enterprises that used a computer during January 2005 is 93.9%, almost the same compared to 2004 when it was 93.5%. There was an increase in Internet usage by enterprises from 88.1% in 2004 to 90.2% in 2005, that comes mainly from small enterprises (10-49 employees), and reaches almost the EU25 average of 91%.¹³ The proportion of enterprises with their own website in 2005 is 44% compared with the 62% of EU25. Enterprises with a Website use their Website mainly for marketing their products (97.1%).

Table 8: Information and Communication Technologies Usage and eCommerce in Enterprises

	2004 (%)	2005 (%)
Computer usage by enterprises	93.5	93.9
Internet usage by enterprises	88.1	90.2
Enterprises with their own website	42	44

Source: Cyprus Statistical Services, annual survey 2005

Broadband situation

As per Eurostat data for 2005 broadband technologies are evidently beginning to be adopted by a substantial number of SMEs and households (Table 9). Almost 23% of European households have a broadband connection whilst the majority of European SMEs (62%) are using broadband technologies. The take up and provision of broadband connection in Cyprus in 2005 is quite limited (4% for households as compared with the EU25 averages of 23%) although growing. Broadband services have been provided since 2001. Today, only the Cyprus Telecommunications Authority (CYTA) offers this type of services, and its ADSL network covers only the urban areas (70% of the population), whilst network expansion to rural areas has been started at the end of 2004 and is still in progress. As per data provided by CYTA showing the ADSL coverage as a percentage of area of population is 8.1% and the ADSL penetration rate is 0.5%, both quite low comparing with the EU25 average rate. The cost of ADSL for households¹⁴ is relatively low, whilst the ADSL cost for businesses¹⁵ is quite high, although a significant decrease in prices has been observed in the last two years.

¹³ Eurostat Community survey on ICT usage in enterprises. Use of the Internet among individuals and enterprises - Issue number 12/2006

¹⁴ There are three products offered for households and their prices range from CY£9 to CY£15 monthly rental, whilst connection charges are fixed at CY£40. (Source:www.i-choice.cyta.com.cy). (Exchange rate 1CY = 1.72 Euro)

¹⁵ Two business products are offered, and their prices range from CY£40 connection charges and CY£30 monthly rental to CY£100 connection charges and CY£45 monthly rental. In 2003 only one product was offered and its price was CY£100 connection charges and £52 monthly rental (prices do not include the rental of the telephone line, the ISP fee, and the VAT). (Source:www.i-choice.cyta.com.cy) (Exchange rate 1CY = 1.72 Euro)

Table 9: Proportion of households having a broadband connection according to the degree of urbanization in 2005 (%)

	EU25	EU15	CY
Broadband	23	25	4
Internet	48	53	32

Source: Eurostat Community survey on ICT usage in households, 2005

In October 2003 the Office of the Commissioner of Telecommunications and Postal Regulation awarded, through auctioning, a second 2G/3G license to Areeba (a company of Lebanese interests) which started offering mobile phone services as from September 2004. As far as fixed telephony is concerned, 23 licences for the provision of fixed telephony services have been awarded, and as from the summer of 2003 fixed telephony services are offered from other suppliers beyond CYTA. Due to the short period that elapsed, the market share of the new providers seems to be still very low. It is noted that the incumbent operator (CYTA) has been determined by the Regulator as having significant market power, under the 1998-2000 Regulatory Regime, in public fixed telephony services, public fixed network, public mobile telephony, public mobile network, leased lines and interconnection. Moreover, the two GSM operators (CYTA and Areeba) have been granted the right to establish and operate 3G/UMTS network and provide 3G/UMTS services. Areeba has been offering 3G/UMTS services since December 2004, but in 2005 the average territory coverage reaches only 51%, whilst CYTA has begun rolling its 3G/UMTS network as well.

I: DESCRIPTION OF CURRENT GOVERNMENT AND HEALTH INSTITUTIONS AND SYSTEMS

The purpose of this chapter is to give background information about the structure, functioning, major problems and issues of the government institutions and healthcare systems in Cyprus. Specifically the following major issues will be addressed:

- The institutional structure of the public administration which is highly centralized and has a clear separation of the executive, legislative and judicial branches. Central government consists of those institutions which execute administration in the entire country. Local government is the responsibility of the Municipal and Community Councils,
- The description of the involvement of the citizens/businesses/civil organisations into governance and democratic decision making which is guaranteed by international and local law, resolutions of the government and other legal documents. Direct participation includes participation in the elections, public opinion polls, meetings, writing proposals, in a general referendum, etc. Regarding participation of all Citizens into governance the Citizen's Charter has been defined as a bond of honour between the public service and citizens that safeguards the right of citizens to enjoy quality and high-standard services.
- The recent policy, institutional reforms and strategies in the area of public administration addressing the main issues of increasing the efficiency of the public sector, enhancing the conditions of competition and changing the status of the organizations in the utilities sectors and enhancing and modernizing the public employment services.
- The healthcare system including its institutional framework, its ownership and financing structure and healthcare reforms.

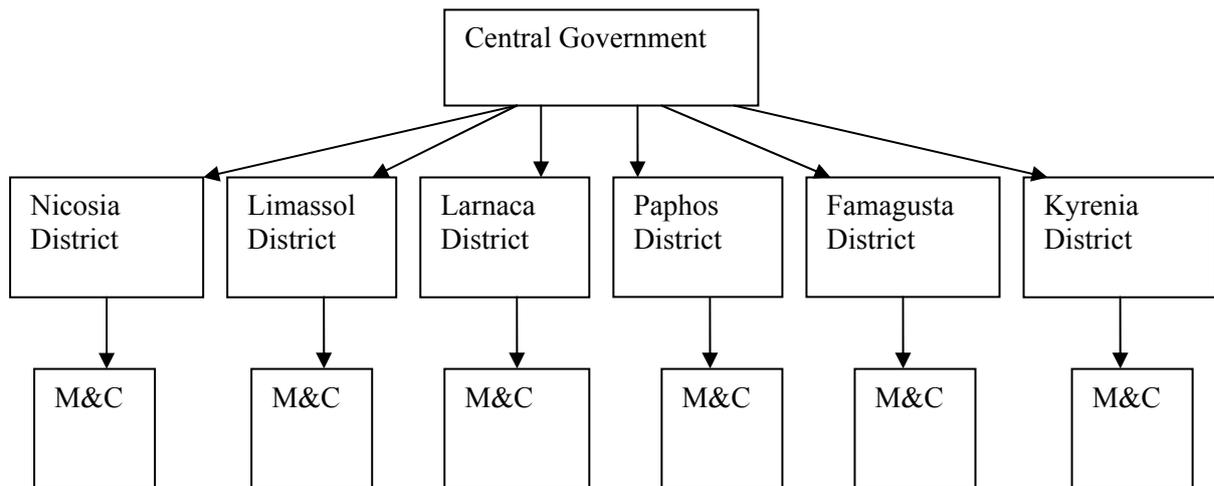
1.1 Structure of the public administration

Structure of public administration

Cyprus is an independent sovereign Republic with a presidential system of government. The President is both the Chief of State and Head of Government. The basic principles of the institutions of country governance are defined by the Constitution of the Republic of Cyprus.

Cyprus state structure is highly centralized consisting of the central government and 6 administrative districts (Graph 2). Each district is headed by a District Officer who is essentially the central government's local representative, acting as chief coordinator for the activities of all Ministries in that District and is accountable to the Ministry of Interior.

Graph 2: Cyprus structure of Public Administration



Source: The Cyprus government webpage (M&C means Municipalities and Communities)

Central government consists of those institutions which execute administration in the entire country. The Parliament, institutions accountable to the Parliament, the President, the government, various governmental institutions such as departments, inspections etc. are defined as central administration subjects.

Local government is the responsibility of the Municipal and Community Councils, The former is concerned with the provision of local government services and administration of the towns and large rural areas, while the latter with the management of village affairs. These councils are independent bodies which are governed by separate laws whose members are elected by universal suffrage.

Institutional structure and functions of central government

In Cyprus there is clear separation of the **executive**, **legislative** and **judicial** branches. There are also a number of independent officers and bodies which do not come under the jurisdiction of any Ministry.

Executive: Under the 1960 Constitution executive power is vested in the President of the Republic, elected by universal suffrage for a five-year term of office. Executive power is exercised through a Council of Ministers appointed by the President, who has the right of final veto on decisions of the Council of Ministers and laws or decisions of the House of Representatives concerning foreign affairs, defence or security. There are 11 Ministries in Cyprus: Ministry of Defence, Ministry of Agriculture, Natural Resources and Environment, Ministry of Justice and Public Order, Ministry of Commerce, Industry and Tourism, Ministry of Foreign Affairs, Ministry of Labour and Social Insurance, Ministry of Interior, Ministry of Finance, Ministry of Education and Culture, Ministry of Communications and Works, Ministry of Health. Each Minister is the head of his Ministry and exercises executive power of all subjects within that Ministry's domain. The Government Spokesman and the Deputy Minister to the President are also present at the meetings of the Council of Ministers.

Legislative: Legislative authority is exercised by the House of Representatives. Its members are elected for a five-year term. In accordance with article 67 of the Constitution of the Republic of Cyprus, the House of Representatives may dissolve itself only by its own decision carried by an absolute majority.

Judicial: The administration of Justice is exercised by a separate and independent Judiciary. Under the 1960 Constitution and other legislation in force, the following judicial institutions have been established: The Supreme Court of the Republic, the Assize Courts, the District Courts, the District court, the Military court, the Industrial Disputes Court, the Rent Control Courts and the Family Courts.

Independent officers and bodies: The independent officers of the Republic under the Constitution are the Attorney-General, the Auditor-General (who head the Law Office and the Audit Office respectively), and the Governor of the Central Bank of Cyprus. The Ombudsman is also an independent officer of the Republic whose position, however, was created much later, in 1991. The bodies with independent functions include the Public Service Commission, the Educational Service Commission, the Planning Bureau, the Treasury, the Commission for the Protection of Competition, the Office of the Commissioner of Electronic Communications and Postal Regulation, the Cyprus Energy Regulatory Authority, the Cyprus Agricultural Payments Organisation, the Office of the Commissioner for Personal Data Protection, the Cooperative Societies' Supervision and Development Authority, the Internal Audit Office, the Office of the Commissioner for State Aid Control, the Tenders Review Authority, the Law Commissioner and the Tax Tribunal.

Institutional structure and functions of local governance – Municipalities

Municipalities account for about 60 per cent of the population, while 353 Communities Councils cover the rest of the population. The corporate structure and functions of Municipalities are determined by the Municipalities' Law of 1985.

Mayors are elected directly by the citizens on a separate ballot, for a term of five years and are the executive authority of the municipalities. The Mayor represents the municipality in a court of Law and before any state authority, and presides over all Council meetings, Administrative Committee meetings and any other municipal committee. He executes the Council's decisions and heads all municipal services which he directs and supervises.

Municipal councils, which are the policy-making bodies of the municipalities, are elected directly by the citizens for a term of five years, but separately from the Mayor. The Council appoints the members of the Administrative Committee. The latter's duties include the preparation of the municipality's budgets and annual financial statements, the provision of assistance and advice to the Mayor in the execution of his duties, coordination of the work of other committees appointed by the Council and the carrying out of any other duties entrusted to it by the Council or the Mayor. The Council may also set up ad-hoc or standing committees which have an advisory role.

In 1981 the Union of Cyprus Municipalities was established. Even though membership is voluntary, at present all municipalities (33), accounting for 65 per cent of the population of Cyprus, are represented. The Union's main functions are to contribute to the development of local government autonomy, as well as to act as spokesman of local government interests vis-à-vis the central government and other national institutions.

Institutional structure and functions of local governance – Communities

The functions of Communities are generally similar to those of municipalities, although structurally different. The residents of the Community elect the President of the Community and the Community Council for a term of five years. With the exception of some Communities which are financially better off, the central Government provides essential administrative and technical assistance as well as most of the necessary services to most Communities, through its District Offices. The revenue of Communities consists of state subsidies as well as taxes and fees collected from the residents of the area.

In 1996 the Cyprus Union of Communities was created. The primary objective of the Union is to contribute to the reinforcement of the Local Self-Government institution, mainly by modernizing the existing legislations under which the Local Authorities in its Communities-Members are established and operate, either as Improvement Boards or Village Commissions. The Union of Communities does its utmost to influence the formation of the policy at the stage of study and formulation of governmental positions, so that the final decision taking embodies its views. It is therefore in continuous communication and has contacts with the competent ministries and other organisms, as well as with the House of Representatives. One of the Union's important functions is the representation

of Communities abroad through the participation in international organs of local self-government and through its representation at various local and international congresses. On 24 June 1999, the House of Representatives voted the Communities Law (N. 86 (I)/99) Law and on 9 July 1999 it came into force, thus accomplishing the institutional modernisation of the Local Self-Government.

1.2 Citizen/business/civil organizations involvement into governance and decision making

The citizens' right to participate in the governance is guaranteed by international and local law, resolutions of the Government and other legal documents. Direct participation includes participation in the elections, public opinion polls, meetings, writing proposals, in a general referendum, etc. In the central government all the draft laws are publicly available to all. Thus associations and any other organizations have a right as well as possibility to participate in the process of discussion in the committees of the Parliament.

Cyprus elects on national level a head of state - the president - and a legislature. Every citizen over the age of 18 has the right to vote. Candidates for election must be citizens of the Republic of Cyprus and over 35 years of age. If there is only one candidate for election, he is declared elected. A candidate to be elected needs more than 50% of the votes validly cast. In the last presidential elections carried out in 2003 the participation rate was 90.5% of 476,345 registered votes. In the last House of Representatives elections the participation rate was 89% of 501,024 registered votes.

The involvement of the Municipalities and Communities into governance and decision making is guaranteed by the presence of the Union of Cyprus Municipalities and Cyprus Union of Communities respectively which they act as spokesman of local government interests vis-à-vis the central government.

Regarding participation of all Citizens into governance seven departments of the Ministry of the Interior, which offer services to citizens, have drawn up a *Citizen's Charter* with a view to providing fuller information and quicker services to the public. This important innovation marks the start of a new era in the relations between the Government and the citizens, a relation based on mutual respect, understanding and cooperation.

The Citizen's Charter is a bond of honour between the public service and citizens and safeguards the right of citizens to enjoy quality and high-standard services. At the same time, it helps make public servants feel satisfaction for the services they provide to the public. The Citizen's Charter is not a document which contains only theoretical and general principles and aims. On the contrary, it contains specific provisions and sets out specific obligations for the public services like: the period of time within which the department has the obligation to reply, the type of information to be given etc. On the basis of the Citizen's Charter, public services are obliged to inform the public in detail on the kind of services they provide; to define and publicised standards of services; to be easily accessible and friendly to the citizen and to provide adequate information; to explain the options afforded and give correct advice to the public; to be courteous and forthcoming in providing services and to rectify mistakes. The departments that have prepared and implemented the Citizen's Charter are: Land and Survey Department, Town Planning and Housing Department, Migration Department, Registration Department, Special Service for the Care and Rehabilitation for the Displaced and Management of Turkish Cypriot Properties. The Citizen's Charter has been published in many copies, which are available at the Ministry of the Interior, its departments and at the District Administrations.¹⁶

As per the Citizen's Charter the Government has undertaken the following obligations:

- All letters should be replied to promptly and clearly. Every department should set its aims/standards of service and publicise at specific intervals the progress achieved.

¹⁶ <http://www.cyprus.gov.cy/cyphome/govhome.nsf/Main?OpenFrameSet>

- Appointments between government officers and citizens should be held without any delay. (Delays should not exceed ten minutes.)
- To give specific and clear information on the services the department is providing and at least one telephone number to ring for information.
- Government officers should regularly ask the opinion of the public about the level of the services provided and the results achieved.
- To define procedures and to adopt appropriate measures, which ensure easy and unimpeded access to the services, provided to all citizens.¹⁷

A good example of involvement of all citizens and business in the governance is that during the preparation of the National Lisbon Programme of Cyprus, social partners, political parties and the private sector in general were informed and consulted extensively. Thus, the preparation of the report provided a much-needed platform for a constructive dialogue with all stakeholders on the broad reform agenda. The draft Lisbon Programme was prepared by mid-September 2005 and discussed with social partners and the political parties and the final version was submitted to and approved by the Council of Ministers. The strong involvement of all interested parties in the process of preparing the programme has contributed positively in enhancing the sense of national ownership of the Programme. The National Lisbon Programme is available on the website of the Ministry of Finance. Upon publication, all stakeholders have been invited to submit suggestions regarding the establishment of an effective monitoring mechanism for the implementation of the Programme.

Cyprus has submitted to the Parliament in April 2006 draft legislation on re-use of Public Sector Information legislation (PSI) and is currently in the process of adoption. A legal framework regarding the Freedom of Information act still needs to be defined.

1.3 Recent policy and institutional reforms and policy strategies, adopted by government for modernizing, in the area of public administration

Regarding modernization in the area of public administration four main institutional reforms and policy strategies that have been adopted by the government are described below. These refer to the *increase of the efficiency to the public sector, enhancement of the Conditions of Competition in the utilities sectors, change of the Status of the Organizations in the Utilities Sectors and enhancement and modernisation of the public employment services.*

Increase the efficiency of the public sector

Cyprus generally possesses a well functioning public administration. However, there is a significant room for improvement, taking into account the changed environment that Cyprus faces, following its accession to the EU. Over the past few years Cyprus has managed to sufficiently staff a number of Ministries/ Departments that were in need of immediate enhancement of their capacity in order to be able to effectively implement the *acquis communautaire*, as well as to establish and sufficiently staff new, independent organizations, in line with the *acquis* (e.g. Internal Audit, Asylum Unit, Office for the Commissioner for Data Protection, Office of the Commissioner for Public Aid, Regulatory Authority for Telecommunications and Postal Services etc.).

The main policy priority is to modernize the public sector so as to be in a position to function effectively within the changed environment, resulting from membership in the EU, the globalization of the economies and the rapid technological changes.

The government, with a view to increasing the efficiency of the public sector as well as enhancing transparency and accountability, is promoting a number of policy initiatives:

¹⁷ http://www.pio.gov.cy/ministry_interior_eng/index.html

- Amendment of the Public Service Law to accelerate recruitment procedures
- Further modernisation of job schemes (which prescribe the general duties and responsibilities of an office/ post and the qualifications required).
- Code of Conduct for civil servants - A code of conduct is being developed in the civil service based on the relevant Code of Conduct of the European Council, which defines the responsibilities/ obligations and expected behaviour of civil servants in the Cyprus civil service.
- New performance appraisal system - A new performance appraisal system in the public service has been developed in close co-operation with a private consultancy firm. The new system aims, amongst others, at:
 - Appraising performance in a fair, objective and consistent manner;
 - Evaluating the potential of employees for promotion;
 - Creating the necessary performance-oriented culture.

The new appraisal system is, currently, being negotiated / discussed with P.A.S.Y.D.Y – the civil servants' trade union.

- Common Assessment Framework (CAF) - Efforts are being made to introduce the CAF (a quality management tool), on a pilot basis, in a number of public sector departments, that will assist them in promoting measures for improving their organisational performance and efficiency as well as the quality of the services provided to the citizens. Based on the results of the pilot introduction, the CAF will then be promoted, in a gradual manner to the whole public sector.
- Develop one-stop-shops in the civil service, with the purpose of delivering better access to a series of government information and services, from one point of contact / location. The first pilot one-stop-shop has been put in operation in 2006.
- Continuous Training / Learning - Promotion of learning in the civil service (at individual, team and organizational level) with the development of decentralized capacity for managing learning on a systematic basis. The initiative was launched by the Cyprus Academy of Public Administration (CAPA) in October 2001 and will be implemented in a gradual manner.
- Direct provision of learning to civil servants by (CAPA), the training institute for the Cyprus public service.
- Citizens' Charter and Citizen's Guides - As regards increased transparency and improvement of the relationship between citizens and the civil service, the introduction of a Citizen's Charter /Citizen's Guides in Departments / Services rendering services to the public is being promoted as from 2000; a number of them have already been developed. The measure will continue to be implemented aiming at the improvement of offered services to the citizens and to provide them with more in depth information.

Enhancement of the conditions of competition in the utilities sectors

Competition was absent in the utilities sectors of telecommunications and electricity till very recently. The situation is gradually changing with the liberalisation of the sectors; however, time is required for the new network/service providers to gain significant market shares.

The Commission for the Protection of Competition (CPC) is the administrative body for regulating competition issues in Cyprus. The CPC examines cases of suspected breaches of the Law on its own initiative or upon complaint. In the telecommunications and postal services sector as well as in the energy sector separate sector-specific Regulatory Authorities have been set up and assigned ex-ante regulatory competencies with a view to secure extant conditions of fair competition.

The specific situation in the utilities sectors is that all hindrances to market access in the sectors of telecommunications, postal services, electricity and air transport have been removed and the sectors have been liberalised, as from 1st of May 2004, the date of Cyprus's accession to the EU. Moreover,

the liberalisation in the sectors of telecommunications and electricity necessitated also the elimination of cross subsidisation and thus a tariff re-balancing, so that the prices of the rendered services reflect their actual cost. The liberalization of the telecommunications and energy sectors is leading to enhanced investment opportunities also for foreign investors (partly already seen) and an increase in the volume of production, improvements in quality, wider choice for consumers and containment of prices, with positive repercussions on growth and employment. The containment of the cost and better quality of the services rendered by the utilities' sectors will have a positive impact on the overall competitiveness of Cypriot goods and services, as the services of the utilities sectors constitute intermediate inputs in other sectors of economic activity.

The main policy priority is to further enhance the conditions of competition in the electronic communications and electricity markets.

Change of the status of the organizations in the utilities sectors

The policy strategy is to change the status of the organisations in the sectors of telecommunications (CYTA) and postal services (Postal Services Department of Ministry of Communications and Works) with a view of enhancing their flexibility and enabling them to cope with the pressures of the new liberalised environment.

The main policy initiative are to change the status of CYTA aiming at making it a flexible and efficient organization with business and operational autonomy so as to operate on equal terms with other private telecommunication organizations. The changed status aims at safeguarding:

- More flexibility in decisions concerning annual budget, investments, conclusion of strategic coalitions and pricing of services;
- More flexibility in matters concerning personnel;
- Flexibility in tenders for purchase of services and equipment.

A bill entitled the Operation of CYTA Law of 2005 is now under the legal vetting process, changing the status of CYTA, according to the above mentioned principles.

Regarding the status of the Postal Services the Council of Ministers decided to proceed to the change of the legal status of the Postal Services from a government Department into a semi governmental organization with administrative and financial autonomy. Currently, consultations are underway between the trade union of civil servants, on the one hand, and the Department of Public Administration and Personnel and the Ministry of Communications and Works, on the other, towards this direction.

Enhancement and modernisation of the public employment services

Implementation of a measure aiming at enhancing and modernizing the public employment services, over the 2005-2008 period, under the European Commission Structural Funds has been initiated. The enhancement and modernisation of the public employment services is expected to contribute positively towards increasing labour market flexibility by a better matching of the demand and supply of labour and the better utilisation of the labour force.

1.4 Healthcare system

The institutional framework of the healthcare system

The medical needs of the Cyprus population are met through three systems of health services:¹⁸ the government health sector, the private health sector, and a number of schemes covering specific sections of the population.

¹⁸ Cyprus Ministry of Health: <http://www.moh.gov.cy/moh/moh.nsf/>

Government provision: Since independence in 1960, the Ministry of Health has been responsible for improving public health and providing public medical services, as well as overseeing the extensive private healthcare sector. Healthcare is provided free through Government facilities to a very vast percentage of the whole population.¹⁹ The poor were entitled to free services; middle-income families paid for care at reduced rates. These two groups accounted for well over half the population; upper-income persons paid for the full costs of medical services. In addition, there were a number of health plans subsidized by employers and trade unions. Civil servants and members of police and military units received free medical care. Cypriots needing care not available in the republic were sent abroad at government expense. For non-citizens, healthcare services, except emergency treatment, are charged at full cost during the first six months of residence. The range of services offered through the government health scheme is comprehensive and includes visits to general physicians, specialist consultations, inpatient stays, specialized medical care given abroad not offered in Cyprus and all drugs prescribed. Furthermore, medical care free of charge is provided in all cases receiving treatment at the accident and emergency departments irrespective of the economic situation or the nationality of the person involved, including visitors. However, if these cases need hospitalisation, subsequent care fees have to be paid. Government provision of healthcare is funded out of general taxation.

Private health sector: It is open to all those who can afford to pay for their treatment. Private medicine is dominated by a large number of physicians in individual practice. A number of polyclinics have also been established in urban areas with a number of physicians offering a range of medical services. The private sector is mainly concentrated in the urban areas.

Special schemes: A number of special schemes cover specific sections of the population. These include: 1) Medical Services provided by the Trade Unions to employees and their dependents. These services provide mostly primary healthcare. The above schemes use both the government and private sector whenever secondary or tertiary care services are needed, through a partial reimbursement of medical expenses. 2) A number of employer-sponsored arrangements, all of which provide free medical care mainly through public health facilities. Apart from the curative services offered by the public and private sectors, the public services, in cooperation with other Ministries and the Municipal Authorities, deal with the provision of preventative health services in the form of health education, inoculations, control of epidemics and infectious diseases, the disposal of sewage, the control of the quality of drinking water, food etc.

The ownership and financing structure of the healthcare system

Based on the Statistical Service of Cyprus annual report “Health and Hospital Statistics” 2004 the share of expenditure as a percent to GDP increased from 5.7% in 1998 to 6.2% in 2004. Public healthcare expenditure as per GDP was 3.2% in the period 2003 to 2005 without any registered increase.

The planned introduction of a National Health Scheme (NHS) by 2008, which foresees no fee at the point of consumption, and the prospective increase of demand for cost-intensive healthcare, especially of the old aged and the ageing population, is expected to introduce relatively large increases in healthcare expenditures. However, the NHS is also expected to lead to saving, inter alia, through the implied competition pressure on the public hospitals to become more efficient, efficiency gains through the anticipated improvement of primary healthcare, saving due to the introduction of the concept of the family doctor and the introduction of the global budgeting concept for the National Health Scheme. The total impact of these factors on the evolution of health expenditure over the long-term is difficult to assess.

¹⁹ The groups formally covered by this scheme are: government employees, individuals earning less than C£6.000, households earning less than C£10.000 per annum and households with more than three children. Individuals with an income between C£6.000 and C£9.000 and households with an income between C£10.000 and C£14.000 have healthcare provided at 50% of the prescribed rates.

For the purpose of this exercise, projections were undertaken by the Cyprus government,²⁰ based on the assumption that healthcare expenditure would exhibit a GDP growth elasticity of 1.1 between 2005-2010, which would decrease thereafter, gradually, to 1.03 by 2050, reflecting efficiency gains through the introduction of the NHS. Furthermore, based on the agreement between the government and the social partners on the contribution rate of the Government (4.55% of earnings), employers (2.55% of earnings) and employees (2% of earnings), it was estimated that the Government will cover roughly 52.5% of the total healthcare expenditure (including its contribution as employer) after the introduction of the NHS, planned to take place by 2008.

Based on the above-mentioned assumptions, it is estimated that the government healthcare current and capital expenditure would rise from the current 3.2% of GDP to 4.3% by 2050.²¹

In view of the considerable importance the government attaches to raising the level of resources channelled to growth-enhancing expenditure categories, including the health category and eGovernment, it is planned that government expenditures on such activities be raised by some of 6% per annum over the medium-term. Such an important increase in expenditure as well as the expenditure required for the other measures/actions included in the Lisbon Programme, will be financed by national and EU resources, as well as through PPP.

Healthcare reform

The present system of healthcare has, for a long time, been criticized for the fragmentation of its services, the lack of equity in its financing and in general its inability to respond to the expectations of the population¹¹. Improvements have to be made both in the provision of healthcare, and the management of hospitals and resources, especially medical supplies. What's more, there is the necessity of insuring the public health services also in the rural areas, ensuring accessibility through a network of rural hospitals, rural health centres, sub centres and dispensaries. Currently there are five main hospitals covering the healthcare needs of the urban areas, one in each of the main districts: Nicosia, Larnaca, Famagusta, Limassol and Paphos. In the rural areas, primary healthcare is provided through 23 rural health centres and 217 sub-centres to which general physicians (usually one or two) are assigned, but are not always on duty. Physician visits in the health sub centres are carried out once every two weeks. As per the National Lisbon Programme of Cyprus of October 2003 there is a need of improving the healthcare provision in rural areas. For this to be achieved increases in the health expenditures are planned.

A new National Health Insurance Scheme (NHIS) was ratified in 2001. It has been a long process starting from 1991 with the completion of two studies for the review of NHIS and principles. The final NHIS study, completed in 2002,²² has analysed the existing health system aiming on the identification of needed actions for the introduction of the NHIS. The study was carried out by experts of the Harvard School of Public Health and has identified that the healthcare system is confronted with a number of problems including parallel-uncoordinated public and private sector providers lead to duplication and resultant waste; excess of total supply of hospital and high technology equipment; antiquated organization and management of public hospitals which lead to low levels of productivity; and low fees for use of public hospital services which result in unnecessary use of services as there are no appropriate measures of prohibiting citizens in acquiring any kind of health services at hospitals and any time they feel to. These problems have been also stated in the National Lisbon Programme of Cyprus of October 2003.

The NHIS has been defined to provide free healthcare at the time of delivery. It will be universal in its coverage of population and will be financed by contributions from the state, employers, employees, the self-employed, pensioners and all those who have no employment incomes. The NHIS will be

²⁰ Centre for Administrative Innovation in the Euro-Mediterranean Region, Welfare in the Mediterranean Countries, 2004

²¹ W.C. Hsiao Cyprus National Health Insurance Scheme, 2001

²² W.C. Hsiao Cyprus National Health Insurance Scheme, 2003

administered by the Health Insurance Organisation (HIO), a public law body managed by a tripartite Board. The organisation will purchase health services from the government and private medical institutions and services.

As per the National Lisbon Programme of Cyprus of October 2003 reform of the healthcare system will proceed in two steps:

- Hospitals will be organised into autonomous establishments under the wider public sector. They will have financial independence and will compete with other private sector hospitals for the provision of healthcare. As such, these units like other private hospitals will be required to apply cost minimisation principles and will therefore strive to provide the best possible care at a cost which reflects costs and market prices.
- In the second phase, planned for 2008, the NHIS will be launched. This will establish universal, healthcare coverage within the public healthcare system. It will also bring to the forefront the role of the general practitioner doctor so as to control more effectively referrals to specialists both domestically and overseas. These changes will improve considerably the efficiency of the hospital system and although the start-up costs will be significant, it is estimated that the medium- to long-term benefits will be large both for the provision of healthcare itself, and the long-run economic repercussions.

II: DESCRIPTION OF E-GOVERNMENT / E-HEALTH DEVELOPMENTS

The purpose of the second chapter is to give a synthetic overview of the building blocks that affect the evolution of eGovernment and eHealth in Cyprus. Within the broad range of the relevant factors, this chapter will focus at assessing the following main issues:

- The institutional structures, resources and funding for eGovernment and eHealth,
- Current strategies, policies, action plans and projects,
- Description of relevant actors, including the degree of participation of the private sector,
- The legal framework supporting the eGovernment and eHealth applications,
- The dedicated specific information and communication technologies infrastructures,
- The services provided to citizens, businesses, and other stakeholders, including pan-European or trans-border services,
- The systems and solutions in place, as well as the unsolved problems,
- The costs involved in terms of human resources, equipment, etc.,
- The acceptance and usage of technologies and services by the different actors,
- The tools, dimensions and results used by stakeholders for assessing the impacts of eGovernment and/or eHealth initiatives, projects and/or tools,
- The impacts of eGovernment / eHealth developments on the public sector and the healthcare systems and on Information Society.

II.1 The institutional structures, actors and the resources and funding for eServices

II.1.1 Major institutions with horizontal national responsibilities for the provision of eGovernment and eHealth services

IS policy and the development of eGovernment and eHealth services in Cyprus is largely formulated by the central Government and implemented both by the central and local government. A number of government and semi-government bodies are playing different roles in advancing the and the development of eServices in Cyprus.

The responsible institutional structure can be described by different categories.²³ The *Policy/strategy* category describing the policy and strategy decision makes, the *Coordination* category describing the actors responsible for the co-ordination of the computerization of the public services, the *Implementation* category for the development of the public services, the *Audit/assurance* and the *Data protection* category.

Policy/strategy category

Cyprus Planning Bureau

The Planning Bureau is the responsible authority for the development of the IS in Cyprus. It is a semi-government organization established in 1961 responsible in assisting in the formulation of a long-term strategy in the area of economics and in controlling and implementing the development policy as set by the government. Concerning IS policies, it has a crucial role in the allocation of financial resources and projects in the 5-year development plans that were initiated since 1998. The first one commenced in 1998 and its goal was to create the necessary conditions for Cyprus to become an international

²³ IDABC\EUROPA - IDABC - eGovernment Factsheet - Cyprus

business and services centre. The Cyprus National Strategy for 2004-2006 has been prepared by the Planning Bureau in cooperation with the Ministries concerned, aiming at the development of IS in Cyprus. The Cyprus National IS Strategy for 2007-2013 is currently under preparation. The Planning Bureau is also responsible for the planning, spending and raising awareness of the EU Structural and Cohesion funds.

Coordination category

Ministry of Finance - Directorate for the Coordination of the Computerisation of the Public Service

The Ministry of Finance's Directorate for the Coordination of the Computerisation of the Public Service is responsible for coordinating and monitoring the computerisation projects of the entire Civil Service. The Directorate is mainly in charge of the coordination and monitoring of the progress recorded by the computerisation projects under construction, or, projects that are planned within the framework of the Strategic Computerisation Plan, including eGovernment and eHealth services. The Ministry has a direct involvement in the financing of eGovernment and eHealth services.

Implementation category

Ministry of Finance - Department of Information Technology Services (DITS)

The Ministry of Finance's Department of Information Technology Services (DITS) is the Government Department responsible for ensuring that the full potential of information technology is harnessed to support the Government policies and objectives. In particular, DITS is in charge of the development or procurement of government-wide Strategic Application Systems, including eGovernment and eHealth systems, as well as of several small-scale bespoke systems for specific departmental requirements not included in the Computerisation Master Plan.

The DITS provides additionally consultancy and/or technical advice and support to all Ministries and departments. It is also in charge of the procurement of consultancy services, IT management and technical services, and maintenance services for hardware, firmware and software packages for all government bodies.

DITS collaborates with the different Ministries and government departments for eServices system requirements and functionality analysis. eServices system functionality acceptance and operation are under the responsibility of each Ministry. DITS has an important role in overseeing eServices implementation progress by private sector suppliers. It also coordinates implementation of eServices among different Ministries. Final acceptance of eServices implementation is done by each Ministry and by DITS. Based on such final acceptances payments are made from the Ministry of Finance to the business sector in case of private sector procurement of IT services. DITS has a shortage of resources and normally overloaded with the implementation of all the different projects for the different Ministries. Coordination among the Planning Bureau and DITS is in many cases not effective resulting thus in a diversity of understandings of the relation between IS and implementation of eServices and the allocation of related EU funds, for which the Planning Bureau is responsible.

Union of Cyprus Municipalities

At a local government level the Union is involved in decisions and approvals regarding eServices implementations in Municipalities and takes an active stand in the evolving relations of Cyprus with the European Union. The Union is a member of the Council of European Municipalities and Regions (CEMR) and participates in LOGON (Local Governments Network), a project part-financed by the European Union (INTERREG III C). It is also represented in the Council of Europe's Congress of Local and Regional Authorities of Europe (CLRAE) and the Committee of the Regions of the European Union.

Union of Cyprus Communities (large municipalities/districts)

The Union plays an important role at a local government level regarding the modernization of Communities including the wider use of ICT and eServices requirements definition.

Audit/assurance category

Audit Office of the Republic of Cyprus

The Audit Office is an independent office responsible for the audit of all public expenses, of the inspection of all accounts of moneys and other assets administered and of liabilities incurred by or under the authority of the Republic. In addition to the audit of government accounts, the Audit Office is also responsible for the audit of statutory bodies, special funds, local authorities and other public organisations.

Data protection category

Office of the Personal Data Protection Commissioner

The Commissioner deals with the protection of personal information relating to an individual against its unauthorized and illegal collection, recording and further use and it also grants the individual certain rights, i.e. the right of information, the right of access and gives him the possibility to submit to the Office complaints relating to the application of the Law.

II.1.2 Other important actors

Additional to the public institutions described in section II.1.1 which are responsible for the provision, development and monitoring of eGovernment and eHealth services other important bodies include the following:

Ministry of Communications and Works is the governmental body directly supervising the telecom sector. The Department of Electronic Communications assists the government in ‘telecommunication policy matters’ and technical issues. It directly supervises the activities of CYTA, represents the government in all related international organizations such as ITU (International Telecommunications Union), ECTRA (European Committee for Telecommunications Regulatory Affairs), and EUTELSAT (European Telecommunications Satellite Organization), and manages the activities of the Cyprus Coordination Telecommunications Committee.

Cyprus Telecommunications Authority (CYTA) is a state company and was by law the exclusive supplier of facilities and services in the telecom area until the introduction of the telecom liberalization law in 2004. Using this advantage, it has created a network of connections and relationships within the political sphere of Cyprus. For many years, it has benefited from its monopolistic power to achieve high profit margins. Only recently, after increased pressure by the EU and other international bodies, it began to reduce the prices for its services.

Ministry of Commerce, Industry, and Tourism is responsible for the liberalized part of the telecom market, like data transmission and internet services provider.

One of the most important steps in 2002 related to IS developments was the creation, under strong pressure by the EU, of the semi-government **Office of the Commissioner of Telecommunications and Postal Regulation** regulating the telecom sector. The goal of the Commissioner is to promote the interests of the sector’s consumers in terms of price, quality and breadth of services. The liberalisation of the sector in September 2004 has widened the choices of the consumer. Specifically, it strives to create a competitive environment by providing choices to consumers in terms of consumption sources, maintain high quality of services, reduce prices, ensure consumer safety, and promote innovation.

Ministry of Health is responsible, among others, to submit suggestions to DITS on Policy issues relevant to Information Technology in the Ministry, to manage the implementation of the Ministerial Information Systems Strategy and to assist with the development and implementation of strategic projects within the Ministry including eHealth projects. The Ministry is an Associate Partner to the European Network on Health Technology Assessment project (EUnetHTA) whose aim is to coordinate the efforts of 27 European countries including 24 Member States of the European Union in

evaluating health technology in Europe and is supported from the European Commission. Ultimately EUnetHTA aims to identify the best medical practices to help decision makers invest in safe, effective technologies including eHealth solutions.

Academic institutions have been playing an important role in eHealth developments. The Computer Science Department of the **University of Cyprus** has been contributing substantially in the development of innovative eHealth services currently in successful operation by different private clinical organizations. It has participated in a number of international and national funded eHealth and eGovernment projects and has prepared in 2003 together with the Ministry of Health and DITS the tender requirements of the new Cyprus large scaled healthcare integrated system. Additionally the **Cyprus Institute of Neurology and Genetics** working closely with the government, private doctors and the University of Cyprus has participated in various European Commission funded eHealth projects and has initiated the deployment of promising pilot eHealth services. The institute is a non-profit making organization having international reputation and specializing in neurology and all aspects of human genetics.

Private sector organisations

There are also many information technology companies who are actively partnering with public institutions in the development of advanced solutions. Most of these companies have build up the Cyprus Information Technology Enterprises Association (CITEA) (www.citea.net) that is a voluntary organisation with the objective to unite the Cyprus information technology and telecommunications companies, to promote their co-operation in Cyprus's development towards information society, to represent and protect the interests of its member companies and to express their common positions.

II.1.3 Involvement of the private sector to the provision, control and financing of eGovernment and eHealth and ways of involving the private sector

The private sector has a limited role regarding eServices provision in Cyprus. It has mainly a supplier role regarding the development and implementation of eServices, and does not participate on the control and financing of such services. There are practices of equipment leasing, maintenance, operational support etc., but the involvement of the private sector in such actions is on a project contract base having no responsibilities on financial risks and long term sustainability of eServices provision. The private sector includes a number of Information Technology (IT) medium and small sized companies. Non Government Organizations (NGO) are very limited involved in the provision of eServices. Their role is mostly in the uptake of eServices solutions into their operation.

The government and specifically the Ministry of Finance is in charge of the procurement from the private sector of government-wide strategic application systems, including eGovernment and eHealth systems, and also for outsourcing the implementation, maintenance and operational support of several small-scale bespoke eServices for specific departmental requirements to the private sector. Consultancy services, IT management, technical services, and maintenance services for hardware, firmware and software packages for all government bodies are partly also procured from the private sector.

The public procurement process is carried out through the issuing of related Request for Proposal (RFP) for such services. The selection procedure for an appropriate proposer is based on a technical and financial evaluation. The Public Procurement law and especially public procurement practices do not promote strategic partnerships and long term relationships between the public and the private sector. This results in different cases in time consuming tender evaluations and higher budget expenditures regarding the implementation of eServices.

The IT industry plays an important role in the lobbying of eServices as the uptake of their development from the government side and the related issuing of tenders, creates for them more revenue opportunities from collaboration with the government.

II.1.4 Role of PPP in developing eGovernment and eHealth services

PPP are not a common practice in Cyprus. Even though some of the main barriers on the provision of eServices, like the lacking of appropriate IT skills and resources in public administration, could be reduced through long term alliances with the private sector there is no appropriate strategic framework of how such partnerships should be carried out. Existing practices put the government as a customer having less responsibility on the quality and roll-out of the implemented service; this lowers motivation of public sector to engage in such “risky and complex” alliances as PPP. Nevertheless Public sector reform and the streamlining of fiscal expenditure resulted in defining PPP as a priority in the National Lisbon Strategy.

II.1.5 Financing structure

In general there is a very centralized structure regarding the financing of major developments in Cyprus. Institutions responsible for the development and monitoring of strategic projects are financed by the central government from national budgets, EU programmes, EU structural and cohesion funds and internal institutional resources. Required funding is included in the National Strategic Plan for IS development. The national budget does not specify eGovernment and eHealth budgets. Each of the Ministries has its own budget for computerization, but not specifically for eGovernment developments. In case of eHealth, the budget of the Ministry of Health does not specify the budget related to eHealth and activities related to computerization. There is no official data available specifying the overall eGovernment and eHealth budget.

The budgeting procedure for public projects, including eGovernment and eHealth projects is carried out by the various organisations involved in the administration of the annual Development Budget, in accordance with the policies, objectives and investment targets set by the Planning Committee. This committee, which is the main planning arm of government, is headed by the President of the Republic and includes all members of the Ministerial Council and the Governor of the Central Bank as advisor. It has the overall responsibility for the formulation of the financial and social government objectives, the definition of the aims and targets of the Development Plans and the monitoring of the timely and co-ordinated implementation of the projects. Budget estimates are sent to the Planning Bureau for evaluation and detailed discussion with the Permanent Secretaries. Final proposals are then prepared and forwarded to the Ministry of Finance which in turn, prepares the draft Development Budget and submits it for approval to the Council of Ministers and the House of Representatives. The three main sources of finance for development projects are: government appropriation (Development Fund), loan commissioners and foreign loans.

Foreign loans are aggregated with the Development Fund for controlling and accounting purposes, whereas the loan commissioners operate as a separate fund. Development project accounting is undertaken by the various departments involved in accordance with the Government Financial Instructions and Stores Regulations. The controlling officer of each vote (usually the Permanent Secretary of the ministry in question) has the ultimate responsibility for the use of funds. Unauthorised excess expenditure is illegal, with the controlling officer being held personally responsible. Excess expenditure may only be incurred where Supplementary Appropriation is approved by the House of Representatives or through properly authorised transfer of savings between budget votes.

Local governments have budgetary autonomy and local tax-raising powers, thus, they are independent in their ICT decisions. Taxes, duties and fees represent the major source of revenue while state grants and subsidies amount to only a small percentage of the income. The central government, however, usually finances major infrastructure projects undertaken by the municipalities, like eGovernment services, but this dependent very much on each individual project. The yearly budgets of the municipalities are submitted to the Council of Ministers for approval and their accounts are audited annually by the Auditor General of the Republic. Municipal loans also need to be approved by the Council of Ministers.

EU funds for the IS development could be regarded as a good opportunity for financing ICT developments, given that appropriate utilization is made by the government, which was not the case regarding the spending of such funds in the period 2004-2006. Better planning of those funds has been undertaken for the period 2007-2013.

Annual expenditure

Cyprus ICT expenditure per head is among the lowest at 53 Euro per capita, comparing with the highest which is around 400 Euro per capita.²⁴ The public sector in Cyprus will spend EUR 51 m on ICT in 2006, including hardware, software, ICT staff, services and communication. This represents only 0.1% of total European spend, for a country with 0.1% of European GDP and 0.2% of the European population. ICT spend in the public sector, represents 0.4% of GDP.

Currently there are no official annual expenditures for eGovernment and eHealth provided by the Cyprus government.

Spending by the private agents

Private agents' participation in eGovernment projects is practically nonexistent. In a few positive cases, private investments were rather leveraged, than made for this specific purpose like the use of internet banking identification for eServices provision in Tax inspection. In this case already existing eBanking user identification technologies were made available by the private sector.

II.2 Current strategies, policies, action plans and projects

II.2.1 Government policies that affect eGovernment and eHealth developments

The government of Cyprus focuses on improving the public administration through the effective use of Information Technology. It also aims to serve the citizens directly by providing integrated and seamless services, information and transactions. These objectives were incorporated in the *Information Systems Strategy*, a master plan for the computerisation of all Ministries and Government Departments, approved by the government in 1998.

The development of information systems is an ongoing procedure and depends (a) on the latest technological advances, (b) on the government Ministries/Departments/Services IT needs, and (c) on the European Union guidelines. For this reason, the *Information Systems Strategy* is continuously updated, in order to be adjustable to the new technology environment. Strategic projects are continuously being developed and/or enhanced in order to satisfy the increasing Information Society (IS) needs.

Cyprus is a 'late-starter' in terms of IS policy, a factor that has been affecting negatively the evolution of eGovernment and eHealth developments. The majority of IS related activities began after 1996, when the accession to EU was a visible goal and harmonization was required. Before 1999 IS activities were part of other strategic designs often considered as a means to achieve quicker rate of progress. One has to marvel as how much the country has progressed in terms of IS in the past years without a specific national policy in place.

Cyprus adopted the guiding principles of the national IS strategy in 1999. This strategy is tailored to the structure, characteristics and the needs of Cyprus' economy. The strategy took into account the overall economic and social policy objectives, and its main pillar were the creation of a modern and technologically advanced infrastructure, the introduction of a regulatory legal framework, and the wider public. The legal framework governing telecommunications and media was harmonized according to EU standards and the legislation concerning the internet is mainly in place

²⁴ ICT spend in the European public sector to 2007, Kable Market Intelligence Services

Cyprus policies that affect eGovernment and eHealth developments take into account EU policy direction. Many of the objectives of eEurope 2002 (increase of internet penetration, telecom framework, low internet costs) have already been achieved, whereas the Cyprus Government has been working towards achieving the eEurope 2005 objectives of giving emphasis in the development of modern online public services in the areas of eGovernment, eHealth, eLearning and eBusiness. The involvement of the private sector, SME organizations and trade unions, in redesigning policy measures, as stated in EU IS policies, were given also particular attention.

eGovernment

Regarding the establishment of an eGovernment strategy historically a strategic study was carried out in 1987 to examine the Information Communication Technology needs of the Government of Cyprus and to identify candidate applications for computerisation. Based on the recommendations of this study, the Council of Ministers adopted a Government Computerisation Master Plan (GCP) in March 1989. This plan was followed till 1998 where an updated version of the plan was approved by the Council of Ministers to catch up rapid technology changes, evolving user demands and EU accession requirements. The improved revision of the master plan included new infrastructure and strategic projects and was aimed to adjust the national Information Systems Strategy to a fast-changing technology environment. The GCP objectives are: (a) provide turnkey solutions (Strategic Systems) for the various Ministries/Departments/Services and (b) create the infrastructure for the interconnectivity of all the systems through the Government Data Network. Among the main GCP targets are the provision of eGovernment services and the harmonisation of the Information Systems of the Cyprus Government with the European Union Information Systems.

eGovernment has been mainly addressed as an important issue under the Cyprus National Development Plan (CNDP) 2004-2006²⁵. The CNDP includes a series of measures of ensuring that all citizens have access to modern communication technologies to improve their quality of life and are equipped with the skills needed to live and work in a new Information Society. The Cyprus National Development is under the responsibility of the Planning Bureau. The strategy is focused around six pillars, namely: eGovernment, eBusiness, education and learning in the Information Society, applications for the Improvement of quality of life (eHealth, Environment), the development of human resources in the Information Society, and effective infrastructure for the development of the Information society. The promotion of equal treatment is an underlying principle of the Strategy and measures for eInclusion are incorporated in most of the pillars. The strategy is being expressed through a series of high level targets:

- Improve services provided to citizens and business with the use of new technologies and modernization of operation both of the state and of the local authorities;
- Increasing the competitiveness of business through the use of new technologies and the development of eCommerce;
- Improving human resources' capabilities and consequently, increasing employment and safeguarding better and more well-paid working positions;
- Upgrading of the education provided and of the lifelong education for the Knowledge Society;
- Securing better living conditions and improving quality of life with the implementation of new technologies for example on health, environment etc;
- Promoting equal opportunities and avoiding the establishment of a digital divide gap.

The eGovernment vision of the Government of Cyprus is to deliver one-stop services to the public via the web or through other electronic channels (kiosks, call centres, citizen support centres etc.). On the basis of the eGovernment plan, several Government Ministries/Departments/Services will be offering services to the public through the web, thus creating a dynamic government, with the aim of improving the quality of services offered to the public. For the definition of the aims of eGovernment

²⁵ See website below:

[http://www.planning.gov.cy/planning/Planning.nsf/PubFiles/Executive+Summary+of+the+Strategic+Development+Plan+2004-2006/\\$FILE/NDPSUMMARYTRANSLATIONrevisedFINAL-IACOVOU.pdf](http://www.planning.gov.cy/planning/Planning.nsf/PubFiles/Executive+Summary+of+the+Strategic+Development+Plan+2004-2006/$FILE/NDPSUMMARYTRANSLATIONrevisedFINAL-IACOVOU.pdf)

discussions with social partners, political parties and private sector were carried out as an effort of enhancing the co-operation with organized groups in the process of promoting the implementation of the eGovernment vision.

For the eGovernment vision to be achieved, the following main projects have been planned to be implemented but there is officially no information available regarding the eGovernment estimated expenditure:

- Development of a general framework of electronic transactions and communication of citizens and business with the state and the local authorities;
- The reinforcement of organization, human resource management, digital literacy and capabilities of personnel, the development of learning ability and production and diffusion of knowledge so that the human resources of Public Administration will be able to meet the challenges projected by the knowledge society;
- The introduction of a comprehensive computerized system in the Public Sector, to limit expenses through more effective procedures of Public Administration. Such a system shall be able to provide high quality services to the public without the need of visiting any government department to obtain such services. In achieving this vision a Government Gateway that aggregates all government information and services in one place is to be designed, implemented and given to the public. It is intended to be the primary place where citizens go to get information about government services and transact with government on-line. In order to achieve this, the government has planned among others the following major activities:
 - All government's strategic client/server systems (Social Insurance System, Civil Registry, Road Transport, Companies Registration, Candidates Placement System) will be transformed to provide on-line services to the public;
 - Each civil servant will be able to communicate with the other civil servants and the citizens via email;
 - All major computerized systems will be connected in order to exchange information and have real-time access to data;
 - Establishment of Citizen Service Centers. These centres will provide different services (social security benefits, taxation matters, issuing of birth certificates etc) and therefore citizens will have to visit a single office in order to dispatch their requirements;
 - For each citizen, a smart card will be issued and be used as identity card, medical card and driving license. Furthermore, using this card the citizen will be able to access the Public Service Centers and other eGovernment services;
 - Establishment of the mobile Government concept.

In general the eGovernment planned activities have not been equally welcomed by all the related stakeholders. A number of concerns have been voiced regarding the implementation and the impact of the proposed activities resulting in considerably delays in implementing major eGovernment and eHealth projects. One of the expressed concerns was the shortage of adequate public resources to develop the proposed services. A further implication of this concern is that, if the proposed policies are advanced according to plan, there is a high risk of delay or, even worse, cancellation of other projects of national importance. Some also saw in the development of advanced services the widening of the digital divide, since more advanced services would only be a privilege of the highly educated minority. Others, expressed concerns about the impact and usefulness of standards; on the one hand, lack of adequate eService controls at a Pan-European level may undermine the equitable, reliable and affordable service delivery and lead to a severe deterioration of the services. On the other hand, the confinement to different standards may diminish future opportunities for regional co-operation and public-private partnerships.

The implementation of the CNDP 2004-2006 has been characterized by a slow process and a lot of still needs to be done to achieve its challenging objectives. Achievements regard the implementation of more strategic online public services, like the TAXISNET and CUSTOMS systems, and the enhancement of some of the existing ones to provide online interfaces, but also the establishment of the two Citizen Service Centres, one in Nicosia in December 2005 and one in Limassol in October 2006. The citizen can be served easily, quickly and effectively by just visiting the Citizen Service Centre once; and thus avoiding the hassle of moving from Ministry to Ministry and from Department to Department. These centres give access to the following Information Systems: The Civil Registration and Migration System, the Road Transport System, the Social Insurance System and the Grants and Benefits System. Important outcome was also the release in October 2006 of the new government portal that provides access to all the different online services.

eHealth

A governmental strategy for the health sector in relation to the IS which focuses on the effective use of Information Technology has been defined. The two strategic goals are the upgrading of health unit services, and the improvement of quality of patient treatment and service. The application of this strategy is expected to help minimise treatment cost, and result in the rational handling of hospital resources, increased effectiveness and efficiency (productivity) of procedures, and support decision making to determine health policy, costing and billing.

The defined Cyprus eHealth strategy took into consideration the main objective of the Action Plan for a European eHealth Area launched in 2004 that is to enable easy and equal access to quality healthcare for all citizens and has been proceeding with the implementation of a Healthcare Information Support (HCIS) System described in the next section.

II.2.2 Other policies

The Cyprus Strategic Development Plan 2004-2006 was approved by the Council of Ministers in 2003. The plan constitutes the basis for the preparation of the programming documents, which includes the actions and schemes proposed for co-funding by the Structural Funds, the Cohesion Fund and other Community initiatives of the European Union. The Plan is broader and it is not limited to the interventions co-financed by the Community funds, but covers all the actions that will be promoted by the Cypriot Government. The Strategic Development Plan 2004 - 2006 aims at the achievement of a satisfactory sustainable development rate and at assuring the highest possible benefit from the accession of Cyprus to the European Union, thus contributing to a greater, real convergence with EU member states.

The diversification character of the new plan is that the weight of the developmental policy is transferred from a sectoral approach to one based on the developmental priorities. The five priorities of the plan are:

- Extension and upgrading of infrastructures
- Boosting competitiveness
- Human Resources development - promotion of equal opportunities and strengthening of social cohesion
- Balanced rural development
- Upgrading of the quality of life of the Cyprus Citizens

Specifically the first, fourth and last priorities given above have a close link to eGovernment and eHealth developments. The second priority puts particular emphasis at the encouragement of the R&D sector, as well as the exploitation of the information society. At the same time, it includes measures which support competitiveness and aims among other things at the exploitation of new technologies and the promotion of innovation, productivity improvement, specialisation and the

production of high quality with added value products and services including eGovernment and eHealth services.

Under the boosting competitiveness priority described above the Research Promotion Foundation (RPF) launched the *RPF Framework Programme 2003-2005* that functioned as a mechanism of medium-term strategy aiming at creating the conditions for a balanced development between the research infrastructure and knowledge, and creating the conditions for a dynamic participation in the fields of research and new technologies, including eServices technologies, at an internationally competitive level. It was composed of three circles of strategic objectives (multi-thematic development of research, industrial research development, infrastructure development and research support), 11 research programmes and 34 special actions. The total budget was EUR 34m with a public contribution of EUR 16m.

The RPF Framework Programme 2003-2005 has been successful in encouraging cooperation between research institutions and enterprises and the development of new products and services, including eGovernment and eHealth services, for the benefit of the Cyprus Economy. In addition, it has provided the upgrading of existing and the built up of new research infrastructure, as well as the promotion of research collaborations and the exploitation of human research potential of Cyprus

Recently the *RPF Framework Programme 2006* has been launched as a continuation of the previous successful programme with a total budget of EUR 16m and a RPF contribution of EUR 10m. This measure has been undertaken by the government as a strategic measure to increase the R&D innovation budget to 1% by 2010 and be in line with the Lisbon strategy.

II.2.3 Major projects

eGovernment projects

A presentation of available and in progress web-enabled major eGovernment systems is given in Table 10 and Table 11 below.

Table 10: Available web-enabled systems²⁶

<u>System</u>	<u>Ministry/Department</u>
<p><u>TAXISNET</u> The system allows Taxpayers-Natural persons to submit initial Tax Returns by the use of electronic communication methods (April 2004). By the end of October 2004 the system will also allow companies/partnerships to submit their corporation tax and VAT Returns.</p>	Ministry of Finance/ Inland Revenue Department.
<p><u>THESEAS</u> The system allows traders, or their authorized agents, to submit through the Internet their custom and import declarations for the clearance of goods.</p>	Ministry of Finance /Customs and Excise Department
<p><u>Candidate Placement</u> The system provides on-line services regarding job vacancies registration and search and is connected with the European EURES system for job vacancies.</p>	Ministry of Labour and Social Insurance/ Labour Department
<p><u>Road Transport</u> The system provides online services regarding car registration, drivers' licenses, etc.</p>	Ministry of Communications and Works/Road Transport Department
<p><u>Social Insurance</u> The system provides online services regarding the payment of the social contributions for employees by the employer or for the self-employed.</p>	Ministry of Labour and Social Insurance/ Social Insurance Department
<p><u>Identification and Registration of sheep and Cattle</u> The system allows authorised users/cattlemen to submit and retrieve information (reports) regarding their sheep and cattle through the Internet.</p>	Ministry of Agriculture, Natural Resources and Environment / Veterinary Services
<p><u>Office Automation System</u> Provides an automated system that supports enterprise-wide document management services and the control of work-groups and workflow has been introduced in a number of Government Ministries/Departments/Services and will be rolled out in all Government Offices. The Office Automation System, which has brought the benefits of a paperless office, enforces existing rules and regulations, improves productivity, speeds the communication between office workers, reduces operational costs, and also provides distance-working capability. A revised web-enabled version of the Office Automation System is currently under development and its implementation and rollout in other Ministries/Departments/Services is in process.</p>	Ministry of Finance / DITS
<p><u>Government web portal.</u> The portal was implemented in 2006 and aggregates all government information and services in one place. Specific functionalities of strategic systems (Social Insurance System, Civil Registry, Road Transport, Companies Registration, Candidates Placement System) have been transformed to provide over the web portal on-line services to the public, including citizens and business.</p>	Ministry of Finance / DITS

²⁶ Information taken from different sources from the Ministry of Finance, 2006

Table 11: web-enabled systems in progress²⁷

<u>System</u>	<u>Ministry/Dept</u>	<u>Expected to be Available</u>
<p><u>Civil Registration</u> The system will provide on-line services regarding birth/marriage certificates, passports issuing, etc.</p>	Ministry of the Interior/Civil Registry and Migration Department	By the end of 2007.
<p><u>Child Allowances</u> The system will allow the public to submit their applications for child allowances and to have access to related information via the Internet.</p>	Ministry of Finance/Grants and Allowances Service	Before the middle of 2007.
<p><u>Companies Registrar</u> The system will allow online registration of Companies.</p>	Ministry of Industry and Tourism	By the end of 2007
<p><u>eGovernment gateway</u> A new multi-channel eGovernment portal, through which the public will have access to various government information and services from a single point of entry, based on the life-event cycle, is under development. This portal will incorporate transactional capabilities, when the government gateway middle tier will be completed. The gateway, which will provide security, authentication, encryption and decryption, as well as web-based workflow for interconnection of departmental back-end systems, is currently under study.</p>	Ministry of Finance / DITS	Beyond 2007
<p><u>Water Pricing System</u> A study is currently carried out regarding end user requirements for implementing a water pricing system.</p>	The Ministry of Agriculture, Natural Resources and Environment	Beyond 2008
<p><u>Courts Administration System (Judicial)</u> The main aim of the system is to provide a computerised system to support the administration of the Courts of the Republic of Cyprus. The system will cover the planning and scheduling of court hearings, tracking and monitoring of cases, recording and tracking of court decisions and the production of statistics and reports.</p>	The Ministry of Justice and Public Order	Beyond 2008
<p><u>Legal Information System (Judicial)</u> A web-enabled system giving access to all Judgments, Laws, Regulations and other legal material to Judges, Lawyers, Government Officers, other external entities and the public is in its initial stage.</p>	The Ministry of Justice and Public Order	Beyond 2008
<p><u>eServices over public kiosks and mobile devices</u> Under the strategic projects of the government is the delivery of eServices over public kiosks and mobile devices.</p>	Ministry of Finance / DITS	Beyond 2008

Source: Department of Information Technologies, 2006

²⁷ Information taken from different sources of the Department of Information Technologies, 2006

eHealth projects currently under preparation

As per the National Lisbon Strategy of 2003 Cyprus is at a very initial stage of using ICT applications in the health sector and the eHealth projects are almost non-existent, apart from some projects developed by the University of Cyprus and currently in use by the private sector, but their official adoption by the Government still under consideration²⁸. There is no integrated health system, very low usage of PCs in health centres, whilst the IT infrastructure of the Ministry of Health is inadequate for the utilisation of the huge amount of information and data. In 2001 the Ministry of Health became connected to the Government Data Network, putting the first step in facilitating the delivery of high-speed / Frame Relay services.

Healthcare Information Support (HCIS) System:²⁹ The health sector policy has been connected with the implementation of a HCIS at all Government hospitals, outpatient departments and rural health centres. The health information system will be expanded to cover all disciplines, including pharmacy, pathology, radiology, laboratories, operating theatre management, blood bank, clinical management support, management of supply ordering, human resource management, availability and use of facilities, etc. In 2004 the Government has issued jointly with the Computer Science Department of the University of Cyprus, a Request for Proposal (RFP) for such a system. The selection procedure for an appropriate proposer was completed two years later, in 2006, causing considerable delays in the implementation of the project. The Ministry of Health intends to roll-out the HCIS to all hospitals and medical centres in the public sector by 2010, provided that the pilot implementation in 2006 will be successful.

Thirteen modules have been identified at this stage that will create the Integrated Healthcare Information System (IHCIS). These modules, which tenderers shall provide, are the following:

- Patient Administration
- Electronic Healthcare Record
- Hospital Order Entry
- Clinical Laboratory
- Radiology
- Billing
- Stock Control
- Prescription Management
- Personnel Management
- Blood Bank
- Health Smart Card
- Histopathology
- Coding and Classification of clinical terms

The thirteen modules listed above will be installed in the New Nicosia General Hospital. Twelve modules of the thirteen listed above, i.e. except the Histopathology module, will be installed in the New Famagusta General Hospital. Main system attributes will include among others reliability, security, data transferring between system modules, safety, maintainability, portability, web enabled and user friendly and multilingual interfaces. All modules will maintain classified and confidential and / or vital information, and system use shall take into account the requirements of the Data Protection Act and the Protection of Patient Information.

²⁸ In the national eHealth Day of February 2006 the government representatives have stated that efforts will be undertaken for the adoption of these systems in the provision of healthcare.

²⁹ Request for Tender (RFT) of IHCIS published by the Department of Information Technology in 2004

The system will operate using an appropriate networking and security system infrastructure. The infrastructure shall feature high availability and redundancy, high security, geographical expandability and scalability, appropriate for a modern film less and paperless hospital environment. It is required that the entire networking and security system shall be robust and flexible to offer a solid base on which highly demanding and critical applications will be built on. The infrastructure shall offer Internet, Intranet and Extranet Services, appropriate for a filmless and paperless Hospital System, operating and collaborating with other systems and users from both the government and non-government sector. It is envisaged that at present all interconnections to Government Health and other (non-health) Government entities shall be via the Government Data Network (GDN) which is described in section II.4.1. Also, currently connections to non-Government entities shall be through secure connections using the Internet.

Establishment of the Health Monitoring System (HMS). The ministry of Health has been proceeding with the development of the HMS system making use of web technologies which will provide improvement of the information collection mechanisms relevant to the health of the population. The death causes, the prevalence of congenital disorders, cancer, cardiovascular diseases, diabetes and communicable diseases, several indices (fatal mortality etc), the monitoring of the vaccination programmes, drug intake, healthcare provision, alcohol abuse, dietary habits are among the information that can be collected and forwarded to the EU. The efficient and effective implementation of HMS will have positive impact on the public. In more detail, it will contribute to the improvement of the health level of the population, to the effective tackling of health inequalities, to the efficient use of the available resources intended to be used for health issues, the upgrading of the services provided and to the effective regulation of the increasing demands on behalf of the population of the services needed. The costs needed for the training of the personnel, the relevant equipment and infrastructure will finally counterbalance the benefits that will incur.

II.2.4 International and the EU practices

With little progress achieved in the first years of the implementation of the Lisbon Strategy, the European Council invited the Commission in March 2004 to establish a high-level group with the purpose of carrying out an independent review of the Lisbon Strategy. The review, which was presented to the European Commission on November 2004, recommended that the Lisbon strategy refocuses on growth and employment, bearing in mind the need to maintain social cohesion and to ensure environmental sustainability. Building on the findings and suggestions of the Report, and following extensive discussions at the EU and national levels, an Integrated Package of Guidelines was developed and agreed upon, as a basis for the preparation of the National Lisbon Programmes. To enhance the effectiveness of these programmes and increase the sense of ownership of the Lisbon strategy, the European Council called upon member states and the Commission to engage and mobilize all relevant parties and stakeholders at the national and Community levels in the preparation and implementation process. Cyprus, fully, supported these efforts and welcomed the decision to prepare National Lisbon Programmes, in order to achieve the targets set out in the Lisbon strategy. The National Lisbon Programme was made available on the website of the Ministry of Finance and all stakeholders have been invited to submit suggestions regarding the establishment of an effective monitoring mechanism for the implementation of the Programme.

The “eEurope +” initiative has helped Cyprus, just as other new EU member-states, in joining the “eEurope” programme. In general, the biggest majority of IS strategies and even implementation plans are very close derivatives from the appropriate EU documents. Incorporation of local specifics varies from case to case, however the trend is to follow as close as possible the EU line. Financing from the Structural funds is a crucial factor as well – projects are prepared according to the funding possibilities, therefore the content and the actors are much influenced by the funding conditions. Independent discussions and intellectual search was more characteristic for the early stage of the process, 2000-2002, when the very concept of IS was explored. Later, more EU-level guidelines and initiatives emerged; some provisions arrived in the form of the EU directives. However, certain signs

of possible change of the attitude exist. Local IS policy makers start realizing the gap between formal compliance with the EU benchmarks and actual value to the consumers.

The Cyprus government has included eGovernment and eHealth among the major policy priorities of the Cyprus Development Plan for 2007–2013³⁰. In the context of this policy eGovernment is mainly focused in the provision of public electronic services to all citizens, but no specific eGovernment strategy is defined. The plan is structured in accordance with the main guiding priorities proposed by the European Commission in the “i2010” Initiative. The National IS Strategy 2007-2013 has not been defined yet, but it is expected that a detailed specification of eGovernment activities will be included. These activities will include among others the creation of government-wide data warehouse and the delivery of e-services over public kiosks and mobile devices.

II.3 The legal framework supporting the eGovernment and eHealth applications

Even though Cyprus has recognized the adoption of a legal framework, which should be in line with the EC directives and supports the eGovernment and eHealth areas, to be of high priority, the definition and official approval of appropriate legislation is moving slowly. Currently there is no specific eGovernment and eHealth legislation and no Freedom of Information legislation in Cyprus. The lack of a solid legal framework towards ICT is also a main barrier to eGovernment and eHealth developments. Also the slow process of introducing and approving needed legislation is a constraint in achieving on time implementation of planned services in the two domains.

Legislation related to the **Processing of Personal Data** (Protection of Individuals) Law of 2001 (N. 138/2001), is entered into force in November 2001 and is compliant with E.U. Directive 95/46. The Law, applies to automated processing of personal data, which is included or will be included in a record. Processing of personal data means every work or series of works which is accomplished by any person with or without the help of automated methods and which is applied to personal data. It includes the collection, filing, organisation, preservation, storage, alteration, export, usage, transfer, dissemination or any other form of disposal, alignment or combination, interconnection, blocking, erasing or destruction. The Law also protects persons from the electronic transfer of their processed data or of data which will be processed when they are transferred to another country. This is allowed only when the Commissioner has granted a permit. The Commissioner will only grant the permit if he thinks that the aforesaid country ensures a sufficient level of protection. To this effect, he mainly takes into consideration the nature of the data, the purposes and term of processing, the relevant general or specific legal rules, the ethics codes, the security measures for data protection, as well as the level of protection of the countries of origin, passage and final destination of the data. With regard to unsolicited commercial communications, otherwise spam, section 15 of the Data Protection Law provides that personal data cannot be processed by anyone for purposes of direct marketing or provision of services at a distance, unless the data subject notifies his written consent to the person responsible for processing (data controller). If a controller wishes to carry out processing of personal data for the above purposes, he may, for the purpose of obtaining the data subject’s consent, use his name and address, on condition that the data has been obtained from sources accessible to public.

In 2004 Cyprus has adopted two primary laws – the **Law on Electronic Communications** and the modification of the 2002 **Law on Radiocommunications** – to transpose the new EU regulatory framework and it has also introduced four pieces of secondary legislation in the field of radiocommunications. Cyprus, however, has not yet introduced the necessary secondary legislation for the Law on Electronic Communications. The **Electronic Communications Law** constitutes the framework for regulating Electronic Communications networks and services provided by undertakings within the territory of the Republic of Cyprus. It establishes the conditions for regulating networks and facilities required for the application of a harmonized regulatory framework throughout the European

³⁰ [http://www.planning.gov.cy/planning/Planning.nsf/PubFilesgrk/Outline+of+the+development+policy+2007-2013/\\$FILE/Περίγραμμα%20Αναπτ.Πολ.%202007-2013.%2020.12.051.doc](http://www.planning.gov.cy/planning/Planning.nsf/PubFilesgrk/Outline+of+the+development+policy+2007-2013/$FILE/Περίγραμμα%20Αναπτ.Πολ.%202007-2013.%2020.12.051.doc)

Community with the purpose of providing assistance in the convergence of the fields of electronic communications, information technology and electronic resources. Its objectives are, inter alia, to:

- Create a transparent regulatory and procedural framework encouraging innovative technologies and facilitating the transition of the market towards absolute competition; Ensure and promote the provision of a wide spectrum of Electronic Communications services at a national and cross-border level;
- Promote effective competition and ensure that there is no abuse of a dominant market position; Describe the structure, role, funding and procedures of the Office of the Commissioner of Electronic Communications; Determine the framework of the universal service and the conditions for the provision and funding thereof;
- Incorporate particular rules for data protection, consumer protection and the rights of users;
- Ensure the security and interoperability of networks and services; Ensure and promote the efficient and effective use of scarce resources;
- Introduce an institutional framework which is in accordance with the obligations set on the basis of Community Law; and to
- Protect state interests in the field of public security; The provision of Electronic Communications networks and services is without limitations, except for the purpose of the preservation of public order, public security and public health.

The **Radiocommunications Law** aims at ensuring the effective usage of the whole of radio-frequency means. It provides that the Minister of Communications and Works has competence for all issues regarding radio-communications in Cyprus and he is responsible for the effective and fair usage and monitoring of the spectrum of radio-communications in Cyprus, as well as the availability of the spectrum to a wide range of organisations and users. The Minister also has the power to grant licenses and authorisations for the installation, usage or maintenance of any Radio-communication Apparatus. The Law has been amended in 2003 for the purpose of affording the power to the Director of Electronic Communications to issue Regulations in order to adopt Directives 97/13/EC and 1999/5/EC. Further amendments in 2004 (Law 16(I)/2004 and 180(1)/2004) introduced a new licensing regime whereby individual licences became obsolete and a new type of general authorisations and individual rights of use is adopted.

The principal legislation in Cyprus governing electronic signatures is the **Legal Framework for Electronic Signatures** and Associated Matters Law of 2004 (Law 188(I)/2004). It effectively establishes the legal framework governing electronic signatures and certain certification-services for the purpose of facilitating the use of electronic signatures and their legal recognition. It does not, however, cover aspects related to the conclusion and validity of contracts or other legal obligations which are governed by requirements as regards their form. Furthermore, it does not affect rules and limitations in relation to the use of documents provided by other applicable legislation in force. The Law affords power to the Minister of Commerce, Industry and Tourism (the Competent Authority) to exercise control over and ensure the effective application of this Law, and, in particular, to:

- supervise and monitor certification-service providers established in the Republic, as well as public or private certification providers appointed by him;
- monitor the compliance of signatures with the requirements for secure signature-creation devices;
- prescribe public or private providers for the purpose of certifying the compliance of secure-signature-creation devices;
- regulate voluntary accreditation, that is, a licence to certify electronic data, setting out rights and obligations governing the provision of certification services and which is granted by the Minister upon request by a certification-service-provider appointed by the Minister.

The main legislation in Cyprus in the field of eCommerce is the **Law on Certain Legal Aspects of IS Services**, in Particular **Electronic Commerce** and Associated Matters of 2004, Law 156(I)/2004 (The Electronic Commerce Law). The Law has been enacted on 30 April 2004 for the purpose of

implementing Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of IS services, in particular electronic commerce, in the Internal Market (Directive on electronic commerce). The Electronic Commerce Law aims at ensuring the free movement of IS services between the Republic and the Member States of the European Union, relating to the establishment of service providers, commercial communications, the conclusion of electronic contracts, the liability of intermediaries, codes of conduct, out-of-court dispute settlements, means of legal protection and the cooperation between Member States. The Law applies to all IS services normally provided for remuneration, at a distance, by electronic means and at the individual request of a recipient of services, within the meaning of section 2 of the Law for the Procedure for the Provision of Information on Certain Technical Rules of 2003 to 2004. A service provided at a distance is defined as a service provided without the parties being simultaneously present, but does not include services provided in the physical presence of the provider and the recipient, even if they involve the use of electronic devices. A service provided by electronic means is defined as a service provided at its starting point and received at its destination by means of electronic processing equipment, including digital compression or storage of data, and which is entirely transmitted, conveyed and received by a telephone line, by radio, by optical fibre or by other electromagnetic means.

A **policy paper on the Network and Information Security (NIS)** is currently under adoption by the Ministry of Communications and Works.

The missing of a specific legislation on **Electronic Procurement** and on the **re-use of public sector information (PSI)** in Cyprus affects negatively the implementation of public eProcurement services. The Government estimates that the new EU public procurements directives, including their provisions relating to eProcurement, will be implemented by 2007. Legislation transposing Directive 2003/98/EC of 17 November 2003 on the re-use of public sector information has been drafted and is currently in the process of being adopted.

Legislation related to **Broadband Access and Networks** is also pending. For the introduction of Fixed Wireless Access and TETRA networks in Cyprus, a public consultation will first be conducted to explore relevant issues, such as the number of licenses to be granted, geographic coverage, and the policy framework, especially in relation to public safety and commercial services.

II.4 The ICT infrastructures

II.4.1 Technical background of providing eGovernment and eHealth services

eServices infrastructure

Cyprus ICT supply focus has been in the last years very much related to the advancement of the infrastructure within the telecommunications industry and better service provision. A telecommunications infrastructure has been developed for this purpose providing an advanced technical background for the provision of eServices.

The upgrading, expansion and continuous modernisation of the telecommunications infrastructure for the provision of eServices is one of the main priorities of the Cyprus Government led down in the Cyprus National Strategy for the IS for 2004-2006. The more specific goals are the upgrading and expansion of the telecommunications network so that it can support new services (multimedia: voice and data, high quality sound and image, broadband services, video, etc.) and the utilisation of new technologies for the creation of new eServices of high added value including the provision of broadband services in both urban and rural areas.

In order to connect departmental information systems, the Government has set up the GDN. The GDN is a broadband network based on ATM/frame relay technology over which all government systems are interconnected to exchange information utilising web workflow technologies. Complementary to this is the Government Internet Node (GIN), which provides an interface between Government

information systems and the Internet. It allows civil servants to communicate within Government (Intranet) and with external users (Extranet).

The expansion and upgrading of the infrastructure will cover not only existing weaknesses, but it will also secure the necessary preconditions for continuous sustainable growth, given the complementarity between private sector Funds and Initiatives, and/or through the construction and management of infrastructural projects by the private sector, through the public private partnership possibilities. The expansion and upgrading of the infrastructure will be achieved, either through investment expenditures of the broader public sector and co-financing from the EU Cohesion Fund, and possibly other EU Funds and Initiatives.

eProcurement infrastructure³¹

The development and implementation of an electronic procurement system is expected to be completed by 2008. An eProcurement study is due to be completed and finalised in 2006. The aim is to conduct a significant part of public procurement transactions electronically by the end of 2007 and to provide eProcurement services by 2010. This project is under the responsibility of the Public Procurement Directorate of the Treasury of the Cyprus Ministry of Finance.

eIdentification infrastructure

The Cyprus Government intends to introduce electronic identification/authentication (eID, smart cards) for public services, in cooperation with the other EU Member States, in order to realise seamless access to public services across borders. eID standardisation/interoperability is essential in order to put in place key pan-European services such as cross-border company registration, electronic public procurement, job search, eVoting, etc. There is still no implementation time frame for such an infrastructure.

II.4.2 Technical impediments in front of the eGovernment and eHealth services

Main technical impediments in the development of eServices are the lack of systems interoperability and standards. Even though different efforts have been undertaken by DITS in order to promote systems interoperability and standardization the efforts were scattered and did not lead to an architecture providing the ability to exchange and process data in a meaningful manner among systems, essentially based on standardised data models and elements, common protocols for exchanging data and metadata standards, a prerequisite for which is the use of a uniform syntax.

Existing strategic systems in different administrations are not web-enabled (Social Insurance System, Civil Registry, Road Transport, Candidates Placement System) as they were initially developed based on a client/server architecture concept and make use of a variety of technologies that came to be out of state of the art. A re-development of those systems to make use of state of the art web technologies is a resource intensive activity associated with high cost. Only parts of those systems are currently being enhanced to deliver web-enabled services to the public, but their main design concept remained unchanged. By the development of those systems more attention was paid on technological issues and less on user-friendliness. On the other side recently developed systems (Taxisnet for income tax returns, Theseas for customs clearing) are designed to be directly web-enabled with user friendly interfaces. An integration of all those systems in order to support interoperability and connectivity issues will be a high challenge because of the diversity of their designs.

Additionally the considering of issues regarding identity management, security and data protection by the development of eServices represents an impediment as existing ICT infrastructures does not provide robust solutions for those issues. The uptake of more complex and costly service components such as digital signatures and smart cards will be most probably handicapped by not enough critical mass given the small size of the country.

³¹ <http://ec.europa.eu/idabc/en/document/1285/388>

Implementation of eServices, like the eGovernment gateway which will integrate all eServices provided by different authorities together so that citizens have to interact with one front office (one-stop-shop), is associated with back- and front- office processes reorganization. Given the complexity of the existing back-office arrangements and the technological diversity of the existing systems and administrations a successful implementation of such reforms is a very challenging task. As a first step in the provision of the eGovernment gateway, as mentioned also in previous sections, the GDN has been setup connecting departmental information systems and the GIN, which provides an interface between Government information systems and the Internet. Additionally a Government web portal has been released to the public in 2006, providing a single point of access to different government information and interfacing with existing eServices. However, a successful eServices gateway implementation entails much more than investing heavily in service infrastructures and roll-out, the main achievement in Cyprus to date. Major investment in simplifying the administration structures and processes, and rethinking these (maybe from scratch) before digitizing and automating them is needed. Moreover a common understanding among stakeholders regarding the definition of workflows for interoperability among the different back-end systems has to be achieved and agreed.

Additionally although Cyprus does not face serious security problems as per security indicators of 2004 (Table 12), the improvement of user trust, that will influence positively the expansion and use of eServices and specifically eProcurement, can be also regarded as an impediment as no appropriate technical model has been worked out till now.

Table 12: Security indicators

	2004
Individuals with internet access having encountered security problems:	
computer viruses	9.1%
payment card fraud	0.3%
abuse of personal data	1.4%
Enterprises with internet access having encountered security problems:	
computer viruses	27.6%
abuse of data and/or systems of the enterprise	1.6%

Source: Cyprus Statistical Services, 2004

II.4.3 Technological parameters of major eGovernment and eHealth applications

eGovernment and eHealth services have been either developed from scratched by making use state of the art web technologies or existing ones have been enhanced with web based interfaces to provide specific functionality online. Main technological parameters that have been taken into consideration by the development of the new online applications, like the TAXISNET and THESEAS systems, regards user friendly interfaces, scalability, interoperability, use of ICT standards and information exchange protocols, security and authentication.

The issue of scalability in the new developed systems has been addressed through the use of a multi-tier architecture model building separate layers into applications so that maintenance and development concentrates to a particular layer. In essence, multi-tier architecture allows the distribution of components across multiple servers and access of data that is stored in multiple databases. The following principles had to be satisfied by the implementation of a multi-tier online service environment:

- Scalable architecture and location transparency: It should be possible for each application layer to be located (distributed) on a physical different piece of hardware (server).
- Information exchange: each layer should exchange information only with its successor or predecessor layer.

- Communication interface: Each service within a layer should have a clearly defined way of invocation. This means that a communication interface should exist to exchange data between layers.
- Database Management System. It is required that the system is based on Relational Database Management System (RDBMS). It must be reliable, flexible and stable for developing a database application.
- It must provide direct and detailed technical support through a technology network.
- It must provide efficient management of large amount of information and users. The ability to manage a large amount of information, multiple data types, support of multiple users at the same time and the existence of security checks (access codes, cryptography, detection, prevention and reporting of security breaches by non-authorized users) should be ensured.

The issue of information exchange in eHealth systems, like the HCIS, DITIS and the AMBULANCE has been addressed by making use of the HL-7 message exchange protocol for the electronic data exchange between healthcare environment systems. This communication complies with the CEN/TC251 European standards of Health Informatics and Communication Technology.

II.4.4 Healthcare

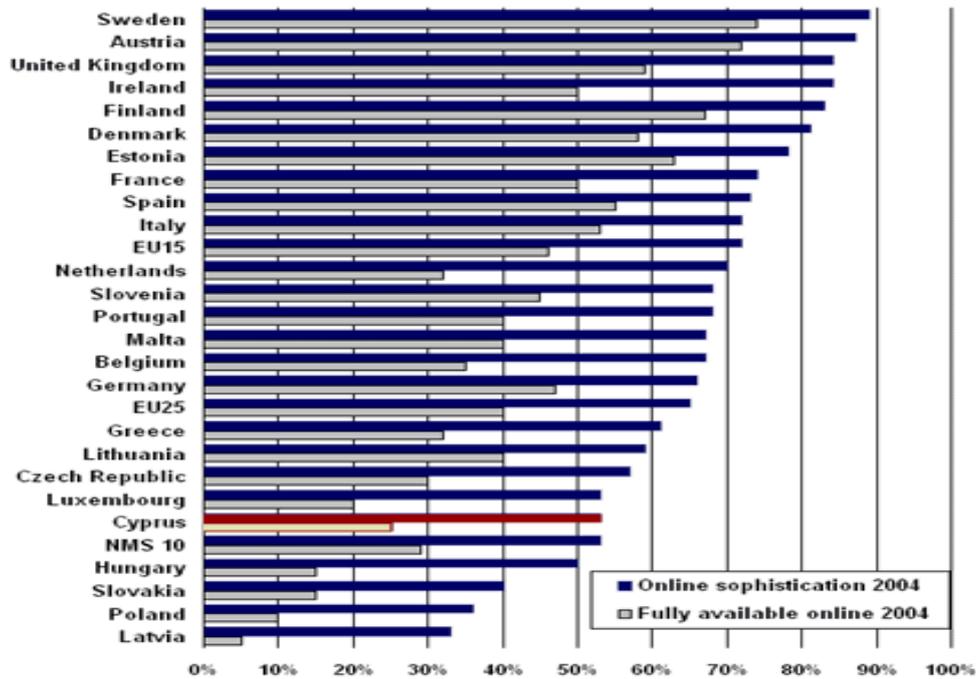
The HCIS System aiming at providing healthcare services in Cyprus is characterized by the following main design and development technical parameters:

- The system infrastructure shall feature high availability and redundancy, high security, high geographical expandability and scalability, appropriate for a modern hospital paperless environment. It is expected that the entire networking and security system will be robust and flexible to offer a solid base on which highly demanding and critical applications will be built on. It shall offer Internet, Intranet and Extranet Services, appropriate for a filmless and paperless Hospital System, operating and collaborating with other systems and users from both the government and non-government sector.
- It shall be opened and conform to all appropriate standards.
- Of particular importance to the HCIS is security since sensitive and personal data are kept in the system. The networking and security system must support and enable the highest security possible starting from the basic networking building blocks and include the computer hardware building blocks and the operating system level (end-to-end security shall be analysed).
- The networking infrastructure shall consist of both a fixed network (enterprise LAN), as well as Wireless LAN interconnected with the enterprise LAN.
- It is envisaged that at present all interconnections to Government Health and other (non-health) Government entities shall be via the GDN. Also, currently connections to non-Government entities shall be through secure connections using the Internet and if needed through direct secure connections via the GDN. In the short term future it is anticipated that the General Health Scheme Node will handle all interconnections to other health entities, as e.g. Hospitals, Clinics, Insurance Companies, Clinical Laboratories, etc. Furthermore it also anticipated that non-health Government entities will interconnect via a Government Gateway (expected operation in a few years). Then, only in exceptional cases there will be direct connections to the Hospital system.
- The coverage of the WLAN is expected to include all operational areas of the hospital, unless operational conditions prevent this.
- The networking infrastructure shall be capable to support other services, as for e.g. video surveillance. The aim to offer an integrated network, which long term should justify its cost, in comparison to offering a number of individual, specialised networks.

II.5 The services provided to citizens and businesses

Even though in the recent years a number of strategic eService projects have been developed or existing ones have been enhanced as an attempt to improve the Cyprus online public services presence, eGovernment service provision is still very limited and has one of the lowest scores in public service online presence among the EU25 (Graph 3).

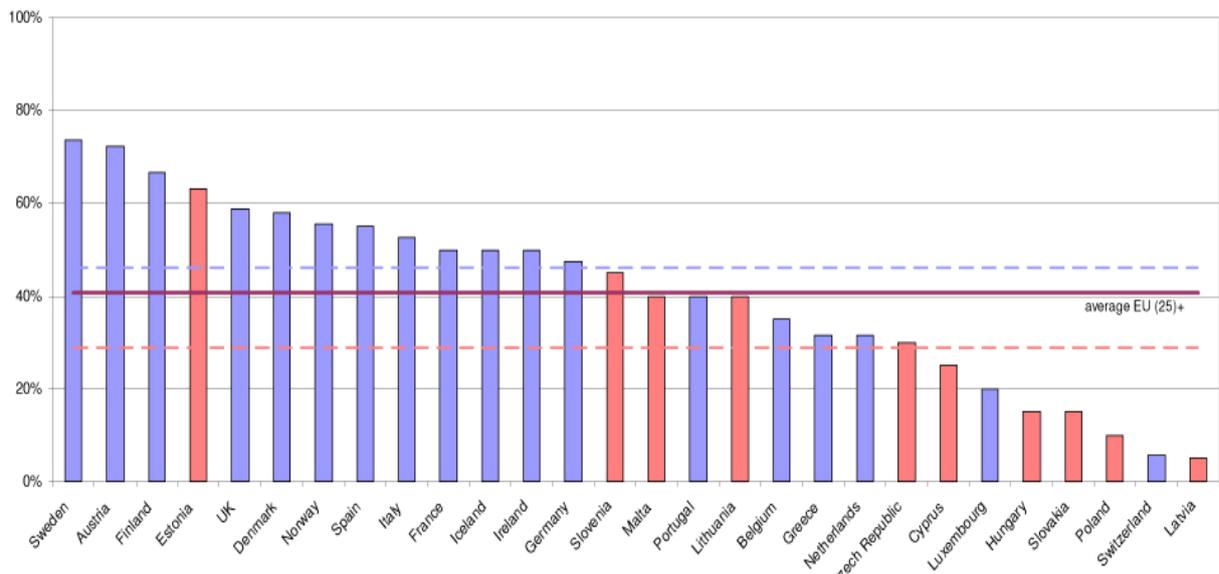
Graph 3: Supply of eGovernment services in Cyprus



Source: Eurostat/Cap Gemini Ernst & Young 2004

Cyprus is also very low when it comes to the sophistication of public services available on the Internet (Graph 4). In 2005 it reached a score of 25% for online availability and 55% for online sophistication, both quite below the EU25 averages.

Graph 4. Public services fully available online, October 2004



Source: Eurostat 2005

A detailed description of electronic availability of most important services in Cyprus is given in this section. The information is based on the common list of 20 basic public services (12 for citizens, 8 for businesses) adopted by the Council of the EU in March 2001, on the methodology used to assess their level of online availability and sophistication in the eEurope benchmarking exercises³² and a list a services list prepared by the IDABC eGovernment observatory.³³

For each service, the sophistication stage reached is indicated, with reference to the maximum stage possible for the service.³⁴

- Stage 1 - Information: online information about public services
- Stage 2 - Interaction: downloading of forms
- Stage 3: Two-way interaction: processing of forms, including authentication
- Stage 4: Transaction: full case handling, decision and delivery (payment)

II.5.1 eGovernment services for citizens

1. For the household sector/citizens: Income Tax Declaration	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Finance, Inland Revenue Department
Website:	http://taxisnet.mof.gov.cy/
Sophistication stage:	4/4
Description:	TaxisNet offers registered taxpayers the option of electronic submission of Income Tax Returns. The service was first made available in April 2004, and it is already well established. It complements the traditional manual way of submitting income Tax Returns. The system is available 24-hours. Taxpayers are immediately notified when their tax return has been received, and can monitor the process of transaction through a special network. The system does not provide personalization, but it is effectively fulfilling the taxpayers' expectations in the process of filing their tax return
2. For the household sector/citizens: Job Searches by Labour Offices	
Responsibility level:	Central Government
Responsible organisation:	of Labour and Social Insurance, Department of Labour
Website:	http://www.pescps.dl.mlsi.gov.cy/
Sophistication stage:	3/4
Description:	The Candidate Placement Internet System enables job seekers registered at the local District Labour Offices to search and locate available jobs, post their CVs on the web and manage their job applications. It also allows employers to publish and manage job vacancies. The System is directed to 3 categories of citizens: <ul style="list-style-type: none"> • To persons (Cypriots or European citizens) wishing to search for and locate job vacancies. • To jobseekers registered with the Public Employment Offices wishing to carry out particular activities through the Internet. • To employers wishing, whether they are registered or not with the Public Employment Offices, to carry out particular activities through the Internet. Accessing information on the website can be slow, particularly during peak periods.

³² eGovernment indicators for benchmarking eEurope

³³ IDABC\EUROPA - IDABC - eGovernment Factsheet - Cyprus

³⁴ <http://ec.europa.eu/idabc/en/document/5706/254>

3. Social Security benefits / unemployment Benefits	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Labour and Social Insurance, Social Insurance Department
Website:	http://www.mlsi.gov.cy/sid
Sophistication stage:	2/4
Description:	The website of the Department of Social Insurance Services offers easy access to information in connection with the rights and obligations of employees and employers in the field of Social Security. The website includes information concerning the organisational structure of the Department of Social Insurance Services, the legislation and schemes it administers, regulations of the European Union for the coordination of Social Insurance Schemes of the member states, the Bilateral Agreements that Cyprus has concluded with other countries as well as relevant statistical data, application forms and publications. The website also provides access to relevant announcements, events, tenders and vacancies.

Social Security benefits / Family allowances	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Labour and Social Insurance, Social Insurance Department
Website:	http://www.mlsi.gov.cy/sid
Sophistication stage:	2/4
Description:	The webpage provides information on the course and the prospects of the Cyprus Economy, the Socio-economic policy of the Government, Government Budget, Financing Requirements, Taxation Policy and the Accession Course to the EU. In addition, it includes data and indicators for the Cyprus economy, laws under the responsibility of the Ministry of Finance and schemes administered by the Ministry of Finance.

Social Security benefits / Medical costs (reimbursement or direct settlement)	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Health
Website:	http://www.mlsi.gov.cy/sid
Sophistication stage:	2/4
Description:	The webpage provides only general information on activities, departments and on the promotion, prevention and protection of health and no transactions are allowed.

Social Security benefits / Student grants	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Finance, Grants and Benefice Service
Website:	http://www.mlsi.gov.cy/sid
Sophistication stage:	2/4
Description:	Information and forms to download regarding student grants are provided. A web-enabled application system is due to be made available by the end of 2006.

4. For the household sector/citizens: Personal Documents (passport)	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Interior, Civil Registry and Migration Department
Website:	http://moi.gov.cy/
Sophistication stage:	2/4
Description:	Information and forms to download regarding passport are provided. The Civil Registration System, which will provide services through the web regarding birth/marriage certificates, passports issuing, etc., is currently under study.

For the household sector/citizens: Personal Documents (driving licence)	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Communications and Work, Road Transport Department
Website:	http://rtd.mcw.gov.cy/
Sophistication stage:	4/4
Description:	The Road Transport System provides services to individuals, companies, car importers regarding car registration, car information and drivers license availability. The system is fully transactional. The whole process of renewing road tax Licence can be done online.

5. For the household sector/citizens: . Car registration (new, used and imported cars)	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Communications and Work, Road Transport Department
Website:	http://rtd.mcw.gov.cy/
Sophistication stage:	3/4
Description:	The Road Transport System provides services through the web regarding car registration, car information and drivers license availability. The service related to MOT tests is completed and is available through the Internet

6. For the household sector/citizens: Application for building/planning permission	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Interior, Town Planning and Housing Department
Website:	http://moi.gov.cy/
Sophistication stage:	2/4
Description:	Only related information and forms to download are provided

7. For the household sector/citizens: Declaration to the police	
Responsibility level:	Central Government
Responsible organisation:	Cyprus Police
Website:	http://www.police.gov.cy
Sophistication stage:	1/4
Description:	The webpage provides only access to information. No online declaration is possible.

8. For the household sector/citizens: Public libraries	
Responsibility level:	Central Government
Responsible organisation:	Central Government
Website:	http://www.moec.gov.cy/
Sophistication stage:	1/4
Description:	Through this website, only information is accessible. Some libraries provide catalogues on the web (e.g University of Cyprus Library).

9. For the household sector/citizens: . Certificates (birth, marriage): request and delivery	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Interior, Civil Registry and Migration Department
Website:	http://moi.gov.cy/
Sophistication stage:	2/4
Description:	Only information and forms to be downloaded are provided. The Civil Registration System, which will provide services through the web regarding birth/marriage certificates, passports issuing, etc., is currently under study.

10. For the household sector/citizens: Enrolment in higher Education/university	
Responsibility level:	Central Government
Responsible organisation:	higher education institutions
Website:	<u>N.A.</u>
Sophistication stage:	N.A.
Description:	There is no such a system available

11. For the household sector/citizens: Announcement of moving (change of address)	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Interior, Civil Registry and Migration Department
Website:	http://moi.gov.cy/
Sophistication stage:	1/4
Description:	The webpage provides only information. The Civil Registration System, which will provide services through the web regarding address registration and change is currently under study.

12. For the household sector/citizens: Health related services	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Health
Website:	http://www.moh.gov.cy/
Sophistication stage:	1/4
Description:	The system is a webpage that provides only information and no transactions are allowed.

II.5.2 eGovernment services for businesses

1. For the business sector: Social Contribution for Employees	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Labour and Social Insurance, Social Insurance Department
Website:	http://www.mlsi.gov.cy/sid
Sophistication stage:	1/4
Description:	The website of the Department of Social Insurance Services offers easy access to information in connection with the rights and obligations of employees and employers in the field of Social Security. On the website you can find information concerning the organisational structure of the Department of Social Insurance Services, the legislation and schemes it administers, the regulations of the European Union for the coordination of Social Insurance Schemes of the member states of the European Union, the Bilateral Agreements that Cyprus has concluded with other countries as well as relevant statistical data, application forms and publications. The website also provides access to relevant announcements, events, tenders and vacancies.

1&2. For the business sector: Corporation Tax (declaration, notification), VAT(declaration, notification)	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Finance, Inland Revenue Department
Website:	http://taxisnet.mof.gov.cy/
Sophistication stage:	4/4
Description:	The social tax can be filed and paid online using the TAXINET system. The system also enables to file, view and correct their corporate tax returns online, but also to view their VAT returns and submit VAT refund applications, to calculate their social tax and to view their tax account balances.

3. For the business sector: Registration of a New Company	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Commerce, Industry and Tourism, Department of Registrar of Companies and Official Receiver
Website:	http://www.mcit.gov.cy/mcit/drcor/drcor.nsf/
Sophistication stage:	2/4
Description:	The website provides information concerning the Department of the Registrar of Companies, their aims, main activities as well as the services offered by them, and also forms to be downloaded. Currently there is a web-based service available which allows a) searching of information regarding the Registered Companies in the Catalogue of Registered Companies, Partnership, Business Names and Overseas Companies and b) the submission of an application for a company name approval. The Companies Registration System, which will allow the registration of a new company through the Internet, is currently under study. .

4. For the business sector: Submission of Data to the Statistical Office	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Finance, Statistical Service
Website:	http://www.mof.gov.cy/cystat/
Sophistication stage:	3/4
Description:	The website contains the most recent statistical data as well as time series data by Theme, information about CYSTAT, the Statistics Law and CYSTAT's publications. Businesses and public authorities are able to transmit statistical data electronically.

5. For the business sector: Customs Declaration	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Finance, Customs & Excise Department
Website:	http://www.mof.gov.cy/ce/theseas
Sophistication stage:	4/4
Description:	THESEAS is the first integrated software introduced by the Cyprus Government in order to facilitate Customs and Excise Department to carry out its daily work in an effective and productive way. THESEAS system allows traders, or their authorized agents, to submit through the Internet their custom and import declarations for the clearance of goods. .

6. For the business sector: Environment-related Permits	
Responsibility level:	Central Government
Responsible organisation:	Ministry of Agriculture, Natural Resources and Environment, Environment Service
Website:	http://www.moa.gov.cy/
Sophistication stage:	1/4
Description:	In this web page, only information regarding wide spectrum of the competences and work carried out by the Ministry of Agriculture, Natural Resources and Environment is presented. Information about the three sectors, namely the Sector of Agriculture, the Sector of Natural Resources and the Environment Service, is provided.

7. For the business sector: Public Procurement	
Responsibility level:	Central Government
Responsible organisation:	Treasury of the Republic of Cyprus, Public Procurement Directorate
Website:	N.A.
Sophistication stage:	N.A.

II.5.3 Services allowing citizens/businesses/civil organisations to participate in decision making and governance

The provision of eServices designed specifically to allow wider interest groups to participate in decision making and governance in Cyprus is almost nonexistent. As per the United Nations, 2003 World public sector report,³⁵ Cyprus is rated at the lowest level of all 25 European Countries. The United Nations eParticipation Index is based upon three components weighted equally: the country's access to eInformation, the prevalence of eConsultation in the country and the incidence of eDecision-Making in the country.

Citizens can be kept inform about the different decisions of the government through the use of the Cyprus Parliament website (www.parliament.cy) which provides useful information about the parliament, its composition and its activities. Citizens are able to have access to legislative work, new legislation submissions and parliament meetings.

A system providing a channel of communication with the Auditor General is the Audit Office system. The Auditor General of the Republic is an independent officer and is responsible for the audit of central government, public organisations, local authorities and other public bodies and funds. The Annual Report of the Auditor General is submitted to the President of the Republic, who causes it to be laid before Parliament.

Audit Office System	
Responsibility level:	Audit Office of the Republic of Cyprus
Responsible organisation:	
Website:	http://www.audit.gov.cy
Sophistication stage:	3/4
Description:	The webpage include information about the Auditor General and the Audit Office of the Republic, copies of the Annual Report and other Reports submitted, and provide a channel of communication with the Auditor General.

II.5.4 eHealth services

The provision of eHealth services in Cyprus is still in its infancy and the implementation of planned services is moving very slow. There is no online information about available eHealth services, no online administrative offerings-transactions related to the eHealth in Cyprus, no online pharmacies. Only a minority of General Physicians, specialists and private health clinics have they are own websites. Even though a considerable number of doctors and specialists have email accounts, it is not a usual way to provide online prescription, renewal and appointment scheduling. There is no one-stop-shop eHealth portal provided by the Cyprus Government.

An eHealth web-page is provided by the Cyprus Society of Medical Informatics, a non-profit, non-governmental organization based on the voluntary work of Health professionals and Computer Scientists with a special interest in Medical Informatics (<http://www.csmi.org.cy/>). The purpose of the Society is:

³⁵ United Nations, 2003 World public sector report35: eGovernment at the crossroads, New York, 2003"

- The incorporation of communications technology in general in the field of medicine, including Telemedicine, multimedia, and the Internet, with a view to education of members of the medical profession and ultimately, improvements in the provision of patient care
- The provision of assistance towards the establishment of the appropriate legal and procedural infrastructure that will promote the applications of Informatics in the field of Medicine
- The organisation of educational seminars, conferences, discussion groups and other activities that promote research, progress and the furtherance of the applications of communications technology in the field of medicine
- Co-operation with allied organizations and the local authorities of the Republic of Cyprus and other countries

The University of Cyprus and the Cyprus Institute of Neurology and Genetics have all participated together in various EU and national funded eHealth projects and have initiated the deployment of the following promising pilot projects (www.medinfo.cs.ucy.ac.cy):

DITIS (Collaborative Virtual Medical Team for Home Healthcare of Cancer Patients) www.ditis.ucy.ac.cy is a system, awarded as a finalist on the EU Ministerial e-Health 2003 Conference, that supports Collaborative Virtual Healthcare Teams dealing with the home-healthcare of cancer patients in Cyprus. It is a web based system that enables the effective management and collaboration of virtual healthcare teams. It provides a secure access to medical information from anyplace and anytime via desktop computers (at work) or a variety of mobile devices from anytime and any place. It includes a set of tools for effective scheduling and coordination of team members, with features including automatic notification and alerting. It makes use of supportive tools relevant to home care that improve efficiency and minimize errors of home care monitoring. DITIS system is on production from September 2001 supporting the activities of Cyprus Association of Cancer Patients and Friends.

Since 2005 DITIS has been successfully integrated in a healthcare monitoring platform developed under the Healthservice24 eTen project aiming at providing a viable mobile healthcare service, permitting healthcare professionals to remotely and interactively diagnose and treat patients whilst the patients are free to continue their normal daily life activities. The DITIS and Healthservice24 integrated system allows patients and non-patients, like elderly people, to stay mobile and have a fairly normal lifestyle while being monitored on a continuous basis, in their normal living environment. Ongoing monitoring is especially important in case of chronic and high-risk patients, e.g. cardio patients discharged early from hospital after a surgery and high-risk cardio patients that require almost constant monitoring. Today these patients are often hospitalised for long periods, resulting in high hospital costs and moral degradation. The integrated system is in pilot use in the Cyprus LITO clinical centre providing home care monitoring to chronic and high risk cardio patients.

AMBULANCE and EMERGENCY are two projects sponsored by the EU and in which Cyprus actively participated. The objective of the projects is to reduce treatment times, improve medical diagnosis, and reduce costs by developing an integrated portable medical device for Emergency Telemedicine. The Emergency Telemedicine system consists of the mobile unit (ambulance) and the consultation unit (hospital). Critical biosignals (ECG, blood pressure, heart rate, oxymetry, temperature etc) collected via a biosignal monitor and images of the patient's position and state captured through a camera are transmitted through the GSM mobile telephony network to the hospital. Physicians at the hospital are able to direct pre-hospital care more effectively, improving patient outcomes and reducing mortality by observing the signals at real-time, viewing the images of the patient and marking some interesting areas. Any marking appears simultaneously at the mobile screen. Furthermore, the physician is able to communicate and give instructions to the paramedic through a bi-directional GSM voice communication. Networking links to medical information databases, Hospital Information Systems, and Inter-hospital links are also provided to maximise information available to consulting.

II.5.5 The extent of one-way and two-way services

Overall there is a very limited provision of two-way eServices in Cyprus. From the categorization of eGovernment services for citizens in Cyprus carried out by the IDAC³⁶ in 2005, it can be estimated that eServices for citizens of stage 4 are only 17% and include only the income taxes declaration and driving licence service. eServices for citizens of stage 3 are 17% and include the unemployment and the car registration systems. eServices for business of stage 4 are 25% and include the taxes and customs declarations systems. eServices for business of stage 3 are only 12.5%.

II.5.6 Level of integration of eGovernment and eHealth services

In most cases there is very little institutional integration in provision of services in Cyprus. Furthermore, even in the same institution different services are not integrated fully into meaningful patterns. For example the Candidate Placement System providing the possibility of unemployment registration and under the responsibility of the Ministry of Labour and Social Insurance is not directly integrated with the social security benefits system which is under the responsibility of the Social Insurance Department. An integration of such systems in order to exchange information and have real-time access to common data presents a high challenge because of the diversity of their designs and the technologies that these systems are based on.

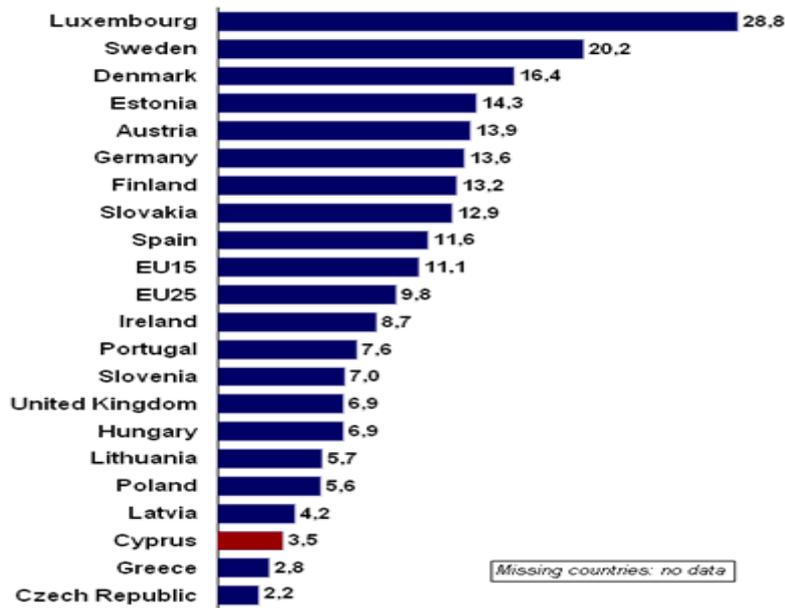
Currently the very few existing eHealth services are very fragmented and not integrated institutionally and technically. Different systems have been developed from different organizations, like the Cyprus Institute of Genetic and the University of Cyprus and are used by different not integrated private healthcare organizations. One of the main aims of the planned HCIS system is to integrate/connect with other systems and institutions from both the government and non-government sector. It is anticipated that the General Health Scheme Node will handle all interconnections to other health entities, as e.g. Hospitals, Clinics, Insurance Companies, Clinical Laboratories, etc. Furthermore it is also anticipated that non-health government entities will interconnect via a planned Government Gateway expected to be completed in 2007.

II.5.7 The level of provision of services to different stakeholders

The main stakeholders of public eServices are the households and enterprises. As per Eurostat statistics in 2004 (Graph 5) the level of uptake of eGovernment among households is one of the lowest among the EU25. As per the United Nations eGovernment Readiness Index of 2003, Cyprus was rated with 0.47 as the last one in the list of the EU25, with an average EU25 Index of 0.67 and Sweden with the highest index of 0.84.

³⁶ IDABC\EUROPA - IDABC - eGovernment Factsheet - Cyprus

Graph 5: Take up of eGovernment among Households



Source Eurostat 2004

Regarding the provision of eGovernment services to business and individuals Table 13 shows that in 2004 the internet interaction of enterprises with public authorities was much higher than with individuals. This can be due to the fact that services directly generating revenue for government, such as company tax, VAT, customs declarations, were given higher development priority than individuals' related services. These services tend to be also the eGovernment services which are easiest to implement as they are provided centrally (thus minimising implementation costs and maximising the scale of returns), as well as being relatively simple administrative procedures with a high degree of pre-existing standardisation. In contrast, the eGovernment services which do not generate direct revenue for government, which are based on existing complex and differentiated procedures have not been rolled out to the same extent. Most of the services provide online information about public services and downloading of forms. Only very few services provide processing of forms including authentication full case handling, decision and delivery (payment).

Table 13: eGovernment service provision

	Enterprises (%)	Individual (%)
Obtaining information	34.8	10.4
Download forms	24.3	3.5
Returning filled forms	11.0	1.4

Source: Convergence Programme of the Republic of Cyprus 2005-2009, Ministry of Finance, December 2005

II.5.8 Stakeholders position regarding major problems of eServices

The main stakeholders propose some actions through which the major problems with the existing eGovernment and eHealth applications services can be reduced:

- Set up of an appropriate council to follow up and coordinate the carrying out of all planned eGovernment and eHealth service provision actions;
- Increase of Public Sector resources;
- Increase of eServices awareness and knowledge;

- Increase needed financial resources by better planning the use of Structural and other EU funds;
- eServices implementation procedures shall be made more easy and effective;
- Close collaboration of Cyprus with the EU15 Member States making use of Best Practices in order to avoid mistakes and delays;
- Making use of proven technical standard solutions which integrate several processes with the opportunity to lower costs;
- Security and privacy issues should be designed and implemented in close collaboration with the EU15 Member States;
- Flexible partnerships between the public and the private sector.

Most of these measures have been identified and included in the preparation of the Cyprus National Lisbon Programmes in September 2005 in order to achieve the targets set out in the Lisbon strategy. During the preparation of the National Lisbon Programme of Cyprus, social partners, political parties and the private sector in general were informed and consulted extensively. Thus, the preparation of the report provided a much-needed platform for a constructive dialogue with all stakeholders on the broad reform agenda.

II.6 The usage of technologies and eGovernment and eHealth services

II.6.1 Major penetration and usage indicators

As per Eurostat data of 2003 regarding the uptake of eGovernment among private households, Cyprus was scored with 3.5% at place 24 among the EU25, with an average EU25 score of 10.1% and with Luxemburg having the highest score of 28.8%. This reveals a very low acceptance of eServices in Cyprus.

The Cyprus Statistical Department provides an annual survey on the Internet usage on public eServices in enterprises. In Table 14 an assessment of the usage of the Internet for interaction with public authorities is given. In general a decline among years 2004 and 2005 regarding the internet interaction with the public authorities, specifically in the returning of filled forms and also of full electronic case handling, can be identified. Even though no specific reasons have been given by the Cyprus Statistical Department explaining such a decline, it can be somehow justified that the obtaining and return of filled forms has been reduced as more two-way transactional eServices have been made available in 2005. A reason of the decline in full electronic case handling can be that there was a lack of awareness and trust of the new introduced electronic payment concept in 2005.

Table 14: Usage of Internet for interaction with public authorities

Enterprises	2005 (%)	2004 (%)
<i>Usage of the Internet for interaction with public authorities (proportion on enterprises having access to the Internet) of which</i>		
<i>Obtaining information</i>	45.9	42.2
<i>Obtaining forms, e. g. tax forms</i>	27.4	29.5
<i>Returning filled in forms, e. g. provision of statistical information to public authorities</i>	10.7	13.3
<i>Full electronic case handling, e. g. return filled tax form and include electronic payment</i>	3.4	7.0

Source: Cyprus Statistical Department, 2005

II.6.2 Major barriers on the use of eServices

General service acceptance barriers

eServices have been weakly promoted by the government and there is widespread lack of awareness of citizens, and also amongst local officials, about the positive impact that such services could have on the Cyprus economy. Even though no official data is available to support different barriers listed here, these need to be mentioned as they generally characterized the eServices user acceptance situation in Cyprus. Public Administration lacks ICT knowledge and awareness and there is an employee resistance in transforming existing service provision processes. There is low awareness of government to business services, SMEs are not active and innovative-oriented in adopting eServices and there is lack for cultural change in the business sector. Overall there is still significant non-interest in eGovernment by citizens and related stakeholders.

Technical barriers

The existing eServices infrastructure is currently not appropriate to offer a one-stop-shop service provision which is one of the main directions of eGovernment. The services are characterized by a low level of sophistication and by their development heavy focus was given on technology and less on full reengineering processes and final user acceptance handicapping thus the wider use of eServices.. One of the main technical barriers on the take up of the eServices is also the limited provision of broadband and faster internet access.

eHealth services barriers

Some of the main reasons for the short supply of eHealth services can be identified both in terms of users and user needs, and in terms of governmental policies. On the user side, one could blame the low level of IT skills of the population for the lack of adoption of eHealth services, as well as the voiced concerns of many, regarding security and privacy of these services. Also, both patients and doctors are accustomed to more traditional ways of interaction and work, which makes them hesitant to use new technologies. In addition, government policies to promote diffusion of technology among users is pending. This situation could also be due to the fact that there is a lack of enough resources in the public health sector for implementing eHealth projects.

II.6.3 Major facilitators on the use of eServices

Increased of efficiency through successful eServices implementations

Successful implementations of the eServices have brought the benefits of a paperless office, for example the Office Automation System, enforcing the existing rules and regulations, improving productivity and operational efficiency and reducing operational cost.³⁷ Through such implementations tasks and costs can be more efficiently distributed, both within and between public sector bodies, and processes can be streamlined to make better use of available re-sources and increase delivery capabilities.

Reduction of process time and of administrative burdens

The digitalisation of public services can significantly reduce the time needed to process and deliver a service, therefore saving time for both public administrations and their customers. As information and data can be submitted electronically by users and are shared between different organisations, service information can be reviewed online in real time. The use of ICT in the provision of public services makes it possible to significantly reduce administrative burdens both for citizens and businesses and for the delivering organisations.

Increase of IS indicators and internet cost reduction

As also stated in the introduction of this document there has been a substantial increase in mobile subscriptions, computer ownership and internet access from households and enterprises in the last

³⁷ As per information given in the Cyprus government portal and published by the Department of Information Technologies in 2006.

years. Liberalization of the Telecommunication market has resulted in reductions of the cost of internet use. Both factors can be regarded as facilitators regarding the use of eServices.

Improved service level

Through the use of ICT the service level provision has been considerably improved. Such an improvement is associated among others with the better data quality, information sharing, service availability and information transparency and is regarded as a facilitator of the use of eServices.

II.6.4 Shift in the demand for eGovernment and eHealth services

Slowly the households started becoming aware about the positive impact that eServices can have in their life and there is a higher demand of more successful implementation government to citizen services, like eServices for social security benefits. Till now the Government was more focused on more revenue created services for the public, like the customs declaration, and less on government to citizens created benefits services. Multiple channelling and individualised access, has been ultimately becoming a need. There are also demands to be a transformation of government to prioritise the production and distribution of public goods (content) rather than public administration (control), with a re-vitalised public service ethic and high skill, high value staff.

In addition there is a shift to the demand of mobile services provision as the use of mobile telephony in Cyprus is very high. On the year 2005 in particular, mobile usage in Cyprus was more than 85% of the inhabitants, showing a great potential for the development of mobile services.

Demands from the business sector are shifted to focus on the availability of high functionality and performance eServices with simplicity of deployment that will help them to increase their productivity through a more time efficient and effective interaction with the public. eServices should be associated with low cost of provision and be reliable. Competition in the provision of broadband services must become entrenched to ensure that business and households gain and retain access to sufficient bandwidth at affordable prices.

II.6.5 Impact on employees of affected institutions

Spread of eGovernment introduced reorganization of existing service provision processes in public administrations. Employees had to adjust to new ways of collaborating among each other, with the citizens and enterprises and to new service provision processes. IT skills became a must and employees productivity assessment procedures are about to be defined. Employment prerequisites of new public employees are their IT skills and knowledge. Employees' attitudes to service delivery have been changing to be more careful and precise, as justified complains from the citizens and business sector side can be raised.

In order to catch up with these problems the government has proceeded with the development of the National Action Plan for Employment for 2004-2008 containing among other country-specific policies the investment in human capital and life-long learning, the increase of the adaptability of workers including the public employees and the taking of advantage of the emerging young and competent labour for the public and the private sector.

II.7 The impacts of eGovernment / eHealth developments on the public sector and the healthcare systems and on Information Society

Cyprus is moving slowly to understand that eGovernment is a key enabler of the transition to competitive government. eGovernment developments have been showing that application of ICT in government services can indeed increase both the efficiency and the quality of public services, while reducing the cost and hassle of administrative compliance for citizens and businesses. Online public

services can be produced and delivered much faster, thus saving considerable time and money for both service providers and users. Even though precise measurements in Cyprus are still missing, there are strong indications that these benefits are substantial and are likely to have a multiplier effect across the Cyprus economy. Therefore, the Government started re-focusing its eGovernment efforts towards two key objectives: the identification and realisation of productivity and efficiency gains across the public sector, and the reduction of administrative burdens for both citizens and businesses.

In general there are very few surveys and impact assessment studies on eGovernment and eHealth projects and policies in Cyprus. The statements presented below are put together from different general information that could be found by different government sites, but no quantified data was officially given to backup the given statements.

eGovernment and eHealth have not been understood by the Cyprus government as tools for public administration and healthcare reform. More there were understood as EU directives to achieve quicker rate of country progress by improving the quality of services to citizens and business by the use of new technologies. An eGovernment and eHealth implementation plan identifying overall required reforms, risks and contingencies at a national level has not been defined. Cyprus is more focused on actively performing reforms, that are mainly initiated and stimulated by the EU policy, rather than identifying and performing reforms that are mainly needed at a national level as a result of eGovernment and eHealth developments.

Effects associated with eGovernment developments has been related to different issues like the reorganization of existing service provision processes in public administrations and the adjustment of employees to new ways of collaborating among each other, with the citizens and enterprises and to new service provision processes. The Government, with a view to increasing the efficiency of the public sector as well as enhancing transparency and accountability, is promoting the development of a new eGovernment monitoring system in the public service with the aims of: appraising performance in a fair, objective and consistent manner; evaluating the potential of employees for promotion; creating the necessary performance-oriented culture. The system is based on the Code of Conduct of the European Council, which defines the responsibilities/ obligations and expected behaviour of civil servants in the Cyprus civil service.

The effect of eHealth developments on public reforms can not be definitely assessed as such services are very at their infancy. Nevertheless impact assessment of the homecare system DITIS (described in section II.5.2), developed by the University of Cyprus and in operation in the homecare sector since 1999, has revealed that there was a positive qualitative and quantitative impact. DITIS qualitative impact regards benefits for all the patient, healthcare professionals, healthcare provider organization and healthcare system at large. Improvements were registered regarding the quality of life of the patient, as he was given the opportunity to stay at home and be monitored and cared 24/7 a week and also the collaboration and communication among healthcare professionals³⁸. The system is giving additionally the opportunity to gather vital statistics that can be used to provide directions for better healthcare. The quantitative impact of DITIS regards 40% savings of yearly running cost estimates (Yearly running cost estimates per nurse without DITIS were EUR 53.570 and with DITIS EUR 35141).

DITIS has also improved substantially homecare service provision, especially for people living in rural areas promoting thus a more inclusive society. An impact assessment of the system has shown that there is an increase of homecare visits for chronic ill patients from 2 to 5 visits per months without any increase regarding the related medical personnel.

³⁸ N. Panteli, B. Pitsillides, A. Pitsillides, G. Samaras, An E-healthcare Mobile application: A Stakeholders' analysis, in Web Mobile-Based Applications for Healthcare Management (Editor Dr Latif Al-Hakim), Book chapter, Idea Group, 2007.

Spread of eGovernment initiatives has raised the need of more public resources and the government has proceed with the employment of additional resources in the last three years, especially in the DITS. Public employment procedures and prerequisites have been changed to cover the skills and knowledge needed for coping successfully with new technologies and new administration working procedures. More young people having IT skills have been employed. Nevertheless because of the very rigid employment hierarchies in the public sector, new resources are managed by existing personnel not promoting actively the introduction and use of new technological solutions.

The impact of eServices on the users, as far as this can be estimated from their short operation history as also stated above, it can be defined to be for the public resources the improvement of their working processes to be more time and cost effective and for the citizens to be the savings of time and the improvement of the quality of the service. But official data is missing in order to back up those statements. On the other side the provision of eGovernment services designed specifically to allow wider interest groups to participate in decision making and governance in Cyprus, as also stated in section II.5.3 of this document, is very low, so there is no improvement of the involvement of citizens/businesses/civil organisations into governance and democracy.

There is also no data available regarding the influence of eServices to the spread of ICT use. Nevertheless the use of some successful systems, like the income declaration and the custom declaration services, show good potential in affecting positively the growth of ICT use.

III. ASSESSMENT OF THE CURRENT DEVELOPMENTS AND TRENDS, SPECIFIC BOTH TO E-GOVERNMENT AND E-HEALTH

III.1 Analysis of current state and trend of eGovernment and eHealth developments based on selected indicators

Based on facts and data presented in the previous sections, it is possible to determine main general achievements and shortcomings of eGovernment and eHealth which characterized the current state and trend in Cyprus.

ACHIEVEMENTS

Common achievements of both eGovernment and eHealth

An important achievement for both domains has been the development of an **advanced telecommunications infrastructure** providing the needed technical background for the provision of eGovernment and eHealth services. All government systems have been interconnected to exchange information utilising web workflow technologies through a broadband network. Priority has been given on the continuous expansion of the infrastructure for absorbing further volume increases in the number of services and users.

Cyprus has been able in the period 2003 to 2005 to **raise its ICT indicators** very fast which allowed it to improve its relative position in Europe.

Closely related to the expansion in the number of online services has been the rise of **usage of internet** by the **business sector** to interact with the public authorities.

Last but not least an important achievement has been the **high priority** given on the definition of **policies** related to the increase of the number and level of online available public services including the provision of broadband services in both urban and rural areas.

eGovernment-specific achievements

One major achievement in the period 2004 to 2006 regarding eGovernment has been the fast **increase** in the number of **public services available online** as well as the upgrading of the level of their availability. The implementation priorities were focused on the development of the 20 major public services (12 for households and 8 for businesses) listed at IDABC but also on the introduction of a comprehensive one-stop-shop service in the public sector, to limit expenses through more effective procedures of public administration have been in progress

eHealth-specific achievements

One major achievement regarding eHealth was the **initiation** in 2006 **of the HCIS System** aiming at providing integrated healthcare services in a wider sense, both geographically and functionally.

SHORTCOMINGS

Common shortcomings of both eGovernment and eHealth

While Cyprus may present various specific achievements in eServices, there are still several shortcomings that are characteristics of online public services. First, even though considerable implementation effort for the provision of **eServices**, specifically in the area of eGovernment, has been undertaken in the recent years, their number is still **limited** and they **lack** both in terms of **online availability and sophistication**. Especially the provision of eHealth is still in its infancy and the implementation of planned services has been considerably delayed.

Further shortcoming is the fact that current services are mainly **provided by the central government**, by institutions which have not been adequately prepared to provide online public services. Those institutions are generally scarce staff, use outdated technological solutions and models, reducing thus the range and quality of services provided by them, and they are lacking appropriate IT and managerial skills.

One major shortcoming that can be regarded also as a future barrier is the **lack of a committed “owner”** of both IS and eServices developments. The example of successfully converging countries shows that it is difficult to achieve success without having a strong political commitment and a leadership/“owner”, who is determined to put the Information Society, and eServices developments as a top priority.

Another shortcoming is that the process of introducing and **approving needed eServices legislation** has been very slow, like on the Digital Signature and on the re-use of public sector information (PSI), which has been a main constraint in achieving successful eServices implementation.

Last but not least the **low spending on ICT and the fact that eServices and R&D expenditures** are mainly **carried out by the public sector** without any substantial participation of the private sector are regarded as main shortcomings of eServices developments.

eGovernment-specific shortcomings

Currently eGovernment services are very **fragmented and not integrated** institutionally and technically. The development of such services has been mainly based on the vertical needs and requirements of various public institutions. This has resulted in serious connectivity and interoperability problems among those services reducing thus their accessibility. Additionally, different not interoperable hardware and software platforms have been used by their implementation leading to the lack common universal interfaces.

A serious shortcoming of eGovernment developments has been also the **limited scope of back office reforms** and related institutional and organisational changes. Most of the developments have been concentrated at developing online interfaces on existing systems for the provision of specific functionality, increasing thus the number of services available online without preparing the back offices to shift from paper to online services and reorganising their institutions to meet the requirements of online public services. Thus a serious gap emerged between the services offered by front offices and the back offices providing these services, which will hinder the upgrading of the level of interaction and service provision and will reduce the net benefits from shifting the services from paper to online provision.

Additionally, successful developments in recent years are **limited to** the ones providing **income generating online services**, like the taxation and customs declaration systems, and less on the roll out of online services, which do not generate direct revenue for government, like registration/return and permits services.

III.2 Major factors affecting the evolution of the eGovernment and eHealth developments

The described evolution of eServices has been the outcome of various, sometimes overlapping factors. Out of these factors the major economic, legal, policy, as well as technological and service related and socio-cultural factors could be regarded as the most decisive ones.

Economic factors

Macroeconomic stability has been playing an important role why Cyprus has been able to take in the past years large strides in IS and specifically in the ICT sector and the development of eServices. It has been classified by the World Bank as a high-income country; in effect, GDP per capita is at 82.9,

which is 80% of the EU average. Cyprus's economy is supported by a workforce that is relatively flexible in terms of labour market regulations and highly educated – some 30% of the workforce has received tertiary education. Unemployment has rarely exceeded 3.5% in 20 years.

Another factor influencing the development of ICT and as a consequence the development of eServices is the low level of R&D and related expenditures in Cyprus. Cyprus has always spent very little of its GDP on R&D activities: while at the beginning of the nineties this figure was at about 0.18% of the GDP, in the late nineties and in 2000 increased only slightly, reaching 0.32% of the GDP by the end of 2003. This value is still significantly low in both international and regional comparison.

Additional factor that influences ICT developments is that unlike in the EU, where the business enterprise sector is the foremost performer of R&D, in Cyprus the government sector still dominates R&D even if in a decreasing manner. It is followed by the higher education and the business enterprises sector. The private and non-profit sectors still have a low share, but its importance in the R&D involvement is growing nowadays.

Policy factors

Cyprus adopted the guiding principles of the national IS strategy with considerable delay and the late start had significant impact on the results as well as on applied policy measures. Even though the strategy is tailored to the structure, characteristics and the needs of Cyprus' economy and reflect the revised attention devoted at government levels to IS policy eServices developments have been given relatively low level priority by the government. In addition, eGovernment policies and strategies are not clearly distinguished from general IS policies.

Nevertheless it is important to note, that in the recent 2-3 years eServices developments received particular priority and eServices targets have become central elements of the government programs. For example in the Cyprus National IS Strategy of 2004-2006 main focus was given on eGovernment, eBusiness, education and learning, the development of human resources in the Information Society, applications for the Improvement of Quality of life (eHealth, Environment), and effective infrastructure for the development of the Information society. However only improvements regarding the eGovernment services have been noted and there are still significant gaps in eHealth with the EU15 countries.

A further important factor shaping the development of online public services has been the lack of effective coordination of technical solutions, procurement, deployment and maintenance of public services among the different institutional settings and decision makers from all the government and the private sector. Planned implementations were considerably delayed or ended up to be unsuccessful because of missing clearly defined management and coordination structures and strategies and also due to the fact that the main actors avoided the undertaking of the responsibility to stand behind major associated structural changes.

Additionally, the institutes responsible for IS policy are scarce staff and their voice within the government remains weak compared to the strength of other ministries and the long-lasting monopolistic power of Cyprus Telecommunication Authorities.

Technological factors

One of the main factors that have influenced the development of eServices in the recent years was the continuous modernization of the ICT infrastructure associated with the introduction and harmonization of a regulatory legal framework governing telecommunications and media as per EU standards and laws. The provision of an updated ICT structure has been playing an important role in the improvement of the service sector creating higher demand regarding the provision of online services.

In the period 2003-2005 an increase of awareness among households has been noted regarding the positive impact that online services can have in their life. This has led to a higher demand of more successful implementations of eServices and a quite quick increase of penetration rates for mobile

telephony, computers and Internet (households, enterprises access). This sets a solid ground for advanced use of ICT.

Legal factors

Even though Cyprus has recognized the adoption of a legislation regarding the provision of eServices to be of high priority, the definition and official approval of appropriate legislation has been very slow having as a result that the adoption of important legislation like the Legal Framework for Electronic Signatures and Electronic communications were delayed till 2004. The missing of a specific legislation on smart cards, electronic procurement, the re-use of public sector information (PSI) and Broadband Access and Networks affects negatively the implementation of public eServices. Moreover the lack of a solid legal framework towards ICT is also a main factor influencing eServices developments. Currently there is no specific eGovernment and eHealth legislation and no Freedom of Information legislation in Cyprus.

An important positive factor regarding eServices implementations was the approval of the telecom liberalization law in 2004 changing the monopolistic status of the Cyprus Telecom Operator and resulting thus in reductions of the cost of internet use.

Demography

The ageing of the population and the increasing share of this segment in total population present an important factor regarding eServices implementations, specifically regarding eHealth services. It is recognized that required reforms of the welfare system and the healthcare system can be supported positively by eHealth implementations and even more eHealth can be regarded as part of those reforms.

Socio-cultural factors

The level of eSkills among users is generally limited to basic ones and many lack even the basic knowledge and interest on online services and technologies. On the supply side the average level of eSkills in public administration is low with high variance depending on the institution. There is also low adaptability of public employees regarding the use of state-of-the art technologies.

An additional factor affecting online public services is the high demand from the citizens for more successful online services and an improvement of service quality in the healthcare sector. The generally positive attitude of the users (and in this regard not only of the younger generations) may be an important factor of online services developments.

Additionally demands from the business sector are shifted to focus on the availability of high functionality and performance eServices with simplicity of deployment that will help them to increase their productivity through a more time efficient and effective interaction with the public.

Ethical factor

The issue of data security and privacy/confidentiality can be regarded as an important factor influencing the development of eServices. The development of a secure gateway which will be responsible for authentication, security, encryption and web workflow has been identified and is currently in progress. Such a gateway provides a single point of access to all the different services and will increase the trust of using eServices among the different users.

Regional factor

Cyprus is a small-sized country and even though it is divided into five regions, this is only an administrative division and does not play any role in the provision of eServices. However the economic growth observed in the past decades cannot be described as balanced between the different regions of the island, and as a result regional inequalities were created, with economic growth being concentrated in the urban regions. The inclusion of rural areas through the provision of eServices is currently an important government policy measure.

III.3 Drivers and barriers to eGovernment and eHealth developments

The major goal of this section is to identify the main drivers/barriers for eGovernment and eHealth developments considering all the above-mentioned major groups of factors, for the two domains.

DRIVERS

Higher demand for improved efficiency and effectiveness of public and Healthcare service provision

The positive economic performance and fast income growth in the last decade in Cyprus has led among others to the increase of awareness of the impact of ICT services to citizens and there is a higher demand for improved efficiency and effectiveness of public and Healthcare service provision. Such a demand can be translated in cost reduction of operation of the public and healthcare sector, improved timing results in better citizen satisfaction and improved process of decision making.

Public and healthcare reforms have been initiated in order to modernise the sectors. Public sector reforms comprise the changes in the scope of services provided by the public sector and the adjustment of the institutional set-up providing these services. Health sector reforms aim to minimise treatment cost, increased effectiveness and efficiency (productivity) of healthcare procedures and to enable easy and equal access to quality healthcare for all citizens. Public and healthcare reforms could rely on technological organisational and procedural solutions made possible by online services. Thus online applications themselves may support the technical implementation of reforms.

ICT services access and affordability

Cyprus has been focused in the last decade in the provision of advanced ICT infrastructures as a prerequisite for better service provision. This has led to strong improvements regarding the IS indicators, including the introduction of broadband connections, enabling thus a better access to ICT services including online services. Additionally the fact that telecommunication regulation has undergone significant reforms as an attempt to align with the EU regulation has positive effects, even though not the expected high ones, on price, quality and competitiveness. Lower prices can be translated in better affordability and regarded as an important driver in ICT services developments.

Exchange of best practices

The importance of making use of best practices regarding the development of eServices has been recognized by Cyprus. The use of such practices is not only associated with the speeding up of the widespread, but also with cost savings regarding the development of such services. Moreover high quality eGovernment and eHealth services that have been already successfully tested by other countries will be customized for Cyprus needs reinforcing thus a uniform European way of online service provision. For this purpose the introduction of the European Good Practice Framework and introduction of effective transfer mechanism can be regarded as a driver enabling more advanced application of eServices,

Demographic processes generate massive future demand Governmental steps towards eServices

Financial and social consequences of an ageing society will affect Cyprus. Pension schemes and exploding costs have to be kept under control, and the shrinking labour force, which affects both production and public finances, needs to be handled too. This demographic trend is an important factor in carrying out service provision reforms and reinforcing the utilization of ICT services.

Private sector (PPP) involvement

Public sector reform and the streamlining of fiscal expenditure resulted in defining PPP as a priority in the National Lisbon Strategy. There are plans stage to increase their use in order to achieve a better match between private and public funding -reducing, if possible, the scope of the public sector. The appropriate and beneficial application of PPP depends on several factors, like the determination of those areas where PPP can be used efficiently. PPP could provide a framework for involving the private sector in the improvement of access and content in the public sector. PPP programmes could be used in broader projects linking IS development and public sector reform, including eGovernment and eHealth programmes.

BARRIERS

The following can be considered as emerging barriers for the evolution of eGovernment and eHealth in Cyprus

eServices expenditure

One of the main barriers regarding eServices developments in Cyprus is the low level of ICT and R&D expenditures as compared to the EU15 average. Allocation of ICT funding for online services provision in the public and healthcare sector is also low, impacting thus negatively eHealth and eGovernment developments.

Missing legislative framework

There is a lack of a solid legislative framework in Cyprus regarding the use of ICT in the healthcare and public sector. The legal background is much behind the demand for the services and market readiness to provide them. The major current legal constraints affecting the development of the eServices are related to inappropriate security measures and tools regarding for example personal information, identification of users beyond an institutional level and the not convincing definition of general standards.

Structural reforms

Even though in Cyprus the importance of public and healthcare structural reforms has been recognized and related actions are under progress, the speed of implementing such changes has been very slow stacking on a number of obstacles like administrative burdens, diversity of interests among related stakeholders and opposition and low motivation to change of the involved institutes. Changes for example in the healthcare sectors are related to substantial reorganization of institutional settings and healthcare processes for which public administrations are missing an appropriate implementation approach. Moreover, the need of developing eHealth services was not taken seriously into consideration by the proposed healthcare reforms.

Lack of interoperability

Existing eServices in Cyprus are lacking technical, semantic and organisation levels interoperability in order to achieve seamless and joined-up activities which are device or platform independent and able to replace or cope with legacy technologies, architectures and systems. Apart from technical interoperability weaknesses there is a missing understanding of how public organizational units should work together to ensure that systems and applications are completely interoperable. This regards among others the way they share data and knowledge, and the way data is transferred between different departments and institutions.

Lack of political awareness about the impact of eServices

Even though there has been high political commitment in Cyprus regarding the provision of ICT services, there is a lack of awareness among the responsible stakeholders regarding the impact of eServices. This can be attributed to a number of factors like the lack of impact assessment of

eServices projects addressing user acceptance and adoption and the provision of related raise of awareness measures.

Lack of IT competence and experience

It is also worth mentioning the fact of lack of readiness of public administrations in Cyprus to implement eHealth and eGovernment processes as well as the inadequate level of skills and experiences in the area of IT project management and implementation. The public administration staff and policy makers have a fragmentary look on services automation process. In particular, they try to implement certain individual IT tools, instead of defining processes reorganization activities. Such approach will not bring significant results as it represents a bottom up initiative that has mostly a technological dimension.

IV. ANALYSIS OF THE POSSIBLE POLICY OPTIONS

The aim of this chapter is to analyse the most important policy options in order to tackle effectively the challenges faced by Cyprus related to the development of eGovernment and eHealth. In recent years eServices related policies have been linked to the important structures of **economy, infrastructure and technology, legislative, institutional as also policy structures**. eServices developments have been associated with the need of sustainability and improvement of public finances via a redirection of public expenditure including among others the increase of ICT and R&D expenditures and also with the need of public sector and healthcare reforms. Such reforms have been initiated in an effort to give a solution to the higher citizen demand for improved efficiency and effectiveness of public and healthcare service provision, but also to the rising financial and social consequences of an ageing society. Additionally, public sector reform and the streamlining of fiscal expenditure resulted in recognizing PPP as an important factor in improving service provision. Continuous upgrading and maintenance of the ICT infrastructure and regulation improvement have been given high attention as important prerequisites for better eGovernment and eHealth developments. Additionally the importance of making use of best practices regarding the development of eServices has been recognized as it is not only associated with the speeding up of the widespread but also with cost savings regarding the development of such services.

Economy-related measures

Cyprus functioning market economy in the last 25 years characterized by a sufficient degree of macroeconomic stability has been playing an important role why Cyprus has been able to take large strides in IS and specifically in the ICT sector including the development of eServices. In order to continue contributing positively to the development of the ICT sector and specifically regarding the eGovernment and eHealth service provision issues related to *sustainability of public finances* and *improvement of quality of public finances* via a redirection of public expenditure, the use of *European Structural Funds* and of *PPP* need to be considered.

Sustainability of public finances. There is the need for economic and fiscal sustainability, as a basis for maintaining macroeconomic stability and boosting growth in the long run and safeguarding improvements in the development of Information Society. Within this broader context, policymakers will need to secure longer-term sustainability of public finances in light of population ageing. The process of population ageing is crucial both for its impact on the public finances and on long-term growth.

Improve the quality of public finances via a redirection of public expenditure. Achievement of this goal requires an improvement in the quality of the public finances and public expenditure management systems. Increasing the share of government expenditure in growth-enhancing categories such as R&D and ICT expenditure through the formulation and implementation of budgetary policies in a medium-term framework would contribute positively to eGovernment and eHealth developments.

Policy options

1. Ensuring the sustainability of public finances over the long term requires, inter alia, significant improvement in the underlying fiscal position to prepare the economy to withstand the upcoming demographic changes. To achieve a structural improvement in the public finances strategies related to reform the healthcare system need to be considered. Improvements have to be made both in the provision of healthcare, and the management of hospitals and resources, especially medical supplies. Legislation for the transformation of public hospitals to more autonomous units needs to be approved along with plans to introduce a NHIS. eHealth developments could play an important role in the improvement of efficiency of healthcare provision and also cost reductions.

2. Increase substantially R&D and ICT expenditure per head including financial resources in the public sector for eServices implementation. Other issues that the national research policy needs to take up, are:
 - The upgrading of existing and the building of new research infrastructure;
 - The encouragement of involvement of the private sector in R&D activities. The small size of enterprises and the weak links between research organisations and private enterprises hinder the involvement of private business in R&D;
 - The generation of a critical mass of researchers, through the development of researchers' careers, the encouragement of mobility of researchers and the enhancement of research capacity;
 - The promotion of research culture within all levels of the educational system;
 - The further promotion of competitive alliances between the Cypriot and the European research community, for securing funding from EU RTD programmes.
3. A policy mix needs to be defined that will boost private involvement in R&D and eServices developments through the use of PPP.
4. Structural Funds should be regarded as a potential funding possibility of eServices development. It is a vital policy issue to use this funding for the most important bottlenecks, to spend them for such developments which may generate sizeable spill-over effects and additional spending and contribution from the private sector.

Infrastructure and technology measures

The development of the ICT culture is placed at the centre of the efforts for the development of eGovernment and eHealth services. Within the past few years, the Cypriot economy exhibited noteworthy progress in a number of areas, such as the substantial increase in computer ownership and internet access from households and enterprises and the improvement of the telecommunication infrastructure. However, there remains a vast potential for higher improvement of eGovernment and eHealth service provision. Policy options need to be defined in the areas of *broadband infrastructure* and *eService provision* but also the improvement of *eSkills* of the population.

Policy options

1. Important policy measures include the expansion of the broadband infrastructure to cover both the urban and rural areas and the granting of licences for broadband networks to more organizations in order to reduce the monopolistic power of CYTA in this area. Regarding the expansion of broadband this could include the creation of digital terrestrial television broadcasting, the introduction of Fixed Wireless Access (FWA) and TETRA networks.
2. An important policy element is to give emphasis on the increase of availability of more advanced and integrated eServices. Issues of interoperability, openness and security need to be considered.
3. The roll out of eGovernment services, which do not generate direct revenue for government, needs to be given higher priority.
4. The promotion of eHealth services and solutions should also be included in the policy options suggested. Most of the actors and potential users are not familiar with the positive aspects, the value added and ways of usage regarding eHealth solutions. Raising of awareness would be needed in a wide circle of the population as well as even more intensively in the target group of healthcare professionals.
5. Another important area, where policy may play a role is the determination and monitoring of users' demand. So far the development of online public services has followed the need to comply

6. There is also the need to find solutions that simultaneously meet the trust, protection of data and security concerns of users in online service provision. A key issue is for example legislation of personal data security.

Legal structure measures

Even though Cyprus has recognized the adoption of a legislation regarding the provision of eServices to be of high priority, the definition and official approval of appropriate legislation has been very slow. Currently, in Cyprus, the procedure for the creation or adjustment of the regulatory framework involves a wide consultation at the stage of drafting the legislation between the competent government department and the relevant stakeholders, a legal vetting process undertaken by the Law Office of the Republic and further discussions and consultations at the level of the competent Parliamentary Committee. Within the framework of this procedure, the costs and benefits of the various legislative measures are broadly discussed. It has been proven that this procedure needs reviewing and updating to match the rising need regarding on time approval of eServices related regulation.

Main issues concern the reduction of the regulatory and administrative burden avoiding legislation approval delays, the putting forward of missing legislation, but also the definition of a solid framework towards ICT.

Policy options

1. Develop the institutional framework and the administrative capacity for a systematic impact assessment and measurement of administrative burden of existing and new legislation. This could be achieved with activities like:
 - Study of best practices in member states of the EU
 - Provision of technical assistance
 - Creation and staffing of a unit to this end, at central government level, for strategic guidance, technical assistance to implementing Ministries, monitoring progress etc.
 - Creation and staffing of units at the level of each Ministry
 - Development of a methodology for a systematic impact assessment and measurement of administrative burden of existing and new legislation.
2. Approval of missing legislation regarding the Legislation on Electronic Procurement, the re-use of public sector information (PSI), on Broadband Access and Networks, smart-cards and on the Network and Information Security.
3. A solid legal ICT framework needs to be defined taking into consideration Cyprus specific eServices development parameters and needs.

Institutional structure measures

A number of government and semi-government bodies are playing different roles in advancing the development of eServices in Cyprus characterize by lack of appropriate communication and collaboration. Additionally the implementation responsibility of strategic ICT systems, including eGovernment and eHealth services, is centralized on the Ministry of Finance.

Policy options

1. Provision of measures regarding the improvement of collaboration among main actors.
2. Decentralization of eServices implementation responsibility and the establishment of an effective monitoring mechanism for the implementation of the eServices as a measure to accelerate their emergence.

Policy structure measures

eServices policies are not clearly distinguished from general IS policies and there are no specific eGovernment and eHealth strategies.

Policy options

1. Assignment of a committed owner for IS policy and specifically of eServices.
2. Key challenges include the definition of specific eGovernment and eHealth strategies and the review of the National IS Strategy to give clear and stronger emphasis on eServices provision.

V. THE MAJOR FUTURE TECHNICAL AND NON-TECHNICAL R&D CHALLENGES SPECIFIC TO E-GOVERNMENT AND TO E-HEALTH

The purpose of the final chapter is to suggest the most important future technical and non-technical R&D challenges specific to eGovernment and to eHealth, in order to address the challenges and the local/global needs identified in the Chapter III.

Technological challenges for both eGovernment and eHealth

The main technological challenges that need to be addressed regarding the development of eGovernment and eHealth services are: integration and interoperability, personalized services for all, and trust and security.

Integration and interoperability

This key research challenge focuses, in terms of integration, on interoperating of public organisational units. In terms of interoperability, the theme covers technical, semantic and organisation levels, as well as standards, in order to achieve seamless and joined-up activities which are device or platform independent and able to replace or cope with legacy technologies, architectures and systems.

In order for eGovernment and eHealth applications to work across networks, systems must be interoperable and must have the possibility to be integrated. To this aim, research needs to be carried out to understand how public organizational units should work together to ensure that systems and applications are completely interoperable. Research can work towards enhancing the relationships between citizens and public administrations due to the increased perception of ease of use of eServices. This is related to the so called ‘one-stop-shop’ idea that has been around for some time in eGovernment research circles and also to the integrated healthcare platform idea that has been promoted by the health sector. Whilst much work to date has been done on integration and interoperability from a technical perspective, there is still the need to carry out work in the institutional issue area: the workings of public administrations, the way they share data and knowledge, and the way data is transferred between different departments and institutions must be examined.

Personalized services for all

In this research challenge, infrastructures, platforms and interfaces need to be accessible to their users in different formats, including the different variety of channels, such as digital TV, PC, mobile, etc. This challenge is also about linking a public administration’s back-office(s) to personalized, adaptable interfaces taking into consideration the user profile and preferences. Current research has focused on delivering services to all citizens through different interfaces, by concentrating on improving portal design, rather than looking on new interfaces design. More research work is needed in the definition of adaptable personalized user interfaces accessing different channels. Research also is needed upon the role of the electronic channel as a ‘backbone’ and into the mixed strengths and weaknesses of each type of technology channel, focusing on how these influence the perceptions of public and health organizations.

Trust and security

Trust and security covers the tools, methods, technologies and policies of information assurance, and additionally addresses needs of privacy and identification. It is concerned with building and maintaining trust and confidence between all stakeholders in all directions, for example in relation to network and data security, data protection, identity management, authentication, privacy, surveillance, and digital rights management.

Research is needed to ensure trust and security between government and citizens and the civil sector as users of government services, whether these direct services or framework services conditioning the social or regional environment in which they live and work, particularly the tools, methods,

technologies and policies of information assurance. Massive data transfers and exploitation between the public and private and civil sectors require sound data protection based on legal, technical and institutional safeguards and standards.

Other R&D challenges for both eGovernment and eHealth

User needs

This challenge looks at the needs of users, whether as groups (communities), or individuals, and tries to understand how to deal with the variety of different user preferences. The challenges that lie ahead are manifold, and cover many different domains; they include the political challenges of creating 'user-driven services', which will be far more likely to appeal to citizens than user-centric services. The challenges of increasing take up and confidence in eServices are closely related to this, In order to ensure for example that eGovernment services still remain efficient and effective (both for the citizen as an individual, a member of a community, or as an employee or employer, and the public administration), there is the need to develop common models and frameworks that will enhance ease of use and simplicity of systems.

Research is required into the direct needs or demands of citizens and civil users, whether as individuals, families, households, communities, civil sector organizations, NGOs, etc., or within specific localities or regions. This should cover citizen relationships with government, user skills, expectations and activities in relation to public services, including understanding different types of citizens/civil organizations and their characteristics and situations which will contribute to determining which channel mix they need and how they are to be used. This includes the context of use, service initiation and control, the delivery environment, service visibility/findability, utility/usefulness, access/availability, and service quality and fulfilment in relation to the specific citizen user or group.

Evaluating and benchmarking

Evaluation focuses on the overall outcomes of eServices, particularly of monetary costs and benefits, the business case and benefits, economics and financing and added-value to the end users as well as overall evaluation frameworks and methodologies. Benchmarking is concerned with the roll-out and take-up of eServices.

Research is required on the provision of evaluation and benchmarking methods and tools to measure for example, the added-value of eServices on individual users and to assessed their take-up. Given that the public sector deals with a diverse range of needs from diverse groups of citizens, the 'user' can rarely be treated as a homogenous entity. The evaluation research focus has, until recently, been on the supply side of eServices, and only weakly on the demand side.

Impact assessment

Regarding eGovernment services public impact assessment focuses at a high level on public value outcomes. It examines definitions of the public good and public value and how online services can contribute to these, including the main EU and national policy goals of competitiveness, economic growth, employment and jobs, social inclusion and regional development. Until now very little research has been undertaken on the direct importance of such services to the high level social and regional policies of social inclusion or regional cohesion, certainly no attempts which show the differential impact of eServices.

Regarding eHealth the actual and potential usage of online services is scarcely measured and as a result rarely considered when deciding on eHealth developments. Major research effort is required to better understand and exploit both the general and differentiated impacts of eServices on social and regional objectives in order to improve policy making and maximise development results. Research impact of eServices on the quality of life including health, welfare of workers and consumers (as well as citizens) needs to be further developed. There is a missing link between the development of eServices and the study of their uptake and subsequent impact which has to be defined.

New business models

There is a preference to the establishment of PPP to fund eServices. There are potential reasons other than just funds for involving the private sector in capital projects as the private sector may bring various benefits, including: bring skills and know-how; enhance the efficiency of service delivery; insulate upcoming operations from political intervention; make the project more responsive to the public's needs and preferences. Even though various methods have been tried in the effort to involve the private sector still a lot needs to be researched in the provision of appropriate PPP models which can be beneficiary for all involved stakeholders.

Monitor and observe of best practices

Even though a lot of successful eServices implementations are currently in operation there are no appropriate models of how such implementations could be transferred to other countries, taking into consideration the specificities of the different countries. Research needs to be carried out regarding the definition of appropriate monitoring procedures, observing and taking up successful international experiences and practices regarding eServices developments. The taking up of successful implementations, like the eSignature and eProcurement, will give the benefits of speeding up the roll out of such services with less cost.

Other challenges related to eGovernment

Besides general challenges there is some research and development related challenges specific to the eGovernment.

Reform in the public sector

This research challenge covers the overall institutional, organizational, administrative, managerial and cultural changes necessary for eGovernment and government modernization generally. It is essentially concerned with change management, leadership, decision-making and human resources within the public sector. It also covers, both at the organizational and individual civil servant level, learning, roles, jobs, skills, competencies and resistance to and/or opportunities for change and how to balance the need for change with the need for some stability both for the public sector itself as well as for the society it serves.

Sustainability of public finances

There is the need to carry out research on the definition of models to maintain economic and fiscal sustainability, as a basis for boosting growth in the long run and safeguarding improvements in the development of Information Society. Within this broader context, a key challenge for policymakers is to secure longer-term sustainability of public finances in light of population ageing. The process of population ageing is crucial both for its impact on the public finances and on long-term growth. This prospect requires more ambitious fiscal targets, with specific plans to control expenditure and enhance the efficiency of the tax system, measures to increase labour market participation and employment, and a restructuring of the social insurance and healthcare systems.

Other challenges related to eHealth

Besides general challenges there is some research and development related challenges specific to the eHealth.

Integrating information systems

Currently various eHealth stakeholders like service providers, public or private insurance units, public administration units, national and regional healthcare centres poses with a variety of information. One problem increasingly faced by the service providers is the limited possibility to integrate the data and information available at various service providers or healthcare units. To address the aspects related to interoperability and integration of existing information systems (e.g. seamless data collection and integration from electronic health records and health monitoring systems) research on advanced data integration and harmonization of different stakeholders needs to be carried out.

Monitoring developments

Another important challenge for eHealth is the definition of appropriate monitoring eHealth development mechanisms. In order to monitor the implementation of various projects, there are various approaches that could be adopted. These mechanisms should be at different levels, from the level of individual healthcare service providers to the level of the implementation of the strategy as a whole. Moreover, developments should be monitored in comparison with other EU states. Finally, end-user satisfaction regarding information solutions in the field of e-Health should be evaluated. An important aspect, which may lessen the weight of this challenge, is that many initiatives are financed from the Structural Funds – which has its own monitoring expectations. It is important and useful to create the synergies between the obligations to monitor Structural Funds and the need for monitoring eHealth developments.

Innovation initiatives

Health can contribute strongly to research innovation initiatives through its comprehensive identification of emerging and new horizons for eHealth research, carried already out in different academic organizations like wireless/mobile solutions, personalization and new diagnostic and monitoring systems.

VI. CONCLUSIONS

The current state and trend in Cyprus regarding eGovernment and eHealth developments is determined by a number of main achievements and shortcomings. Common **achievements** of both domains are the development of an **advanced telecommunications infrastructure**, the fast **raising** of the **ICT indicators** and the rise of **usage of internet** by the **business sector** to interact with the public authorities. Additionally **high priority** has been given on the definition of **policies** related to the provision of broadband services in both urban and rural areas. Regarding eGovernment a fast **increase** in the number of **public services available online** as well as the upgrading of their availability level has been noted since 2004. One major achievement regarding eHealth was the **initiation** in 2006 of **the HCIS System** aiming at providing integrated healthcare services in a wider sense, both geographically and functionally.

While Cyprus may present various specific achievements in eServices, there are still several **shortcomings** that are characteristics of online public services. Even though considerable eServices implementation effort has been undertaken in the recent years, their number is still **limited** and they **lack** both in terms of **online availability and sophistication**. eHealth service provision is still in its infancy and the implementation of planned services has been considerably delayed. Additionally eGovernment services are very **fragmented and not integrated** institutionally and technically reducing thus their accessibility. Further shortcoming is the fact that current services are mainly **provided by the central government**, by institutions which have not been adequately prepared to provide online public services. Those institutions are generally scarce staff, use outdated technological solutions and models, reducing thus the range and quality of services provided by them. Other major shortcomings are the **lack of a committed “owner”** of both IS and eServices developments and the slow process of introducing and **approving needed eServices legislation**. Last but not least the **low spending on ICT** and the fact that **eServices and R&D expenditures** are mainly **carried out by the public sector** without any substantial participation of the private sector are regarded as main shortcomings of eServices developments.

Main drivers for eGovernment and eHealth developments are identified to be the **increased demand for improved efficiency and effectiveness** of public and healthcare service provision and improvement of **ICT services access and affordability**. Additionally demographic processes generate massive future demand.

Main barriers for eGovernment and eHealth have been identified to be the **low level of ICT and R&D expenditures** as compared to the EU15 average and the **lack of a solid legislative framework** regarding the use of ICT in the healthcare and public sector. The legal background is much behind the demand for the services and market readiness to provide them. Additionally, existing **eServices are lacking** technical, semantic and organisation levels **interoperability**. There is a missing understanding of how public organizational units should work together to ensure that systems and applications are completely interoperable. Furthermore even though there has been high political commitment regarding the provision of eServices, there is a **lack of awareness** among the responsible stakeholders regarding the impact of such services. Also even though the importance of **public and health care structural reforms** has been recognized the speed of implementing such changes has been very slow stacking on a number of obstacles like administrative burdens, diversity of interests among related stakeholders and opposition and low motivation to carry out changes of the involved institutes.

Important policies tackling effectively the challenges related to the development of eGovernment and eHealth have been linked to the important structures of **economy, infrastructure and technology, legislative, institutional** as also **policy structures**.

Regarding the **economy structure** eServices developments are associated with the *need of sustainability and improvement of quality of public finances* via a redirection of public expenditure. Economy structure related policy options must address the following:

1. Ensuring the sustainability of public finances over the long term requires, inter alia, significant improvement in the underlying fiscal position to prepare the economy to withstand the upcoming demographic changes. To achieve a structural improvement in the public finances strategies related to reform the healthcare system must be considered. Improvements have to be made both in the provision of healthcare, and the management of hospitals and resources, especially medical supplies. Legislation for the transformation of public hospitals to more autonomous units needs to be approved along with plans to introduce a NHIS. eHealth developments could play an important role in the improvement of efficiency of healthcare provision and also cost reductions.
2. Increasing substantially R&D and ICT expenditure per head and financial resources in the public sector for eServices implementation. Other issues that the national research policy needs to take up, are:
 - Upgrading of existing and the building of new research infrastructure;
 - Encouragement of involvement of the private sector in R&D activities. The small size of enterprises and the weak links between research organisations and private enterprises hinder the involvement of private business in R&D;
 - Generation of a critical mass of researchers, through the development of researchers' careers, the encouragement of mobility of researchers and the enhancement of research capacity;
 - Promotion of research culture within all levels of the educational system;
 - Further promotion of competitive alliances between the Cypriot and the European research community.
3. Definition of a policy mix boosting private involvement in R&D and eServices developments through the use of PPP;
4. Structural funds must be regarded as a potential funding possibility of eServices development. It is a vital policy issue to use this funding for the most important bottlenecks and spend them for such developments which may generate sizeable spill-over effects and additional contribution from the private sector.

Infrastructure and Technology policy options need to be defined in the areas of *broadband infrastructure* and *eService provision*. Specifically the following must be considered:

1. Expansion of the broadband infrastructure to cover both the urban and rural areas and the granting of licences for broadband networks to more organizations;
2. Increase of availability of more advanced and integrated eServices. Issues of interoperability, openness and security must be considered;
3. Roll out of eGovernment services not generating direct revenue for government, must be given higher priority;
4. Reinforce the promotion of eHealth services and solutions. Most of the actors and potential users are not familiar with the positive aspects, the value added and ways of usage regarding eHealth solutions. Raising of awareness would be needed in a wide circle of the population as well in the target group of health care professionals;
5. Determination and monitoring of users' demand. So far the development of online public services has followed the need to comply with the policy priorities of the European Union. This has led to the general neglect of the users' demand, which have clearly shown that are interested on online service provision;
6. There is the need to find solutions that simultaneously meet the trust, protection of data and security concerns of users in online service provision. A key issue is for example legislation of personal data security.

Legal structure related policy options must address the following:

1. Reduction of the regulatory and administrative burden avoiding eServices legislation approval delays. Develop the institutional framework and the administrative capacity for a systematic impact assessment and measurement of administrative burden of existing and new legislation;

2. Approval of missing legislation regarding the Legislation on Electronic Procurement, the re-use of public sector information (PSI), on Broadband Access and Networks, smart-cards and on the Network and Information Security;
3. A solid legal ICT framework must be defined taking into consideration Cyprus specific eServices development parameters and needs.

Institutional Structure policy options should concern the:

1. Provision of measures regarding the improvement of collaboration among main actors in advancing the development of eServices in Cyprus;
2. Decentralization of eServices implementation responsibility and the establishment of an effective monitoring mechanism for the implementation of the eServices as a measure to accelerate their emergence.

Policy structure policy options are related to the:

1. Assignment of a committed owner for IS policy and specifically of eServices;
2. Definition of specific eGovernment and eHealth strategies and the review of the National IS Strategy to give clear and stronger emphasis on eServices provision.

Main R&D challenges that need to be addressed regarding the development of eGovernment and eHealth services in Cyprus are identified to be: the **integration and interoperability** of systems and services, the provision of **personalized services for all**, and the definition of **trust and security** mechanisms and technologies. More challenges regard the carrying out of research into the direct needs or **demands of citizens** and civil users regarding the provision of eServices, the definition of **evaluation and benchmarking methods and tools** to measure for example, the added-value of eServices on individual users and to assess their take-up. Major research effort is also required to better understand and exploit both the general and differentiated **impacts of eServices** on social objectives in order to improve policy making and maximise development results. There is also still a lot to be researched in the provision of appropriate **PPP models** which can be beneficiary for funding eServices developments.

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Abstract

In 2005, IPTS launched a project which aimed to assess the developments in eGovernment, eHealth and eLearning in the 10 New Member States at national, and at cross-country level. At that time, the 10 New Member States were Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia and Slovakia. A report for each country was produced, describing its government and health systems and the role played by eGovernment and eHealth within these systems. Each report then analyzes, on the basis of desk research and expert interviews, the major achievements, shortcomings, drivers and barriers in the development of eGovernment and eHealth in one of the countries in question. This analysis provides the basis for the identification and discussion of national policy options to address the major challenges and to suggest R&D issues relevant to the needs of each country – in this case, Cyprus.

In addition to national monographs, the project has delivered a synthesis report, which offers an integrated view of the developments of each application domain in the New Member States. Furthermore, a prospective report looking across and beyond the development of the eGovernment, eHealth and eLearning areas has been developed to summarize policy challenges and options for the development of eServices and the Information Society towards the goals of Lisbon and i2010.

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