FACTORS AND IMPACTS IN THE INFORMATION SOCIETY: A PROSPECTIVE ANALYSIS IN THE CANDIDATE COUNTRIES

REPORT ON MALTA

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PREFACE

The Institute for Prospective Technological Studies (IPTS) of the Directorate General Joint Research Centre of the European Commission contracted the International Centre for Economic Growth, European Centre (ICEG EC) to act as the coordinator of a consortium of 11 research institutes to carry out this project.

The main objective of the project was to provide a series of national monographs studying the development of the Information Society (IS), including both the positive and negative impacts, in each of the candidate countries. These monographs offer an assessment of the strengths and weaknesses of each country regarding the development of IS, and a view on their possible outcomes; both strongly rooted in factual quantitative data. They provide a clear, contextualised, multi-factoral and multi-causal picture of the input factors that contribute to the success or failure of IS developments, and the relevant output parameters that support mid- and long-term impacts on economic growth, employment and other relevant aspects of the future of each country. Each monograph concludes with a set of alternative scenarios for the development of IS in that country.

This report was carried out by Islands Consulting Services, Malta, and aims to study the factors and impacts of the Information Society in Malta. The report reflects the research results, comments and opinions of the team of authors. It does not necessarily reflect the opinion of the European Commission. It is organised around 9 themes – economy, demography, government policies, industrial development and competitiveness, relevant economic activity, IST penetration rates, institutional capacity and regulatory background, education, and culture. The section on each of these themes concludes with a specific SWOT analysis. Finally, a general diagnosis is made of Malta's potential for IS developments, followed by a brief section on possible scenarios for the future and policy recommendations.

A Synthesis Report was also prepared by the Project Coordinator, the International Centre for Economic Growth, European Centre (ICEG EC), on the basis of all the country studies. This offers an integrated and prospective view on the future outlook for the Information Society in the Candidate Countries and can be found on the FISTE (Foresight in Information Society Technologies in Europe) website: http://fiste.jrc.es/

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LIST OF ABBREVIATIONS

ACs	The EU acceding countries: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovak Republic and Slovenia
ACCs	The EU accession and candidate countries: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, Slovenia and Turkey
ADSL	Asynchronous Digital Subscriber Line
ATMs	Automated Teller Machines
BOV	Bank of Valletta (Malta)
BPA	Business Promotion Act (Malta, 2001)
CC-7	7 of the larger EU Candidate Countries: Czech Republic, Estonia, Hungary, Poland, Rumania, Slovak Republic and Slovenia
CEO	Chief Executive Officer
CIMU	Central Information Management Unit (Malta)
CIS	Community Innovation Survey
DMZ	Demilitarised Zone
EBAN	European Business Angel Network
EBN	European Business Innovation Centre Network
EPO	European Patent Office
EPOS	Electronic Point of Sale
ETC	Employment and Training Corporation (Malta)
EU	European Union
EU-15	The 15 EU member states: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom
FDI	Foreign Direct Investment
FHRD	Foundation for Human Resource Development
FP6	Sixth Framework Programme (EU)
GDP	Gross Domestic Product
GWU	General Workers' Union (Malta)
ICT	Information and Communications Technology
IDA	Industrial Development Act (Malta, 1988)
IMO	Information Management Officer
IRC	Innovation Relay Centre
IP	Internet Protocol
IPRs	Intellectual Property Rights
IPSE	Institute for the Promotion of Small Enterprise (Malta)
IRC	Innovation Relay Centre
IS&E	Information Society and Economy
ISDN	Integrated Services Digital Network
ISSP	Information Systems Strategic Plan (Malta)
ISPs	Internet Service Providers
IST	Information Society Technology
ISVs	Independent Software Vendors
IT	Information Technology
ITU	International Telecommunication Union
KBIC	Kordin Business Incubation Centre (Malta)

KM	Knowledge Management
LAN	Local Area Network
LFS	Labour Force Survey (Malta)
MAGNET	Malta Government Network
MCA	Malta Communications Authority
MCAST	Malta College of Arts Science and Technology
MCST	Malta Council for Science and Technology
MDC	Malta Development Corporation
METCO	Malta External Trade Corporation
MEU	Management Efficiency Unit
MFSA	Malta Financial Services Authority
MGC	Malta Geographic Code
MITTS	Malta Information Technology and Training Services Ltd.
MSU	Management Systems Unit (Malta)
NISCO	National Information Society Council (Malta)
NSO	National Statistics Office (Malta)
NUTS	*Nomenclature des Unités Territoriales et Statistiques*
OPM	Office of the Prime Minister (Malta)
RAS	Remote Access Services
R&D	Research and Development
RTDI	Research Technological Development and Innovation
S&E	Science and Engineering
S&T	Science and Technology
SEC	Secondary Education Certificate
SMEs	Small and Medium-Sized Enterprises
TCE	Technology Centre of Excellence
TQM	Total Quality Management
UOM	University of Malta
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United National Educational, Scientific and Cultural Organisation
US	United States
USPTO	United States Patent and Trademark Office
VoIP	Voice over IP
VPN	Virtual Private Network
WAN	Wide Area Network

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A. NATIONAL AND REGIONAL ECONOMY

A1 Country Profile

Figure A1: Base Map of the Maltese Islands[1]

Malta is an archipelago of islands strategically located at the centre of the Mediterranean Sea, 93 km south of Sicily and 290 km away from North Africa. The Maltese archipelago, which covers a total area of just 316 km^2 and has 140 km of coastline, consists of three inhabited islands, namely Malta, Gozo and Comino, and two uninhabited islands, Cominotto and Filfla. The Maltese islands have a total population of 400,000 people. The main island, Malta, which spans an area of 246 km^2 and extends 27 km lengthwise and 14 km in width, has 360,000 inhabitants. Gozo, the island on which the remaining 10% of the population lives, covers an area of 67 km^2 and can be reached from the main island by ferry and helicopter. A handful of inhabitants live on the island of Comino. Malta is one of the most densely populated countries in the world with a population density of 1,257 inhabitants per square kilometre.

[1] Source: Malta Environment and Planning Authority (MEPA)

Although limited regional statistical data is available, there are some tangible regional socio-economic differences between different parts of the islands. The National Statistics Office (NSO) has developed the Malta Geographical Code (MGC) for the classification of Maltese territorial units in accordance with the requirements of the *Nomenclature des Unités Territoriales et Statistiques* (NUTS) as used on the European mainland, but regional statistics on many topics are still largely unavailable and possibly of little relevance due to the small size of the country. The figure below illustrates the districts derived from the MGC that will be referred to when quoting the available regional statistics in this monograph.

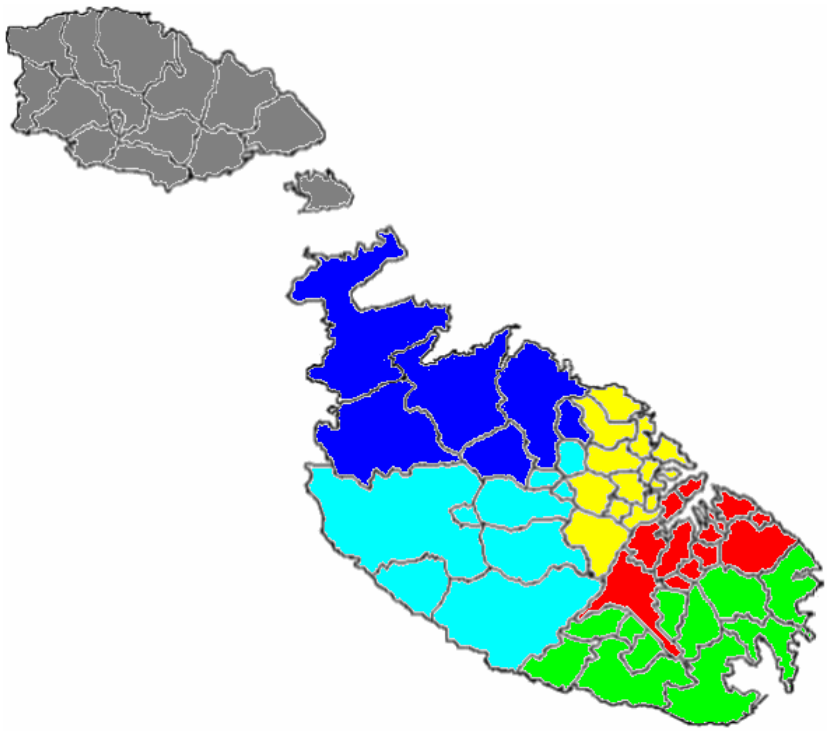

Figure A2: MGC Districts[2]

- **Southern Harbour:** Zabbar, Xghajra, Valletta, Tarxien, Santa Lucija, Paola, Marsa, Luqa, Kalkara, Senglea, Floriana, Fgura, Cospicua, Vittoriosa
- **Northern Harbour:** Ta' Xbiex, Swieqi, Sliema, Santa Venera, San Gwann, St. Julians, Qormi, Pieta', Pembroke, Msida, Hamrun, Gzira, Birkirkara
- **South Eastern:** Zurrieq, Zejtun, Safi, Qrendi, Mqabba, Marsaxlokk, Marsascala, Kirkop, Gudja, Ghaxaq, Birzebbuzia
- **Western:** Zebbug (Malta), Siggiewi, Rabat (Malta), Mtarfa, Mdina, Lija, L-Iklin, Dingli, Balzan, Attard
- **Northern:** St. Paul's Bay, Naxxar, Mosta, Mgarr, Mellieha, Gharghur
- **Gozo and Comino:** Rabat (Gozo), Fontana, Ghajnsielem and Comino, Gharb, Ghasri, Kercem, Munxar, Nadur, Qala, San Lawrenz, Sannat, Xaghra, Xewkija, Zebbug (Gozo)

[2] Based on the local council map of the Malta Environment and Planning Authority (MEPA)

A1.1 Economic Growth

The Maltese economy is small and very open. With a labour force of around 144,400[3], its GDP amounted to €4.1 billion[4] in 2002. On purchasing power parity basis, Malta's per capita GDP is currently estimated to be around 55% of the EU-15 average[5]. This is the fourth highest among the EU acceding countries (ACs)[6], behind Cyprus, Slovenia and the Czech Republic, though still well below that of the EU member states[7] with the lowest GDP per capita, namely Greece, Portugal and Spain.

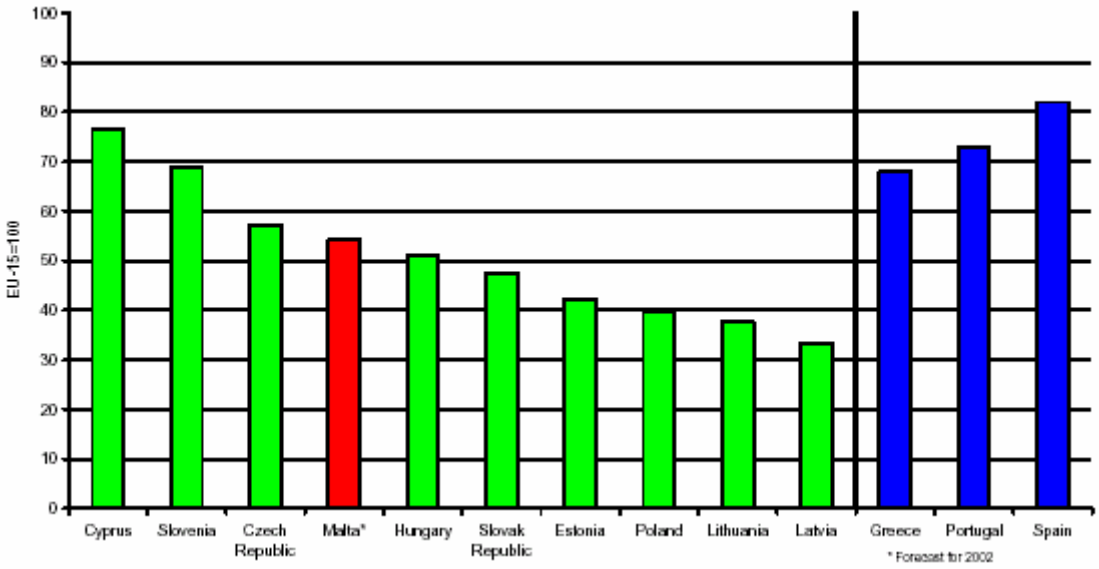

Chart A1: GDP per capita in PPS in 2001 with EU-15 = 100[8]

[3] NSO, News Release No. 61/2003
[4] NSO, News Release No. 46/2003
[5] Eurostat, Statistics in Focus, Theme 2 – 28/2002
[6] Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovak Republic, Slovenia
[7] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom
[8] Source: European Commission, 2003

While real GDP growth averaged just over 5% between 1990 and the year 2000, provisional figures for 2001 and 2002 indicate that Malta has been hit hard by the international economic slowdown of this period, as delineated in Chart A2. This reflects the high vulnerability of the open micro Maltese economy to foreign shocks. Nonetheless, various studies conducted in the run-up to the imminent EU accession anticipate that Malta will be in a position to enjoy substantial growth rates upon becoming a full member of the EU.[9] One of the latest of these studies forecasts that the Maltese economy will grow at 5.9% annually, with production in the electronics sector, which is the largest sector in the local manufacturing industry, growing at a predicted 6%.[10] Indeed, the principal growth areas of the Maltese economy are high-tech manufacturing, IT-oriented services and financial services. A study of the ICT factors and impacts on Maltese society and the economy and their spin-off effects is hence of critical pertinence.

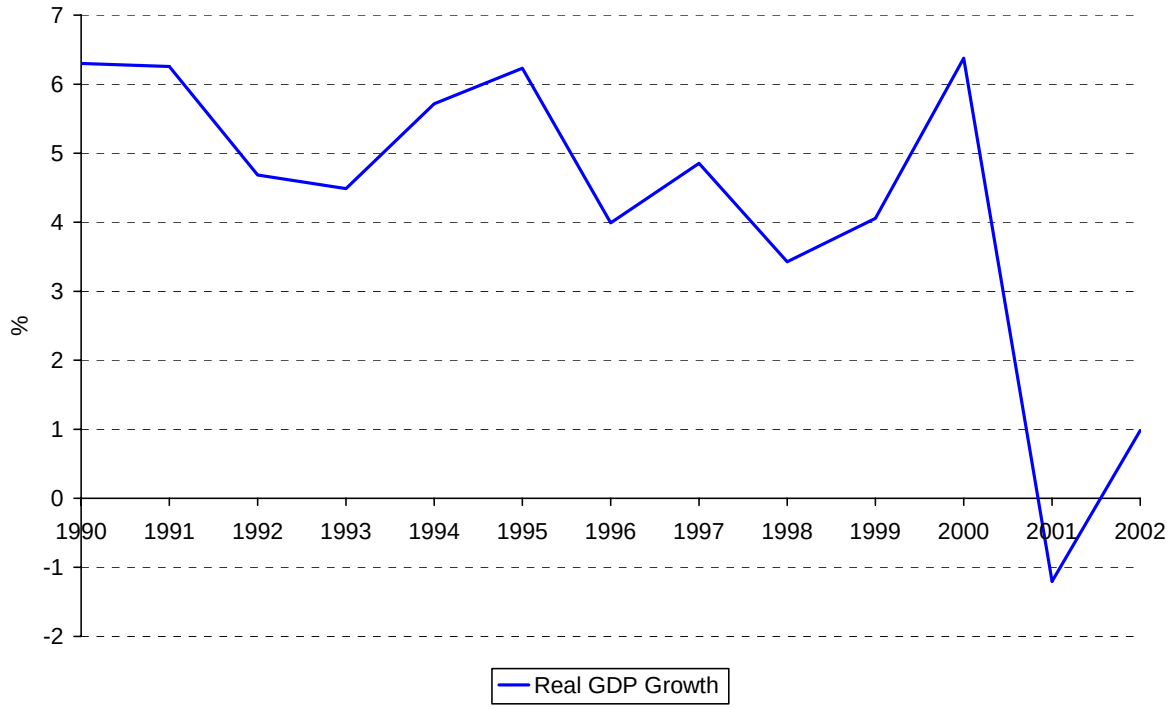

Chart A2: Real GDP Growth

[9] See Briguglio & Cordina, 2002
[10] Bayar (2003)

A2 Contribution

A2.1 Supply-Side

Economic activity in Malta is fairly diversified, with one-fourth of output being generated by the manufacturing sector and around one-third by the services sector in which tourism is the major contributor. The contribution of financial services and information technology (IT) services is expanding rapidly but still accounts for a relatively small share of GDP. Primary activities, consisting of agriculture and fishing, and construction and quarrying, contribute less than 10% of GDP.

Chart A3 illustrates the changes in the percentage contribution to GDP of the various sectors over the past decade. The contribution of agriculture and fishing has been steadily on the decline throughout the period, but seems to have taken an upturn in 2002. Construction and quarrying has been one of the most volatile sectors, since it is increasingly being fuelled by one-off major construction projects. The share of the manufacturing sector has been smaller over the past two years than it was in the early 1990s. This is partly because the service sectors have been developing at a faster pace and partly due to the fact that, since most of the larger manufacturing enterprises are export-oriented, manufacturing was the sector that was affected most by the international economic slowdown. In the service sectors, transport and telecommunications have marginally increased their share of GDP since 1990. Moreover, while the percentage contribution of wholesale and retail trade has been on the decline, other service sectors such as insurance, banking and real estate, and private services have flourished.

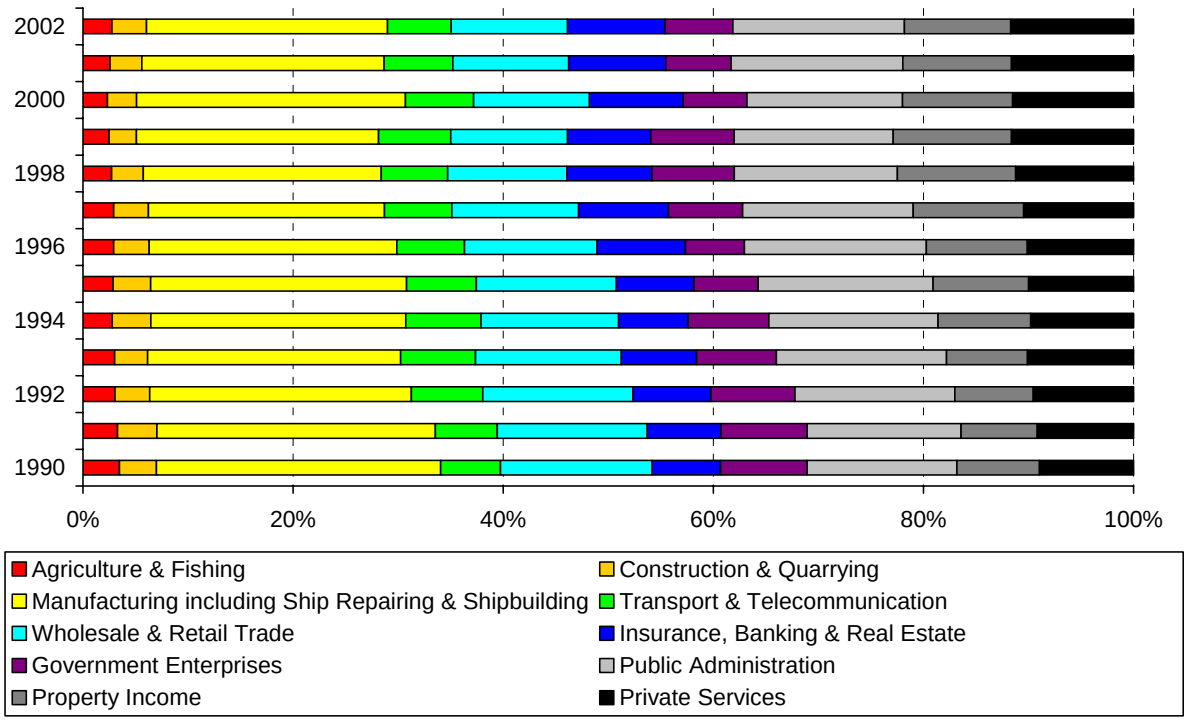

Chart A3: Sectoral Contribution

Government and public enterprises generate a significant portion of GDP, which is, however, declining over time partly as a direct result of the economic restructuring exercise that is currently under way. This restructuring programme is expected to reduce the role of Government in the economy particularly through a programme of privatisation of public enterprises. On the other hand, the share of public administration in GDP has increased over the past years, partly as a result of considerable increases in wages and salaries in the public sector and partly because Malta's bid to join the EU has increased demands on public administration during the negotiation process. It is a known fact that small countries tend to have a proportionately larger Government than their larger counterparts precisely because they are too small to benefit from scale economies at the governmental level.

There are suspicions that Malta's GDP figures may be significantly understated, as the grey economy may in fact be sizeable. While it is difficult to quantify the magnitude of underground economic activity, the relatively high standard of living enjoyed by most Maltese does not seem to be fully reflected in GDP figures. Certain groups of taxpayers, particularly businesses and the self-employed, have notoriously been thought to understate incomes to reduce their tax liability. The introduction of the VAT system in 1995 is believed to have contributed to exposing jobs and incomes that previously lay hidden in the invisible economy. Amidst mounting fiscal pressures, Government is aware of the need to improve tax enforcement; the establishment of the Tax Compliance Unit in 2000 is a clear sign of this.

Small island states are often perceived to be tax havens and are also traditionally associated with illicit financial activities such as money laundering. In choosing to pursue EU membership, thereby embracing the EU's laws and regulations, which are largely incompatible with some of the lucrative financial activities that small island states are notorious for, Malta has clearly signalled its choice to be a different type of island-state economy. In the pre-accession phase, Malta has undergone an extensive exercise to fully align its legislative framework, particularly in the field of financial services, with that of the EU, and has in the process divested itself from the possibility to offer unorthodox tax incentives and entertain tax haven business.

A2.2 Demand-Side

Consumption constitutes over 60% of expenditure in the Maltese economy, as seen in Chart A4. The past five years have seen a steady rise in the share of consumption in total expenditure. The share of investment expenditure has suffered a dramatic decline since 1990, suggesting that there may have been some crowding out of private investment. This decline has been broadly mirrored by a smaller external trade deficit as a percentage of GDP in recent years, with higher investment years showing larger deficits as most capital equipment is imported.

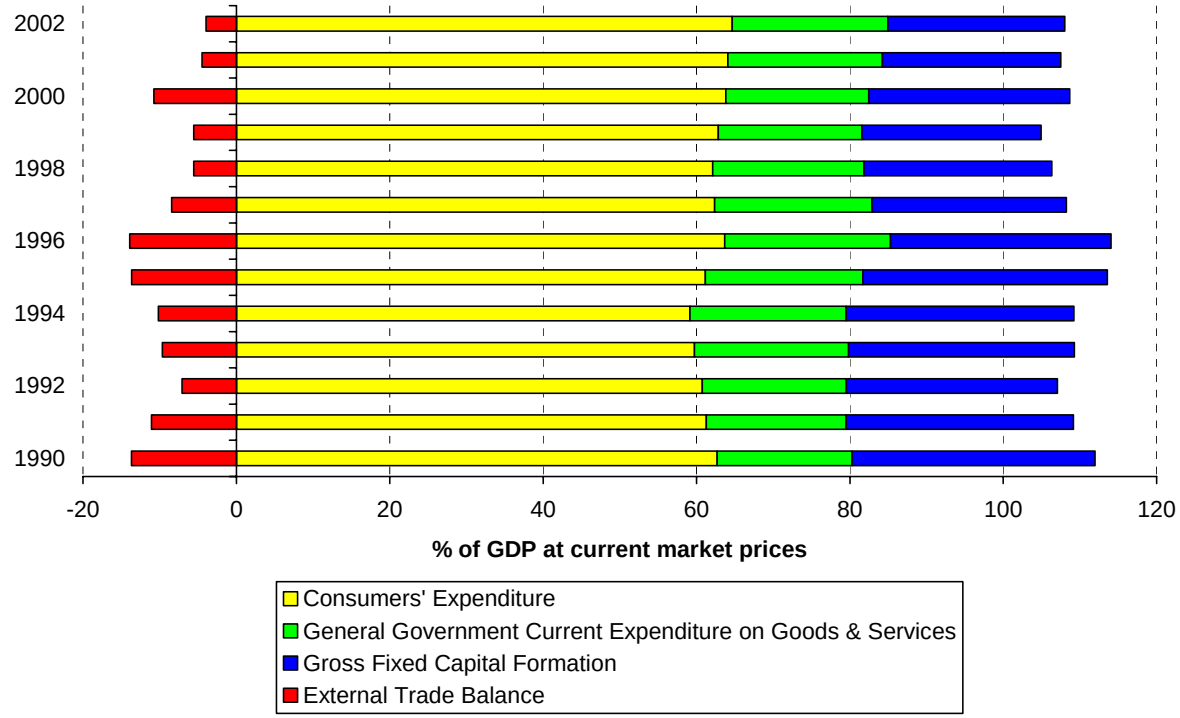

Chart A4: GDP Expenditure Aggregates

Government expenditure has averaged a hefty 20% of GDP over the past decade. Unarguably, Government has traditionally played a dominant role in the Maltese economy, as is attested both by the share of its expenditure in GDP and by a history of pervasive direct controls which have only recently been dismantled. These factors have bred a culture of state-dependence and stifled competitiveness and private initiative to the detriment of economic development in the country.[11] Economic restructuring is hence a prerequisite factor for ICT to have the desired positive impact on the Maltese economy and on the emerging information society.

[11] See Delia, 1986 and Cordina, 1992

A3 Employment, Labour Supply and Productivity

Malta has enjoyed acceptable levels of employment throughout the past decade. As is apparent in Chart A5, the second half of the 1990s witnessed a 1% increase in the average unemployment rate over the first half, during which unemployment averaged 4.5%. In spite of the poor growth performance registered in 2001 and 2002, the unemployment rate is reported to have been below 5.5% during these years. Just over 2% of the labour force had been registering for work for over twelve months at the end of 2002. The unemployment rate must be considered in the light of a relatively low female participation rate, particularly when comparing employment levels in the Maltese economy with those of other European countries in which the female participation rate is much higher.

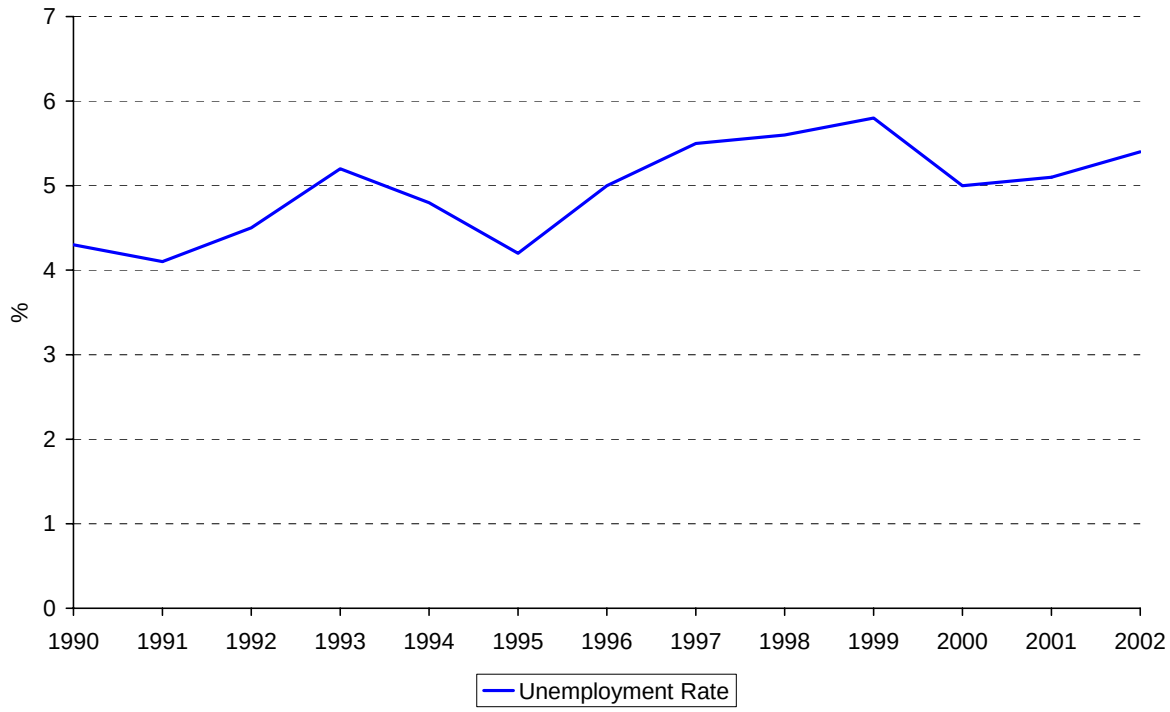

Chart A5: Unemployment

The age distribution of those registering for work under Part 1[12] of the unemployment register, which is depicted in Chart A6, gives some insight into the composition of unemployment in Malta. Around 60% of the unemployed are over 30 years of age, with more than 25% being at least 45 years old. Strikingly, there are more unemployed who are under 25 years of age than unemployed who are over 45 years of age. In fact, almost 30% of the unemployed are under 25 years of age. This is a source of major concern since it indicates a lower degree of employability in the younger generation. It appears that a significant percentage of those

[12] The unemployment register is divided into two parts. Those registering under Part 1 include new job seekers who would have left school, re-entrants into the labour market, and job losers who would have been made redundant by their former employer. Those registering under Part 2 include workers who would have been dismissed from work due to disciplinary action, those who would have left work of their own free will, those who would have refused work or training opportunities and those who would have been struck off the register after an inspection by the Law Enforcement personnel.

under 25 – the unemployment rate in this age bracket stood at 8% at the end of 2002 – lack adequate skills for employment and may not be easily trainable, possibly because of literacy limitations. Indeed, a non-negligible amount of youngsters are believed to leave school at the minimum school leaving age of 16 without having learnt to read and write. This can severely hamper the widespread development of the information society in Malta and give rise to a digital divide, even within the upcoming generations. The adult literacy rate in Malta is among the lowest in Europe at around 92% according to UNDP figures. The attainment of higher levels of literacy must be a national priority.

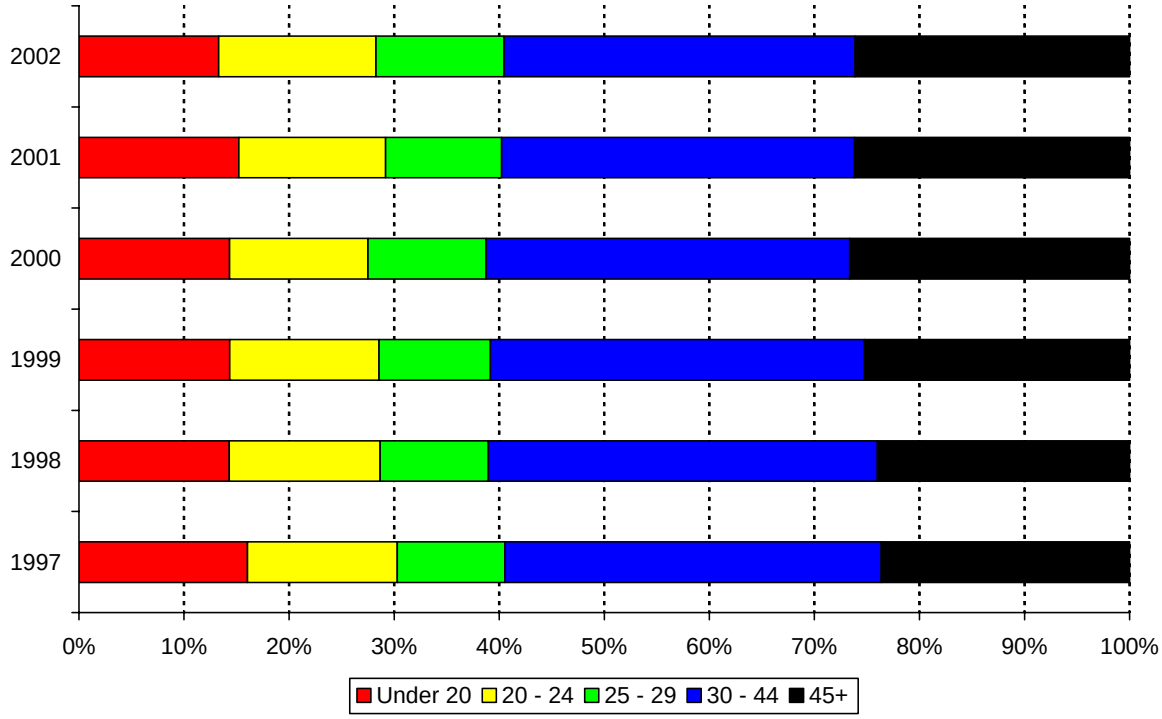

Chart A6: Age distribution of the unemployed

A3.1 Changes in Employment

The distribution of employment in Malta has not changed much over the past six years, with most sectors retaining a stable share of total employment as can be seen in Chart A7. The most notable trend has been the decline in the share of public sector employment by over 3% during this period, notwithstanding the fact that the public sector still employs more than one-third of the gainfully occupied. On the other hand, the sectors that have absorbed an increasingly larger portion of the labour force are the banking, insurance and real estate sector, whose share in total employment has grown by 1.2%, and the other private market services sector which employed 11% of the gainfully occupied in 2002, 2.3% more than in 1997.

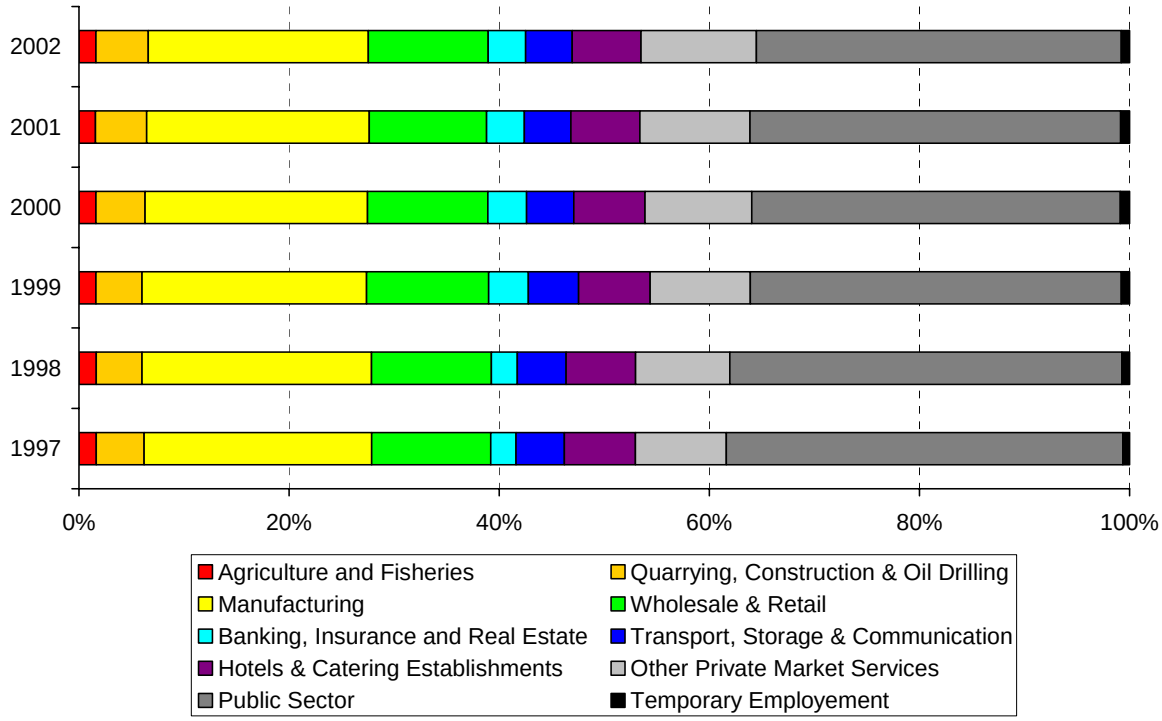

Chart A7: Sectoral distribution of employment

A3.2 Changes in Labour Supply

Labour supply was on the increase between 1997 and 2001, contracting marginally in 2002 to just below 144,400 workers at the end of the year. Given that the participation rate of females in Malta is among the lowest in Europe, labour supply could potentially increase considerably in the years to come, especially as more policy initiatives that promote and support female participation are undertaken.

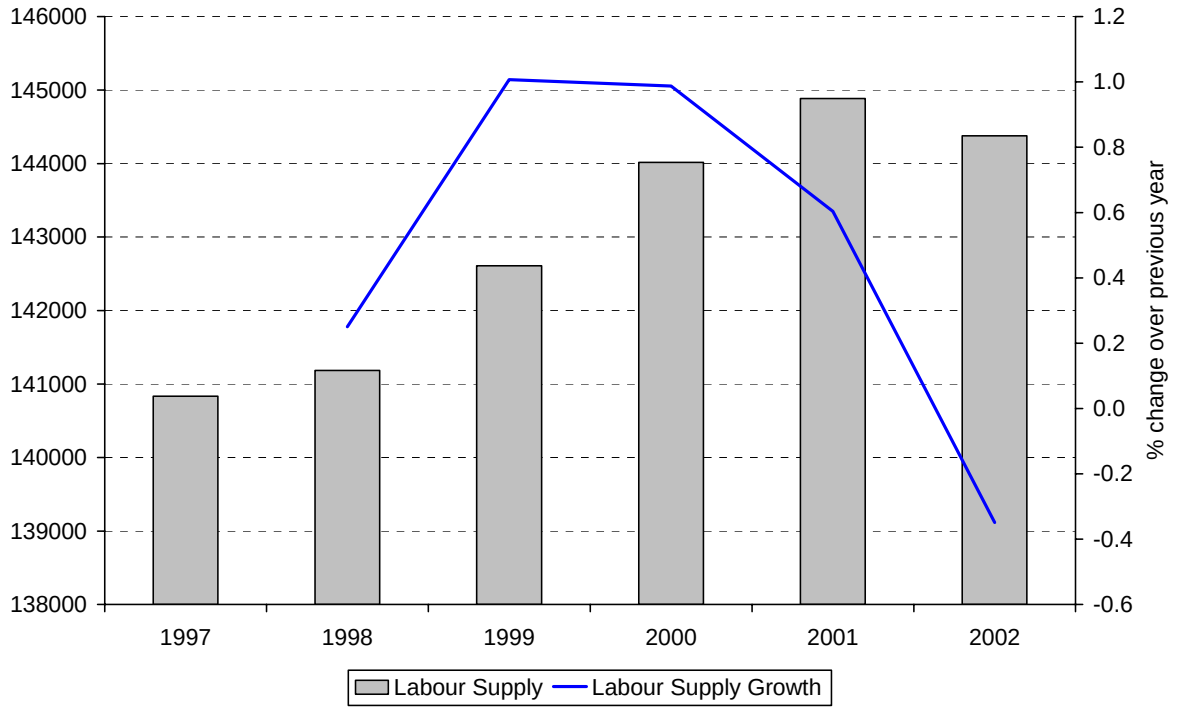

Chart A8: Labour supply

Over and above higher literacy levels, the need for technically-skilled human resources complemented with an entrepreneurial culture is strongly being felt. Shortfalls in human resources in technical and scientific areas are being perceived in all growth areas of the economy. For instance, the single largest manufacturing exporter on the island employs most of the University graduates in engineering as well as a good number of business graduates. Several proposals for foreign direct investment in Malta are known to have failed simply because of a lack of human resources possessing the required skills. Likewise, insufficient skills and an inadequate entrepreneurial culture are often viewed as the principal hurdle that is impeding business restructuring from proceeding at a faster pace.

While structural changes have pushed their way through the Maltese economy in the relatively short time span of a few years, the necessary upgrading of human resources to develop the required skills and instil an adequate entrepreneurial culture is a gradual process that takes its time. Indeed, a number of time lags may be identified in this respect. Government and educational authorities take time to identify the changes that are constantly taking place in the business environment. The implementation of suitable programmes by Government, which typically leads education initiatives in Malta, requires additional time. It also takes time to convince the general public of the need to re-orientate career aspirations away from traditional academic disciplines, such as law, medicine and teaching, to the technical and enterprise education that is in higher demand. Inevitably, educational programmes start producing the required skills in a quantity sufficient to meet the demand after a number of years. Without diminishing the need for and importance of further initiatives, a degree of progress has been achieved with respect to the first three of the above time lags. Initiatives that are already in place, however, require more time to have a stronger impact on the general level of technical and entrepreneurial skills within the labour force.

A3.3 Changes in Productivity

The labour productivity index suggests that the Maltese economy has enjoyed considerable labour productivity gains throughout the 1990s, which is consistent with the positive GDP growth record registered during the same period. Productivity growth peaked in the year 2000 when the electronics sector was experiencing a boom. This positive performance was marred by the negative GDP growth experienced in 2001, which was reflected in the apparent decline in productivity that sticks out in Chart A9. It must be noted, however, that this ostensible decline in productivity can be misleading in that it emulates a demand-driven contraction of GDP and is hence not a reliable indicator of developments on the supply-side of the economy. Meanwhile, a satisfactory increase in labour productivity of around 4.6% has been indicated for 2002. The linear trends of labour productivity growth and real GDP growth drawn in Chart A9 indicate that labour productivity growth has only declined marginally since the early 1990s, whereas real GDP growth has slowed down significantly. It appears that total factor productivity may be slowing down in Malta.

Chart A9: Labour productivity growth and real GDP growth

A4 Structural Changes

Following a deep and prolonged recession during the early and mid-1980s that was provoked by falling international demand and inward-looking economic policies, the Maltese economy experienced strong growth in the late 1980s and first half of the 1990s averaging 6% per annum in real terms. This growth was spurred by government expenditure, investment and export activity. By 1996, Malta had achieved a reasonably high per capita income and level of development, but its economy was fuelled by high deficits on the fiscal account and on the

external current account. In the late 1990s, these deficits peaked at over 10% of GDP and became unsustainable. The Government debt that was being accumulated in the process was imposing an ever-increasing burden in the form of interest costs, eliciting a vicious circle by further deteriorating the fiscal position. The deficit on the external current account was eroding Malta's external reserves and there was thus the risk that the currency peg for the Maltese lira, which in the past had contributed to maintaining low and stable inflation and sustaining export competitiveness, would also become unsustainable[13]. These macroeconomic imbalances were also clearly out of line with the criteria laid out in Maastricht (1990) for Economic and Monetary Union, which became of greater relevance as Malta pursued its EU membership bid.

These pressures were being felt at a time when growth was slowing down from the high levels of the previous years, and when the economy was about to embark on a restructuring programme involving considerable expenditure and investment. A rigorous plan to reduce the fiscal deficit, mainly by increasing revenue from taxation, reined the deficit to 5% of GDP by 2001, contributing to restrain import demand and contain the external current account deficit. But the claim that the fiscal deficit will be further reduced to the target of 3% of GDP by 2004 with increased emphasis on efficiency and rationalisation of expenditure in the public sector, including privatisation, has been discredited by the hike of the deficit to 6.3% of GDP in 2003, against the budgeted 4.1%. This was mainly due to the fact that actual revenue did not meet Government projections as a result of the trailing economic slowdown. It is unlikely that fiscal consolidation can be attained without rationalising public spending. It is also believed that excessive consumption in the early nineties has absorbed resources which could have otherwise been better employed in productive investment expenditure aimed at facilitating and accelerating the pace of economic restructuring and enhancing scientific and technical capabilities. It is likely that more resources become available for investment if the pace of restructuring gathers momentum and fiscal consolidation is attained.

At the micro level, the Maltese economy is characterised by a relatively large number of small enterprises that were traditionally oriented towards a protected domestic market and hence need to re-invent themselves so as to be able to rise up to the challenges of international competition. In a small economy, firms may be unable to reap economies of scale to their full extent. Moreover, competitive forces may be relatively weak in a limited domestic market.[14] These considerations have important implications for the extent to which Maltese businesses undertake investment initiatives. In this context, it is important to note the dichotomous nature of Maltese enterprises. The typical exporting business has significant foreign participation in its ownership and management, faces international competition and has the ability to adapt and innovate in response to and in anticipation of market dynamics. The typical provider for the domestic market is locally-owned and managed, possibly a family-run business, and either an importer or a producer sheltered to varying degrees from international competition with limited ability for innovation and for facing competitive pressures. There are weak connections, if any at all, between these two spheres of business. Malta's imminent EU membership has necessitated a restructuring programme to introduce more market-oriented policies in domestic markets and to assist domestic producers to become effective competitors within a more open economic environment. Measures undertaken towards this end include privatisation projects aimed at providing finance and expertise for restructuring, as well as business promotion measures for targeted sectors mainly in the form of tax concessions.

[13] Central Bank of Malta Annual Report, 2000
[14] See Briguglio, 1993

A5 International Flows

A5.1 Cross-Border Capital Flows

Malta has registered a positive financial account balance through the past years, as outlined in Chart A10, as FDI flows outpaced a recurring trade deficit. The highest balance on the financial account since 1995 occurred in 2000, whereas the years 2001 and 2002 featured a low though still positive balance.

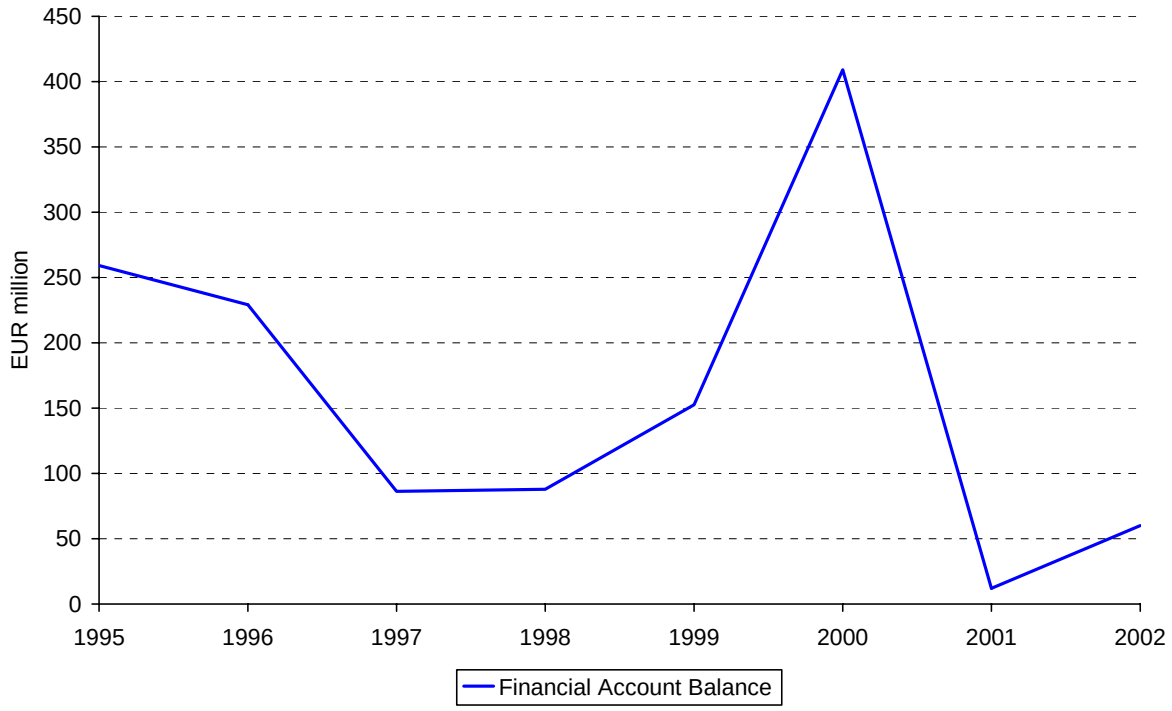

Chart A10: Financial Account Balance

A5.2 Foreign Direct Investment (FDI)

Malta is not only the most open economy among the acceding and candidate countries (ACCs)[15] but it is also the country that has the highest FDI to GDP ratio, which exceeded 17% in 2000, as can be seen in Chart A11. The inward FDI performance index, which is computed as the ratio of an individual country's share in global FDI to its share in global GDP[16], averaged 4.13 for Malta during the period 1995-2000, making Malta the best performer in attracting FDI among the acceding countries, well ahead of the next best performer, Latvia, which averaged 3.4. Inward FDI is also identified to be one of the principal strengths of Malta in relation to innovation activity in the Innovation Scoreboard 2002.[17]

[15] The acceding countries together with the candidate countries Bulgaria, Romania and Turkey
[16] See UNCTAD, 2002
[17] Source: trendchart.cordis.lu

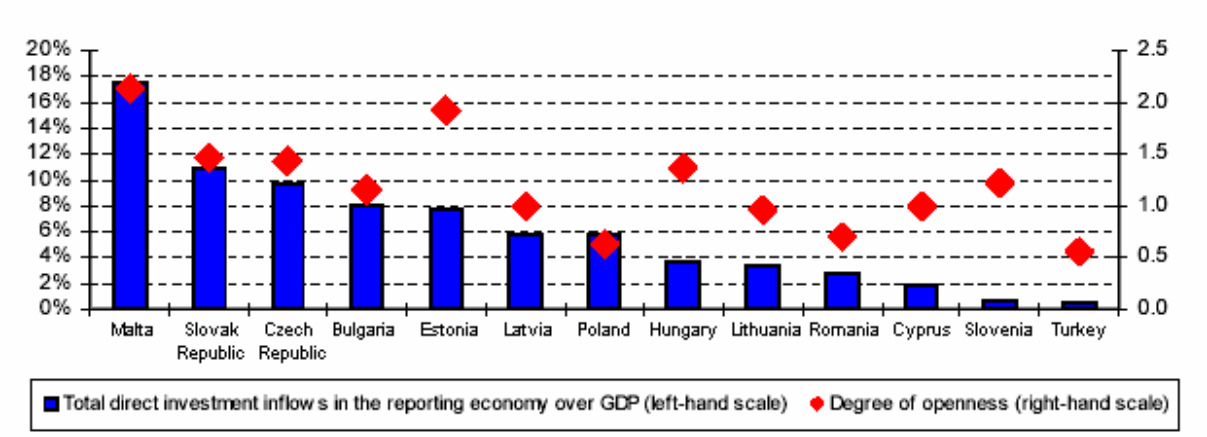

Chart A11: FDI and openness[18]

Inward FDI flows accounted for a staggering 67% of gross fixed capital formation in Malta in 2000. Indeed, the major private sector investment projects undertaken over the past twenty years, which were mainly in the manufacturing and tourism sectors and which are currently generating much-needed export revenues, generally featured a strong component of foreign direct investment.[19] The most important, though not exclusive, example of this is ST Microelectronics, which is a subsidiary of a major global microchip manufacturer. This company started operations in Malta in 1981, employing a few tens of people. It has now grown into a key player in the Maltese economy, employing 2,400 persons, a third of which are graduate engineers and technicians, and generating around one-half of Malta's manufactured exports. The large share of ST Microelectronics' exports makes this company a key player in the local economy, which is by sheer size of numbers excessively dependent on its exports.

Box A1: ST Microelectronics (Malta) Ltd.

"Thanks to the quality of human resources, ST Microelectronics in Malta has mainly concentrated on high-value products with a strong engineering content... We operate with the most advanced technology available and are committed to investing in the most up-to-date equipment and know-how. We are proud to say that our workforce is our main resource and is fully capable of meeting the challenges of a highly competitive market. Moreover, the expertise and professionalism of Maltese managers and engineers has even been used in neighbouring ST plants abroad. The Malta plant is one of the most important back-end facilities for the Group serving a range of key customers in the electronic industry throughout the world."

Gene Gretchen, Group Vice President & Managing Director[20]

[18] Source: Eurostat, Statistics in Focus, Theme 2 – 11/2003
[19] See Cordina & Anderson, 1993
[20] Source: www.investinmalta.com

Similar examples in the manufacturing sector include Brand, a toy manufacturer, Methode, a car switch producer and Baxter, a manufacturer of medical equipment. In the tourism sector, direct foreign participation in investment and business development has featured over the years through the presence of world leaders such as the Hilton, the Westin, Trusthouse Forte, Holiday Inn and lately Intercontinental, amongst others.

Box A2: Baxter Ltd.

"We produce over 35 million medical devices a year, mainly for Europe, a 70% increase compared to 1990 levels. Baxter's interest was triggered by the various incentives offered by Malta as well as the attractive labour rates on the island. After a few years of operation it became clear that several other factors made this operation very attractive. These were the marked flexibility, educational level and language skills of the Maltese workforce and their ability to learn and absorb new technology. Our Maltese workforce was also able to develop new products in line with customers' changing expectations and ultimately to deliver the desired bottom line results. Over the years the above played an important role in the Baxter strategy of consolidating a large part of the production for the European market in Malta instead of maintaining manufacturing plants in different European countries."

Sergio Vella, Director Manufacturing[21]

In the 1970s and early 1980s, foreign direct investment was mainly attracted by low costs and financial incentives including tax concessions. At present, the financial incentives remain in place but the emphasis for the attraction of investment lies on a skilled and flexible workforce, as Malta no longer remains cost-competitive compared to other foreign investment bidders in Eastern Europe, Asia and North Africa. Investment that had, in the past, relied exclusively on low costs, most notably in the textiles sector, has by now virtually disappeared from the Island, while investment that relied on technology and skills has thrived and prospered, [22] and continuous to prosper even as the last remaining low cost industries dwindle away or leave the Islands for cheaper locations.

Box A3: Playmobil Malta Ltd.

"If a company intends to set up in Malta to mass-produce cheap items, then perhaps this might not be cost-effective. But if you need qualified and highly trained labour at reasonable cost to carry out product-development, sales & marketing as well as production, then Malta is the place to invest in. When we compare with similar plants abroad, we see that our employee turnover and wage costs are low, whilst our productivity and profitability are high. The Maltese adapt well and are keen to see their company thrive. Malta also has a good infrastructure of technical support companies."

Helga Ellul, Managing Director[23]

[21] Source: www.investinmalta.com
[22] Cordina, 1993
[23] Source: www.investinmalta.com

A5.3 Trade Flows

As is typical of small economies lacking natural resources, Malta's economy is highly dependent on transactions with foreign economies to earn its income and satisfy its demand for goods and services. Exports and imports each amount to around 90% of GDP. Exports consist mainly of electronic components and tourism services. The greater part of Malta's consumption, investment and intermediate input requirements are imported.

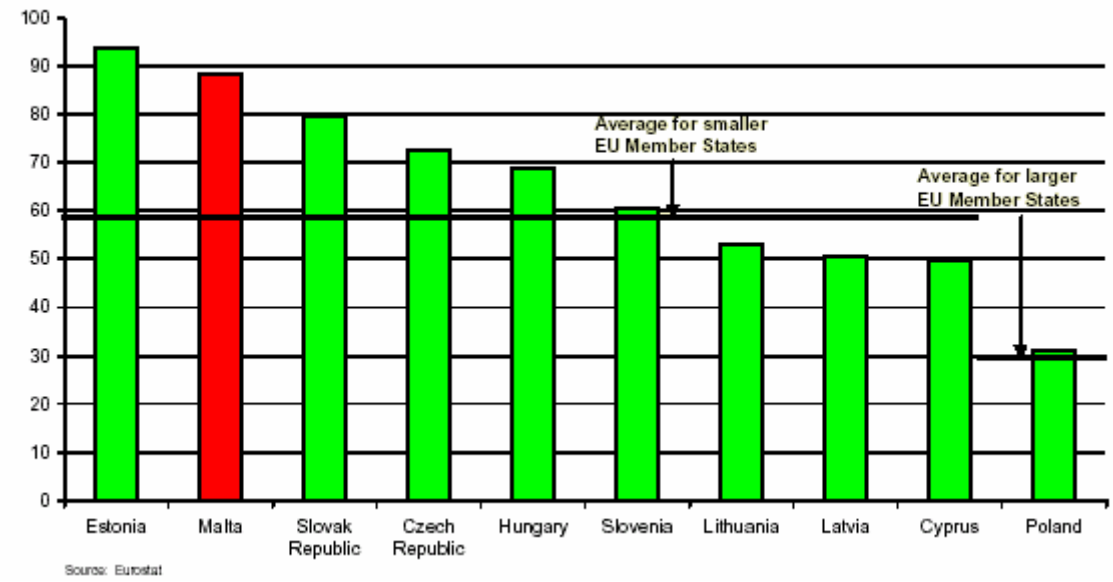

Chart A11: Trade openness in 2001[24]

Exports of high-technology products[25] have increased substantially over the past twenty years. Whereas high-tech products accounted for 14.1% of visible exports in 1980, their share of visible exports in 2000 stood at €1.87 billion or 70.6%. This surge reflects the significant rise in local exports of electronic components, as is evident in Chart A13, which peaked at €1.65 billion in 2000. Exports of computers and parts amounted to €26.5 million in the same year, while exports of scientific instruments reached €66.8 million and exports of medicinal and pharmaceutical products totalled to €22.3. Interestingly, the American and Asian markets overtook the EU market as the most important destination for local high-tech exports in the year 2000. Although still substantial, the importance of the EU for local exports of high-tech products declined during the end of the 1990s relative to the American and Asian markets[26]. Malta is in fact one of the only three EU acceding countries, the others being Cyprus and Lithuania, which exports less than 50% of its total exports to the EU.[27]

[24] Source: European Commission, 2003

[25] The definition of "high-technology products" is according to the OECD classification and is inclusive of Aerospace, Computers, Office Machinery, Electronics, Instruments, Pharmaceuticals and Electrical Machinery. Figures were compiled using the Standard International Trade Classification – SITC rev. 3.

[26] NSO News Release No. 36/2001

[27] European Commission, 2003

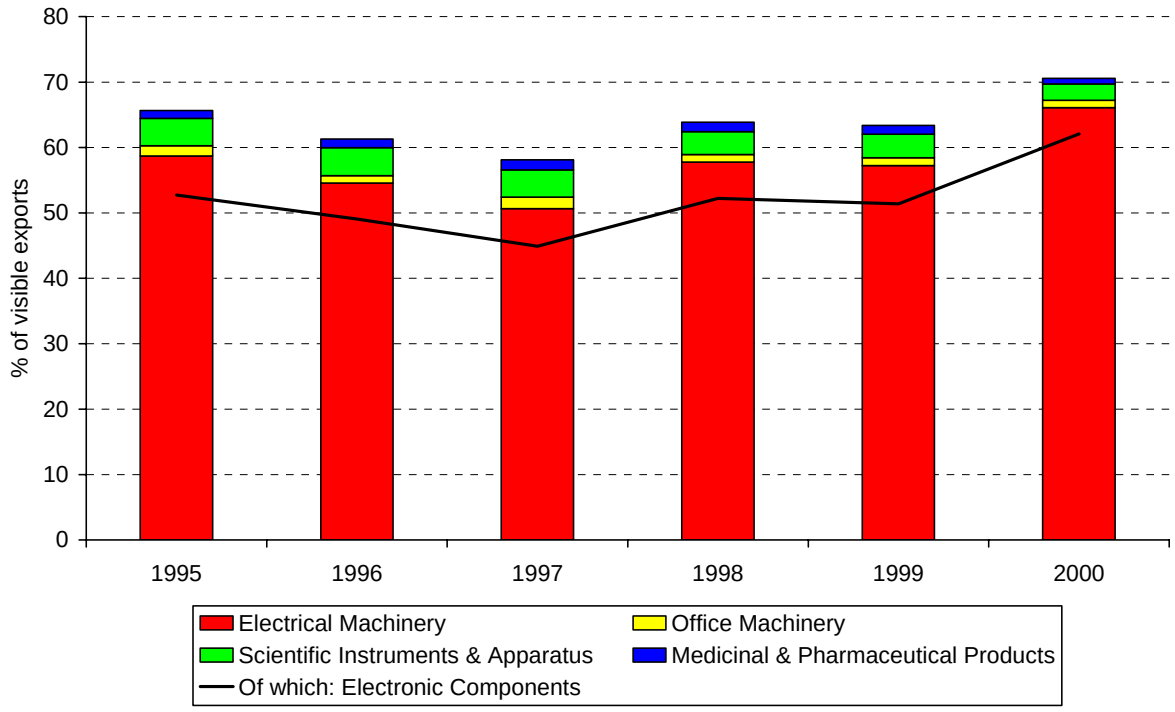

Chart A12: High-tech products in total visible exports

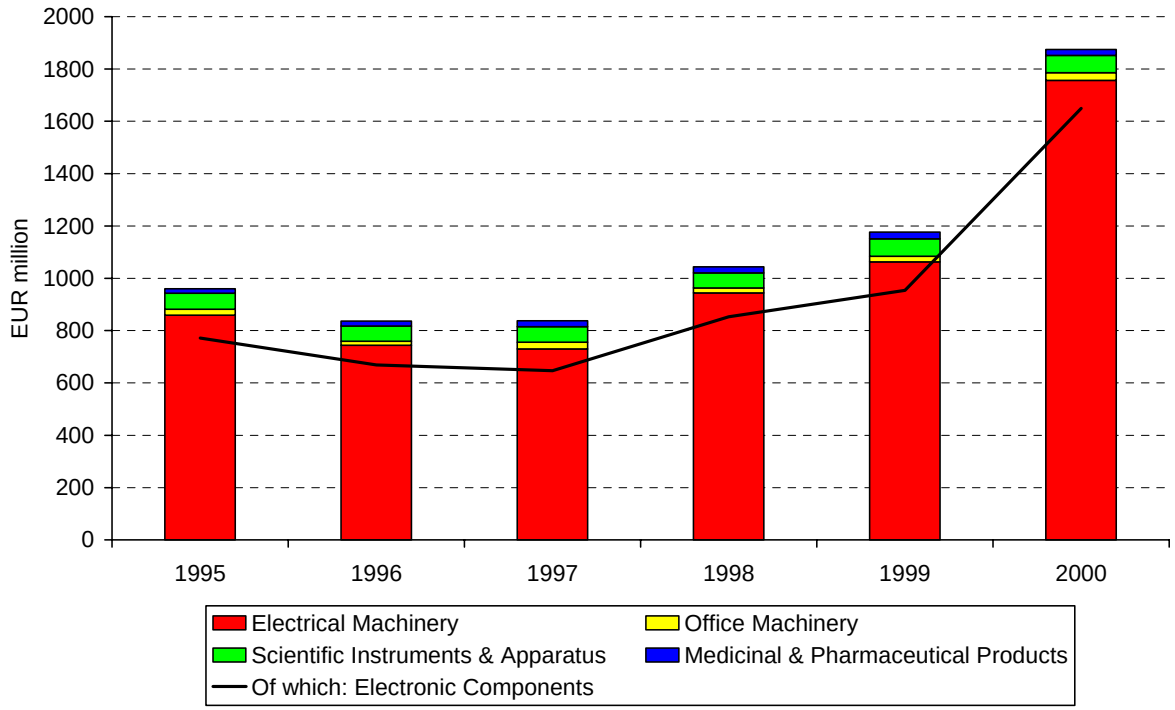

Chart A13: Exports of high-tech products

Key Points

From the ensuing assessment of the Maltese economy, it emerges that:

- Malta has a positive growth track record and good prospects for economic growth within the EU
- Malta has been able to attract considerable FDI over the years, notably in the ICT manufacturing industry
- Labour productivity is high, particularly in the export-oriented sectors of the economy

These factors can facilitate the assimilation of ICT and the development of the information society in Malta. Investment in ICT, not only in the ICT manufacturing sector where Malta enjoys a comparative advantage, but also in the emerging ICT services sector of the economy, can reinforce these strengths.

On the other hand, certain weaknesses can be identified:

- The Maltese economy is still burdened with an over-proportionately large public sector
- The dominant role that Government has traditionally played in the economy has bred a culture of state-dependence that stifles competitiveness and innovation
- Malta has lower levels of literacy than the EU-15 and most of the other acceding countries

The ongoing privatisation programme is bound to contribute significantly to the rationalisation of the public sector. Effective, target-specific national policies with respect to privatisation, business promotion and education, particularly in the fields of science and technology (S&T), are critical to overcoming human resource limitations in the shortest time possible. High literacy levels are a prerequisite to the successful development of an information society.

Malta within the EU may exploit a number of opportunities:

- EU accession implies full access to the large EU market to which Maltese businesses, that have previously restricted themselves to the local market, now have the potential to export
- The process of economic restructuring, including privatisation, is bound to increase efficiency across all sectors of the economy and promote private investment, including more FDI
- There may be significant increases in labour supply since the participation rate is relatively low, particularly in the case of females

Malta has the ambition to become an ICT hub: an ICT-driven economy and an ICT driver in the Euro-med region. The integration of ICT into the restructuring process can contribute to a more efficient economy that can effectively benefit from higher rates of participation in the labour force. Smart use of ICT can play a direct role in the attainment of higher participation rates by facilitating more flexible work arrangements in the information society.

The Maltese economy faces a number of impending threats that can hinder its sustainable development:

- Malta is still struggling to curb its fiscal deficit to sustainable levels
- The unemployment rate is highest in the under 25 age-bracket
- The Maltese economy is excessively dependent on the ICT manufacturing exports generated by a single company

The fiscal issue is one of the greatest challenges for the Maltese Government. Unemployment among the younger generation is also a matter of concern that calls for political commitment to address the existing shortfalls of the education system. On the FDI front, it is hoped that some new investment projects will reduce the economy's vulnerability to sector-specific and firm-specific shocks in future.

B. NATIONAL AND REGIONAL IS POLICIES

B1 Institutional Settings and their Influence on IS Policies

B1.1 The Ministry for IT and Investment

National responsibility for IS policies lies with the Ministry for IT and Investments, which has just been instituted following the re-election of the incumbent administration in the general elections of 12th April 2003. While the setting up of a Ministry to deal specifically with IT is unarguably a welcome step that highlights the importance that the present administration is attaching to the development of the information society and economy (IS&E), this initiative builds on what had been going on in this area in previous years. In fact, the appointed Minister for IT and Investments is the same Hon. Dr. Austin Gatt who formerly held the Ministry for Justice and Local Government under which IS policies were being formulated. The same Ministry was also given the Investment Promotion portfolio in June 2004, following a reorganisation of what had been the Ministry of Foreign Affairs and Investment Promotion for just a few months.

Box B1: Ministry for IT and Investment

In the course of writing this monograph, an exclusive interview was held with the Head of the Minister's Secretariat, Mr. Claudio Grech, who outlined the Ministry's policy and traced the development of the Ministry itself over the past few years. The following is a résumé of his comments.

Policy

In 1987, Malta had a relatively adverse stance to IT. It was thus decided that it was necessary for Government to set up a Reform Commission and to implement reforms in the telecommunications sector. This was a Cabinet decision and a need was recognised for ICT in Government to become a "vehicle for effective management and administration" These two decisions were the "prime movers" for all the IT investment that has taken place since.

This started originally with the setting up of the Management Systems Unit (MSU) as a government agency and subsequently as a limited liability company. In 1996, under a Labour administration, MSU was separated into MITTS Ltd. – the technology arm – and the Management Efficiency Unit (MEU) – the consultancy arm – a government agency within the Office of the Prime Minister.

Between 1996 and 1998 the government was considered to be "technology-averse" in the sense there was no "political championing". This is a crucial element without which advances in technology in the government sector will not materialise. IT initiatives will slowly find themselves being pushed downwards in the list of priorities.

In 1998, the Central Information Management Unit (CIMU) was created with the intention of setting up standards for ICT, developing policies and ensuring compliance of ICT initiatives within the government system. CIMU developed an

Information Systems Strategic Plan (ISSP) that basically laid out the "primary pillars" of the development of IT systems within Government. The rationale was based on the concept that via technology, Government will be able to offer a better service and manage in a cost effective manner.

The Development of the IT Ministry

At the end of 1999, when Government recognised that IT was becoming more and more relevant to society and the economy, discussions were underway between the Prime Minister and Dr. Austin Gatt, then Minister for Justice and Local Councils. The result of these discussions was that Dr. Gatt became the de facto, though not official, Minister in charge of IT from the year 2000.

The first moves in the direction of IT policy-making took place in the form of legislation concerning e-commerce, data protection and amendments in the Criminal Code to include computer-related crime. The e-government vision and strategy was established in June 2001 as government policy after a very positive response to the White Paper. This resulted in the introduction of the e-government portal and the Payment Gateway where payments for government services are enabled through the Internet. Subsequently, an e-Malta Commission was set up in April 2001 when Government realised that apart from IT in government there is the e-society and the e-economy. The raison d'être of this Commission was to address issues that where being overlooked in the areas of society, such as bridging the digital divide through the use of ICT Awareness programmes being run free-of-charge by the government, free e-mail and the Microsoft initiative.

A need has also been recognised for an ICT skill set. An initiative with ETC has failed in this respect (www.careerspace.com). Indeed, the Ministry has sought different partnerships through the vocational training institute known as MCAST. It is interesting to note that the most heavily over-subscribed courses at MCAST are precisely IT-related courses. Thus, in spite of the fact that grounding at secondary school level is limited due to a lack of teachers which is, in turn, attributed to Union salary-pressures, at a specialised training level, demand for specialised IT courses is very high. Suffice to say that MCAST had to reject around 250 students for the over-subscribed IT courses during its first year of operation. This is attributed to an IT resourcing problem.

On the other hand, Government is doing its best to meet the demand for IT skills. For example, the CISCO academy had 65 graduates in 2003 and another 50 undergraduates. This means that Malta will have a good number of IT people specialising as CISCO engineers, a valuable commodity for which there is great demand. Moreover, whereas the cost of such a course would normally cost thousands of Euros, through this initiative it costs a mere €400. There are also other initiatives being discussed at University level where IT students will also be able to take courses leading to CISCO and MS certification. A less flattering side to this commendable scheme is the high level of bureaucracy that the Ministry is facing on the University side.

The current national ICT strategy aims to bring together the public and private sectors as through a "rolling strategy", one that rolls every three years and

includes programmes and initiatives that are regularly updated. This will be in the form of three policy streams: (i) strengthen the information society; (ii) developing ICT in government; and (iii) the internationalisation of the Ministry in terms of attracting FDI within the software industry.

Privatisation

In the next few months, government policy with respect to MITTS Ltd. will be changed. While not envisaging privatisation of this particular company, a change in the outsourcing policy is being considered. This implies that, areas in which MITTS Ltd. is currently operating, such as risk management and quality control in the IT departments of the government sector, can be taken over by the private sector. The reaction to this has been that of eager anticipation on the side of the IT industry in Malta.

The Role of NGOs

An IT Advisory Board is due to be set up in 2003.[28] This will bring together organisations from both the public and private sector such as educational authorities, the MFSA, the Central Bank, the IT industry section within the Chamber of Commerce and the Unions.

The Ministry sees a particularly suitable role for the Unions since they provide immediate access to people at the other end of the digital divide. One initiative has been the provision of the ICT awareness course designs for the Unions to carry out among their members.

B1.2 The e-Malta Commission

The e-Malta Commission was set up in April 2001, with representatives from various sectors of Maltese society which were called upon to come together to drive the identification, promotion and coordination of the initiatives required for the attainment of IS&E in Malta. Its primary objective was to create an awareness of the electronic world and the benefits that Malta can derive from it. The Commission was expected to enable an open discussion, bringing together local and foreign stakeholders who are in a position to advise and assist both public and private sectors in creating an IS&E, and also give advice to Government on thematic issues in the information and communications technology field.

The terms of reference set out by Government for the Commission are the following[29]:

- Identifying quantifiable benchmarks for the development of an IS&E in Malta and monitoring the achievement of these benchmarks on an annual basis
- Promoting the creation and development of an information society via the promulgation of appropriate training initiatives both within and outside the ambit of formal education structures

[28] The National Information Society Council (NISCO) was in fact set up and had its first meeting on 26th September 2003.

[29] Source: www.gov.mt

- Recommending initiatives and programmes relative to training of human resources in specialised ICT-related professions, in order to support the IS&E as well as encourage the growth of the ICT industry in Malta
- Proposing the necessary legal framework that is required for the regulation of all forms of electronic communication
- Developing and implementing awareness programmes, both on its own and in conjunction with Government entities and the private sector, that are targeted at all sectors of the community and that will focus on the benefits and opportunities of the IS&E
- Recommending measures to increase access to information and communications technologies at homes, schools, businesses and public offices, including measures aimed at those in the disadvantaged groups
- Recommending measures to Government and working with Government institutions, such as MDC, MFSA and IPSE, and the business community towards the attainment of an information economy
- Establishing working groups and task forces to highlight specific sectoral issues with respect to IS&E and developing and proposing recommendations for action
- Working with government entities and the private sector to encourage IS&E initiatives in the delivery of the public services and information
- Monitoring trends in IT legislation overseas and recommending legislation that will establish a framework for the attainment of an IS&E
- Aligning national objectives in the attainment of an IS&E with those of the EU

The Commission has articulated the six strategic thrusts and formulated a list of strategic objectives to be focused upon during its term of office. These are laid out in its *Strategic Plan for 2001-2003* as they appear in Table B1.

Strategic Thrust No. 1: Putting in place the basic building blocks for an IS&E
SO1: Communicate and sustain an effective legislative framework
SO2: Encourage industry rollout in ICT-access
SO3: Identify e-barriers and facilitate their removal
SO4: Champion the fight against cyber crime
SO5: Implement measures to protect children from any kind of abuse over the internet
Strategic Thrust No. 2: Extending ICT usage and affordability for all Maltese citizens and businesses
SO6: Build people's trust in information and communications technologies
SO7: Champion the path towards universal ICT access in the Maltese islands
SO8: Promote reductions in ICT-access costs
Strategic Thrust No. 3: Exploiting the New Economy through the propagation of e-Commerce
SO9: Support local businesses to exploit and rapidly take up e
SO10: Extend business-to-business online commerce in Malta
SO11: Support small, medium and large business in adopting e-business and e-export
SO12: Induce all sectors of society and economy to embrace electronic payment systems
Strategic Thrust 4: First class electronic Government services for citizens and businesses
SO13: Manage the central and local agencies' path towards e-government
SO14: Promote a public sector-spread availability of e-government services
SO15: Align and prepare public officers for the new era of service delivery
SO16: Put the citizens on-line and not in line
SO17: Transform Government into a business partner
Strategic Thrust 5: Eradicating the digital divide
SO18: Expand the local e-content
SO19: Address the divide in the under-privileged sectors of society
SO20: Use ICT to improve the quality of life of senior citizens
SO21: Strive to extend the accessibility to ICT to persons with a disability
Strategic Thrust No. 6: Working towards a Centre of Excellence for the ICT-labour supply
SO22: Extend the ICT-content and relevance across all basic educational programmes and curricula
SO23: Champion the establishment of life-long ICT-learning and training standards
SO24: Strive to improve the extent and quality of the ICT-labour supply in Malta
SO25: Facilitate the participation of students in local and international research and academic programmes

Table B1: e-Malta Strategic Thrusts and Objectives

Meanwhile, Government highlighted six focus sectors to which the Commission was expected to give priority during its first term of operation (2001-2003) [30]:

(i) The extension of ICT and particularly Internet usage at all levels of society;

(ii) The spread of eCommerce in all the spheres of the business community;

(iii) The running of an aggressive public awareness campaign and effective customer-expectation management mechanisms;

(iv) The alignment of Malta's electronic policy with that of the EU, in particular the e-Europe initiative;

(v) The design and delivery of programmes addressed towards social inclusion through e-government; and

(vi) The encouragement of public-private partnerships in the eCommerce and e-government fields.

[30] Source: www.gov.mt

The *National ICT Strategic Plan* that was drafted in September 2003 builds upon earlier ICT policy documents. It was presented at the first meeting of the National Information Society Council (NISCO), which took place on 26th September 2003, and proposes the following strategic objectives:

(i) Stepping up the fight against the digital divide across all levels of society;

(ii) The promotion and extension of holistic ICT-education and accessibility to technology;

(iii) The use of ICTs to improve further the quality of life of Maltese citizens and to impact positively on the tourist experience in Malta;

(iv) The use of ICTs as an effective management tool within the public sector as an efficiency-realisation mechanism and as a vehicle for the improvement in the quality of working life of the public employees;

(v) The proliferation of the delivery of first-class, accessible and secure e-Government services;

(vi) The promotion of the ICT culture in SMEs with the objective of making them derive the benefits of introducing ICT in their operations;

(vii) The empowerment of the local businesses to gain access to the larger global market by participating in the e-business community;

(viii) The consolidation of the external ICT environment;

(ix) Making the Internet a secure place, building confidence, trust and security in the use of ICTs;

(x) Strengthening the local indigenous ICT private sector and supporting ICT entrepreneurship;

(xi) The internationalisation of the Maltese ICT industry to compete in the global environment;

(xii) The transposition of the benefits of EU membership in the attainment of a first-class information society; and

(xiii) The promotion of the role and the contribution of the Maltese information society in the global ICT.

This taller order of objectives may reflect a better understanding of the wide range of ICT factors and impacts in the IS&E, but on the other hand, there is the risk that too many words may tilt the balance between words and actions that has generally prevailed in ICT policy formulation and implementation in Malta in recent years. This *National ICT Strategic Plan* is the agenda for NISCO, which is intended to be the formalisation and the upgrading of what has been developed over the last few years. Its terms of reference are the following:[31]

- Monitoring the development of the information society in Malta
- Providing direct input to the development and implementation of the national information and communications technologies strategy
- Devising structured initiatives on specific aspects, programmes or initiatives related to the development of the information society
- Serving as a focused analytical forum on major information society themes
- Serving as a vehicle for national networking, effort convergence and synergy attainment in the development of the information society

[31] Source: www.miti.gov.mt

- Facilitating the empowerment and extensive participation of civil society in all fronts of the information society
- Ensuring that all stakeholders in the public and private sectors and in civil society are informed of the major developments in the information society in Malta
- Bringing to the attention of all the stakeholders any concerns on specific situations or emerging problems in the local and global information society developments
- Developing into an ICT knowledge-sharing platform
- Serving as the national node for the World Summit on Information Society process
- Actively participate in committees, fora and programmes of the European Union with a view of maximising the ICT-potential of Malta's membership in the Union
- Promoting and facilitating the establishment of international partnerships between members of the Council and their international counterparts

B1.3 The Malta Council for Science and Technology (MCST)

In view of the important role of science and technology, it has been Government's policy to upgrade the potential of institutions and corporations to assimilate and develop technological expertise. There have been various endeavours during the past few years with this objective in mind. Within the context of the different priorities set for economic policies in Malta, the MCST was set up as an advisory body in order to assist the Government in the formulation and implementation of a National Science and Technology (S&T) Policy, back in 1988. The National S&T Policy, published in 1994, outlines the direction of Maltese future activity in developing effective science and technology policies.

In 1995, the Foundation for Science and Technology was established as a public Foundation, to work on the implementation and coordination of national science and technology policies under the direction of the MCST. After the general elections in October 1996, the responsibility of the policy was passed from MCST to the Ministry of Education and National Culture. In 1997, the MCST Council was reconstituted with a reorganised board of directors and more representatives from industry and from the University of Malta.

MCST, which reports to the Ministry of Education, is responsible for the coordination of S&T policies at the national level. It is the organisation that manages S&T issues, mainly at a governmental policy level. Since its inception, MCST has sought to promote innovative, more open, participatory approaches to the formulation of national policies for science and technology, through the development of an extensive system of networking. The emphasis has been on involving competent actors at all levels in the policy-formulation, thus balancing traditional "top-down" approaches with more "bottom-up" trends.

MCST works closely with the following national bodies:

- Office of the Prime Minister
- Ministry of Foreign Affairs and the Environment
- Ministry of Education and National Culture
- Ministry of Agriculture and Fisheries
- Ministry of Industry
- Ministry of Public Works and Construction
- Ministry for Commerce

- Ministry of Health, Care of the Elderly and Family Affairs
- Ministry for Transport and Ports
- University of Malta
- Malta Standardisation Authority
- Planning Authority (responsible for the national management of land resources)
- Telemalta Corporation
- Telecommunications authority
- Enemalta Corporation (national energy authority)
- Water Services Corporation (national water authority)
- Malta Development Corporation (MDC) and Malta Export Trade Corporation (METCO)
- Malta Maritime Authority
- Foundation for International Studies
- Management Systems Unit/MITTS (responsible for the public service reform)
- Federation of Industries
- Chamber of Commerce
- Local Councils (on science popularisation "hands-on" exhibitions /weekends)
- Foundation for Human Resources Development

In order to broaden the consultation process in determining general objectives in S&T, MCST organises national conferences on a biennial basis, attracting the direct support and involvement of the Prime Minister, Cabinet Ministers, chairmen of national parastatal companies and leading scientists from Malta and abroad. These efforts have often been limited by insufficient funding. It also appears that at present the scope of networking between the various local institutions is very limited. There are sporadic attempts at innovation in each of the above institutions, but there is little by way of horizontal communication and feedback. Mechanisms for setting strategies and providing co-ordination and communication are called for in this respect.

MCST is the agency in charge of Malta's participation in the EU's Fifth and Sixth Framework Programme for Research and Technical Development. Such funding opportunities will be greatly enhanced following EU membership and it is important that Malta continues with the necessary preparations to ensure that full advantage is taken. This would be of great help to MCST that runs on an annual financial budget of €302,000.[32]

B2 Chronological Description of all National and Regional IS Policies

The development of national IS policies may be traced back to 1994 when the first related policy, namely the National Science and Technology (S&T) Policy, was conceived. In the same year the Information Technology Project took off. The University of Malta (UOM) introduced undergraduate degrees in Computer Science, Computer Systems Engineering and Informatics in 1996. In 1998, the Information System Strategic Plan (ISSP) 1999-2001 was formulated. The Legislative Framework for Information Practices followed a year later. A document outlining the vision and strategy for the attainment of e-government was published

[32] Ministry of Finance, 2002

in the year 2000. Table B2 gives a chronological list of these developments which will be discussed in the hereunder.

Document Title	Organisation Responsible	Legal Status	Comments
National & Science Technology Policy, 1994	Maltese Cabinet	Government and parliament decision	Not implemented
Development of Information Technology Project, 1994	MCST / Ministry of Education and National Culture	Government decision	Action Plan and strategy for the above policy
Information System Strategic Plan (ISSP) 1999-2001, 1998	MITTS	Government decision	Direction for further IT investment within the Public Service
Legislative Framework for Information Practices, 1999	Office of the Prime Minister	White paper	
Vision and Strategy for the attainment of e-Government, 2000	Office of the Prime Minister	White paper	
National ICT Strategy, 2004	Ministry for Information Technology and Investment	Government decision	Launched through the National Information Society Council (NISCO)
National Broadband Strategy, 2004	Ministry for Information Technology and Investment	Government decision	Launched through NISCO; public consultation, which closed on 14th May 2004

Table B2: Main policy documents and consultative papers

B2.1 The National Science and Technology (S&T) Policy

In 1994, Cabinet approved the National S&T Policy Document. This document identifies two key national policy objectives: sustainable development in recognition of the Rio Summit (1992) and Agenda 21[33], and the development of the Integrated Resource Management concept. The National S&T Policy was thus not oriented primarily at developing S&T for its own sake, but as a means to an end, i.e. supporting the country's sustainable development. The document states "To secure our future prosperity we cannot wait for a natural organic growth in our scientific awareness and proficiency; we have to spearhead a rapid and strategic Science and Technology penetration in all areas (institutional, educational, industrial). This process would require initially a considerable stimulus from above to combine with a diffused bottom-up approach."[34] The policy was to be implemented under the direction of MCST. Following identification of the objectives the main strategic thrusts evolved. These are:

[33] World leaders agreed on the adoption of the Agenda 21 document on the environment in the 1992 World Summit in Rio de Janeiro

[34] A Science and Technology Policy Document (1994)

- Promoting sustainable development through the building up of the indigenous S&T base and an S&T culture
- Spearheading a rapid and strategic S&T penetration in all areas (institutional, educational and industrial) by combining “top-down” and “bottom-up” approaches
- A more technologically advanced management of the country through the integrated and sustainable use of all available resources
- Attaining the level of quality assurance required by European and the highest world standards in products and services
- Setting national priority areas and ongoing re-orientation of these priorities as new opportunities arise
- Promoting increased support for R&D activity and training by increasing the number of private and public sector partnerships
- Constant upgrading of the educational system and science curricula at all levels
- Encouraging S&T prospecting and forecasting of emerging technology niches
- Developing the innovative concept of the scientific audit (reviewing S&T practices in the public sector)
- Increasing the national budgetary allocation to S&T to European levels

In general, the S&T policy development process was hindered by a number of constraints. This included the insufficient resources available to MCST to fulfil its mandate; the time lag in the legal constitution of MCST; and the lack of a support framework, in terms of a parliamentary group on S&T, scientific associations and societies, research policy institutes, and other independent bodies or NGOs. This meant that MCST had to act as a pioneer in developing the S&T policy framework and related processes single-handedly. Moreover, the policy is still being reviewed and reformulated and recommendations are being made to the government by the board of MCST as to what organisational set-up is required to implement the policy. With regards to the updating of the policy no such effort has taken place, but Cabinet approved a project called the National Research and Development Audit. This project takes stock of the progress that is being made both in the public and private sector. Up to May 2004, no official results had been published.

B2.2 The Information Technology Project

In 1994, the Government of Malta commissioned a one-year project to draw up recommendations for the deployment of IT on three principal fronts:

- Business opportunities & development
- Telecommunications infrastructure
- Education

This study was entrusted to the MCST and evolved into *Malta's National Strategy for Information Technology*. It identified IT as the necessary ingredient that Malta needed in its search for a new cycle of socio-economic growth and recommended ten strategic thrusts. At the top of the list stood the *raison d'être* of the IT strategy: "to augment Malta's profile as an international broker of services and goods".

The Ministry of Education and National Culture has been increasing its budget and in 1996 it earmarked €25,200,000, 15.7% of its budget, for the University of Malta since the majority of all Government-funded research is carried out at the University. Moreover, the MCST and the National Coordinating Unit are actively encouraging the University researchers to involve the private sector in their research projects and there is evidence that closer links are developing. In 1996, the University introduced programmes particularly in the field of information technology through the provision of courses leading to degrees in Computer Science, Computer Systems Engineering and Informatics. An Academic Audit Unit has now been set up, through which the teaching, research and other output of the Faculties and Institutes will be assessed.

B2.3 The Information Systems Strategic Plan (ISSP)

Late in 1998, the Government published its new ISSP 1999-2001 to establish direction for further IT investment within the Public Service. Its primary goal was to enable the public to use Local Councils to contact government departments and parastatal entities in the knowledge that their requests can be easily traced.

B2.4 The White Paper on the Legislative Framework for Information Practices

Traditional legislation was inadequate to support the development and widespread use of an electronic setting. In February 1999, the Office of the Prime Minister established an Inter-Ministerial Working Group to draw up an Information Practices Act. The White Paper on the Legislative Framework for Information Practices drawn up and proposed to Government by the Working Group encompassed three aspects of information practices and led to the following three bills:

- An Electronic Commerce Bill to establish the legal basis for the safe but free conduct of electronic commerce
- An Data Protection Bill to safeguard citizens from the potential abuse of their personal data through information systems
- A Computer Misuse Bill to protect the rights of the owners of valuable data and information systems.

Parliament enacted the Electronic Commerce Act and the Data Protection Act in 2002 and passed amendments to the Criminal Code to make computer-misuse a criminal offence.

These legislative developments are intended to stimulate the use and development of electronic commerce by consumers and businesses alike. Worldwide Internet use is growing very fast. Estimates of the value of global Internet commerce ranged from 1.3% to 3.3% of global GDP for 2001. This international phenomenon is also affecting trade practice in Malta where the use of the Internet as well as electronic commerce is growing too. The Data Protection Act provides the regulatory framework that is required to suit to this technology, while specific regulations on e-commerce protect both suppliers and consumers better. The government needs to work more on securing transactions online, as the general feeling among businesses is that entrepreneurs are hesitant to transact online and others are reluctant to learn how.

B2.5 The White Paper on the Vision and Strategy for the Attainment of e-Government

Government will actively promote and utilise Information and Communication Technology to the widest possible extent. The strategy to attain this mission is expressed in the White Paper on the Vision and Strategy for the Attainment of e-Government, published in October 2000 and is based on the following principles[35]:

- All Maltese will have the opportunity and the means to participate in the Information Society and the Information Economy irrespective of their financial, social or educational circumstances
- The Government will actively promote the creation of the Information Society and the Information Economy via the provision for transactional on-line e-Government Services
- The Government will provide the necessary policy, institutional and regulatory framework that is required for the successful proliferation of electronic commerce
- Businesses will be encouraged to adopt electronic commerce
- The achievement of computer literacy by all sectors of the population will be actively pursued
- The necessary measures will be taken to build a critical mass of Information Technology specialists that will be required to sustain the growth of the Information Society and the Information Economy

B2.6 The National ICT Strategy and the National Broadband Strategy

With less than one year from its establishment, the Ministry for Information Technology and Investment launched two complementary policy documents, the National ICT Strategy and the National Broadband Strategy, which lay out the plan of action from 2004 up to 2006. Both these policy documents were launched through the National Information Society Council (NISCO) that was set up in September 2003. While the National ICT Strategy is a comprehensive strategic plan that builds on earlier policy documents, the National Broadband Strategy is intended to identify the socio-cultural and infrastructural factors that can contribute to the proliferation of broadband use.

B3 The Implementation of IS Policies

B3.1 The Driving Motivations of IS Policies

The Government of Malta is determined to make the country a model for e-government and a centre of excellence in ICT. It is expected that the setting up and running of e-government will require the acquisition of substantial services from the private sector and will therefore provide the significant impetus for the development of the local IT community. In addition, the adoption of e-commerce solutions in such activities as public procurement is widely recognised as being a trigger for the widespread adoption of e-commerce in the business community. Also, on-line Government services will fuel consumer demand for Internet usage.

[35] Source: www.gov.mt

It is also believed that having the security infrastructure handled by Government will increase consumer confidence in the safety of electronic transactions.

Government's vision of Malta as an ICT hub comes at a time when the Maltese economy is experiencing an evident shift of focus from low-cost manufacturing to higher value-added services, as labour costs have hiked to levels which disqualify the Maltese Islands from the league of cheap labour countries, and standards of living have risen, increasing demand for services. The slowdown in economic growth registered in recent years can only be reverted by modernising the local business infrastructure to increase efficiency in the provision of services, and by investing in higher value-added, knowledge-based activities. These are essentially the motivations behind Government's determination to make Malta an ICT hub.

B3.2 Objectives and Results

The Maltese Government has translated its long-term vision of its electronic policy into the following set of objectives[36]:

- Use ICT to offer public services to all citizens where they want them, at whatever time they want them and over which device they want them, hence translating a traditionally inward-looking civil service into a network of organisations governed by the spirit of customer relationship management
- Use technology in Government to complement the power-decentralisation programme conducted by Government with a view of definitively eradicate any residues of the spectre of clientalism which unfortunately plagued the Government of this country for over 16 years
- Further extend the principle of citizen participation in decision-making by applying information and communication technologies to create new channels over which citizens can express their views on the decisions that are being taken on their behalf by local and central Governments
- Ensure that each and every citizen enjoys accessibility to all forms of information and communication technologies, irrespective of his or her social, education or financial situation
- Strive to engender ICT-literacy in all sectors of society from our children in the primary schools, through to the housewives who are keen to join their children in the information age voyage up to our senior citizens who 40-50 years ago struggled to build our society and preserve our values but never dreamt of something called the Internet
- Harness and exploit the gleaming opportunities that ICT and the Internet offer to our economy by expanding the geographical boundaries of a 380,000-strong market into a global community of over 560 million buyers and by creating an indigenous ICT-industry within an international business scenario
- Apply ICT to identify creative avenues in which we can complement this Government's firm commitment of enhancing the quality of life of our citizens

During 2000 and 2001, substantial progress was registered on a number of fronts leading to the attainment these objectives. Substantial government and private investment in the telecoms infrastructure resulted in a full territory coverage of fibre optic and cable network.

[36] Source: Speech by Minister Gatt at the MITTS Annual Conference, 14th November 2002

This translated into 96% of households having a fixed digital telephone line, which can be used to access the Internet. These advancements also enabled the widespread availability of ADSL and Cable Internet, though the cost of access to these technologies remains a limiting factor for widespread use. The mobile telephony market also experienced substantial growth, with over 65% of the population owning a mobile telephone by the end of 2001.

The importance of shared information had led to the development of a common database for public domain data which had a mere 700 users in 30 government departments connected to it in 1999. A government shared network infrastructure, the Malta Government Network (MAGNET), was set up to offer a profusion of applications related to health, the police, tax, GIS, works planning system and local applications. Initially, the development of IT in the Public Service was purely technology-driven and this resulted in Malta having the IT tools, but not the know-how, to manage these tools effectively. This had lead to an under-utilised culture of information technology with little information management. In some instances, processes were automated and not reengineered. The focus of the whole Public Service initiative was on backroom process and not front-end service delivery. Other problems related to the absence of legislative and regulatory frameworks, the duplication of manual and automation processes, and the low level of data-sharing. Gradually, these issues are being addressed as MAGNET is being developed into the single super information highway for the public sector and there are also plans to commercialise MAGNET and link it to cable modem transmission. MAGNET has indeed become the fulcrum of the information systems environment of the Government. It makes use of various networking technologies (including ATM, FDDI, Channelised E1 and Frame Relays) to connect onto one network all Government Ministries, departments, agencies, Local Councils, schools, police stations, libraries, hospitals, health centres, social services offices and embassies. This network allows all these entities to communicate easily amongst themselves using extremely high bandwidths of up to 155Mbps.

Resources were also invested in capacity building. A Central Information Management Unit (CIMU) was created to handle the development and implementation of Government information management standards and procedures. An Information Management Unit in each Ministry has been set up to serve as the line Ministry extension of the CIMU. These units are the primary implementation arms of e-government in the line Ministries. An e-Champion was identified in each Ministry to serve as the political champion of the e-government initiative in the respective Ministry. Another important step was the setting up of an Office of Review in each Ministry, which was assigned the implementation of all internal change management projects. CIMU has liaised with various local and international entities to set effective policies and standards to serve the entire e-Government Programme. These include e-Government Look and Feel Standards, Data Architecture Standards, a Web Development Framework and an Interoperability Framework. The challenge of e-government is within the capability of integrating various back-end systems to offer seamless joined-up public services to citizens and businesses. Interoperability will be a critical success factor in the implementation of integrated e-government services. The Government ICT-agency, Malta Information Technology and Training Services Ltd. (MITTS), has identified a shortage of skills in the area of interoperability and responded to it by re-aligning its operations to transform itself into a centre of excellence in the integration of middleware applications.

Since 2000, Government has intensified commitment and embarked on a number of further initiatives directed to establish the appropriate framework within which full e-government could be attained. A number of these initiatives consolidate past policy directions where

others seek to refine and to introduce new thrusts and strategic orientations in the light of cutting-edge developments. The e-government strategy is in fact spread over a combination of short-term and long-term policies. Initially, a small set of basic electronic transaction-based services was launched in order to mobilise the expectations of the general public in the field of e-government. Amongst the most used services were the Laws of Malta Online, the Court Judgements Online, a full GIS mapping system, on-line applications for elderly services and payments of government rents in Local Councils. A series of government services have become accessible online, including the renewal of driving licences, the submission and payment of income tax returns, and applications for examinations. A customer service website was launched in mid-November 2002 (www.servizz.gov.mt). This website provides a channel for any individual to send a complaint or a request for information to the civil service and government agencies, as well as to submit suggestions on how a government service may be improved. Around 400 public officials in various government departments and bodies have been trained to handle the suggestions, complaints or requests submitted. A reference number is automatically attributed to each one of them, allowing users to track the progress of their request or complaint on the website. In the vast majority of cases, these are tackled and solved by the department or entity concerned in a matter of days and to the user's satisfaction. Within less than three months, the online service had attracted 452 entries, of which 228 were complaints, 136 were requests for information, and 88 were suggestions. The government is confident that the portion of suggestions will be growing overtime. The aim is to develop the service into a government-wide customer relationship management system, through which government is putting into practice a policy of transparency and accountability. An online application allowing the public to order Public Registry civil status certificates over the Internet, including birth, marriage and death certificates (www.certifikati.gov.mt) was launched at the end of January 2003. This service was one of the most important e-government applications to go online so far and was the first e-government service to be developed by a private company, who delivered the application in a very short period of time despite its complexity. 90% of the transactions conducted between Government, citizens and businesses are now entirely web-enabled. The challenge is now to get people to access government services through the web rather than conventionally.

With the introduction of e-government, Government hopes to simplify the process of government services for those with Internet access, reducing queuing times at government payment centres. To rest assure the minds of users, all e-government services will not only be run over the web, but will be available at Local Councils as well. The Lands Department is setting this example for other departments where it is offering its service through Local Councils. It has stated that 50% of its transactions take place from Local Councils through the use of Internet.

Tied in with e-government there is also the m-government initiative, which involves using a mobile phone to access a number of services that are either available for e-government or services that have been implemented as stand alone for mobile phones. The m-government concept was derived from the first survey carried out by the e-Malta Commission. The people were asked what type of new government service they would prefer – be it through a call centre, computer, Local Council or mobile phone. The m-government initiative seems to have been more welcomed by the public than e-government, one reason being that in Malta there is a high percentage of mobile users and a very high rate of SMS usage. The Maltese Government has in fact decided to integrate multi-channels delivery in its e-government strategy in order to adapt to the wider diffusion of mobile phones than computers in the island. Malta is now at the forefront of the development of m-government services and it may

serve as a model for similar projects elsewhere in Europe. The first set of mobile government services was officially launched on 7th April 2003. This marks the birth of m-government, a programme to give access to government services via mobile phones and other mobile devices. Together with a dynamic public access point's policy, m-government embodies the will of the Maltese government to make its e-services accessible to all. The services available to mobile users include:

- Notification of acknowledgements and status change of customer complaints
- Notifications of court deferrals
- Notifications for license renewal to the holders of licences issued by the Trade Department, Malta Tourism Authority, Malta Maritime Authority and Public Transport Authority
- Notification of examination results for students.

A number of other services are under development. These include notification of payment of social benefits, reporting of incidents to the police and application for birth, marriage or death certificates.

While Malta has the highest rate of public Internet cafes per capita amongst the candidate countries, Government is also providing free public Internet access through Local Councils, schools, libraries, Government offices and now even web phones. The installation of web phones around the Maltese Islands took off in 2003, with the first web phone having been installed in the centre of the capital city, Valletta. 90% of all students in primary and secondary schools have access to the web, each with an e-mail address and personal web space. There is one Internet-enabled PC for every seven students – the highest rate per capita in the European Union. Secondary school leavers also have the facility to attain a full ECDL certificate. Government is partnering with major ICT-players such as Cisco and Microsoft to facilitate the establishment of specialised ICT-academies in Malta and is also offering free high-end awareness training to the members of the community. Meanwhile, Government has reiterated that, in line with the creation of an inclusive information society, every Maltese citizen will be given a free e-mail address and account.
Government considers Local Government as a kingpin in the attainment of the first-class information society in Malta. In view of this, it established a local electronic policy aimed at offering accessibility to technology and service delivery via front offices of Local Councils. Local Councils are also being used as centres for ICT-dissemination. The policy is being implemented through a partnership between Government and the Local Councils, whereby councils opting to participate in this initiative are granted a series of benefits related to the proliferation of the information society. The partnership is aimed at bringing together the principal stakeholders onto one strong platform that will enable the actuation of the national electronic policy in Local Councils and to ensure the latter fulfil their four pivotal roles in this field, which are namely:

i) Social inclusion and the elimination of the digital divide
ii) Best value service delivery satellite
iii) Champion e-democracy
iv) The public's greater take-up of ICTs.

The partnership hence aims at empowering Local Councils, providing them with the necessary capacity and a framework for action that will position them as centres of ICT excellence in their locality.

In these last four years, Government has invested over 100 million Euros in technology in Government. By the end of 2002, there were over 60 ongoing projects within the Ministry for Justice and Local Government, which was responsible for the electronic policy at the time. Government's outsourcing policy has also been very successful. In 2002, the private sector witnessed a record influx of ICT-related work especially within the e-government programme. This policy is expected to be practiced and developed further.

Communication and consultation was a key success factor in the implementation of the information society measures in Malta. The first widespread consultations were on the basis of white papers on legislation and the e-government vision and strategy, both mentioned above. The next consultation mechanism was in the form of consultative meetings with representative bodies on the adoption of the eEurope+ Action Plan. In 2001 two major surveys were carried out on the generic information society and the perceptions/expectations of citizens and businesses from the e-Government Programme. Another important stream of consultations was held internally within the Public Service, on the basis of a series of Ministerial road shows and e-government workshops. From the public consultation feedback it was evident that both citizens and businesses were seriously concerned about divulging financial information over the Internet. In view of this, Government heavily invested in a public-private partnership to set up a secure e-government payment gateway that will serve as the secure vehicle for the conduct of on-line financial transactions between citizens, businesses and Government.

The e-Malta Commission devised a consultation process aimed at bringing stakeholders together to enable them to identify their core competencies and eventually join forces to reach the strategic objectives set out in its *Strategic Plan for 2001-2003* (see Table B1). This is in line with Government's expressed belief that the extensive involvement of all sectors of the Maltese economy and society in both the development and implementation process of IS&E policies is the key factor for the successful attainment of an IS&E. It is also believed that success in this respect can only be measured on the basis of the extent to which citizens and businesses are connected and are experiencing the benefits that ICT offer.

The e-Malta Commission has indeed succeeded in bringing together a record number of organisations, including direct business competitors and traditionally insular public entities, to cooperate within one national programme with a European vision. This process is composed of a number of inter-related initiatives, among which the major ones are the following[37]:

- A number of sub-committees and task forces were set up to handle specialised areas of most of the strategic objectives
- A call for the general public was issued to encourage individuals to participate in the consultation process. After a profiling exercise, each applicant was integrated into an existing sub-committee or task force
- A structured dialogue with the primary stakeholders, including the Malta Chamber of Commerce, the Ministry of Education and the Malta Communications Authority (MCA) on the attainment of the information society, was set up and maintained. The dialogue is based on mutually agreed tangible targets and not on conceptual planes

[37] Source: www.emalta.gov.mt

- An internet service provider (ISP) group was set up and maintained. All ISPs accepted the Commission's invitation to join forces with it to disseminate the accessibility and the usage of the Internet
- An ICT employers' forum was set up and maintained
- An e-Councillor forum was set up and maintained. Each Local Council in Malta was requested to nominate an e-Councillor as an elected representative to assume the championing role of ICT in the respective locality

The e-Malta consultation process gains much more relevance and importance when it is closely coupled with the parallel e-government consultation process and within the entire framework of the eEurope+ consultation exercise. E-government is, in fact, one of the main priority areas of the eEurope action plan. Malta has lately been invited by the European Commission to move from the programme eEurope+, dedicated to developing the Information Society in applicant countries, to the eEurope programme dedicated to Member States, one year ahead of its formal accession to the EU, together with Slovenia and Estonia[38].

Moreover, through the ICT-forum that has been established, the e-Malta Commission and the Employment and Training Corporation have joined forces to bring decision-makers in educational institutions and representatives of the ICT-industry around one table. This forum is to serve to identify and develop training programmes that react rapidly to the actual ICT requirements of the private sector. The measures being taken by the e-Malta Commission to promote an information society and economy in Malta is another major initiative intended to promote information society objectives.

Meanwhile, MCST has developed innovative approaches in developing the S&T policy framework and related processes on the basis of intuition and ongoing policy-learning rather than as part of a previously drawn up plan or strategy. MCST has embarked on a science popularisation programme, with the aim of familiarising the general public, especially students, with the world of science and thus encouraging the pursuit of careers in the fields of pure science and its applications. MCST is also working on a technology foresight. This entails looking at different possible future scenarios, which are based on sectoral analysis of upcoming possible challenges, and seeing how resources can be prepared for these challenges. MCST is promoting the setting up of an IRC (Innovation Relay Centre) in Malta. An IRC will definitely benefit the local industrial community. The proposed project will initially be set up in partnership with the Institute for the Promotion of Small Medium Enterprises (IPSE), Malta Development Corporation (MDC), and Malta External Trade Corporation (METCO), in order to maintain focus on commercialisation of technologies. At present, there are 68 IRCs in 30 European countries, including Israel. They were set up in 1995 under the Fourth Framework Programme. Their function is considered crucial in an increasingly knowledge-based economy, where competitive advantage is difficult to maintain in a scenario that is rapidly changing. It is not enough to engage in scientific research. The application of that research to create products and services, which can sell, is the necessary outcome. Since Malta has a limited R&D capability, it is all the more important for our SMEs to be assisted in sourcing appropriate technologies.

MCST will be driving the initiative, offering contacts into the European IRC network, office facilities, and administrative back up. MDC will be seconding a senior member of staff who is

[38] See Interchange of Data between Administrators (IDA) Website

very knowledgeable in this area. METCO will be offering IT expertise and shared equipment. IPSE will be vital partners, on account of their interest in and knowledge of the local SME base. The IRC could also contribute to the success of IPSE's Business Incubation Centre.

B3.3 The Institutional Setting Behind the Policies

By international standards, Malta was a late-starter in information management. In 1987, the new Government brought with it a vision to drive Malta into the European Union and Malta embarked on a Public Service programme based on institution-building and the use of information management to engender change. To promote this process, the Management Systems Unit (MSU) was set up as a limited liability company. MSU's Information Systems Division drew up an ISSP that introduced the concept of change management with IT in 1990. This ISSP lead to the introduction of over 4,000 PCs in the public sector, which, with an estimated 12,000 knowledge workers, translates into an average of 3 workers per PC. PCs were also introduced in schools and information management was brought into the curriculum. In 1996, the new Labour Government internalised MSU's change management division into the government structure and the technology element of MSU was left as a limited liability company.

CIMU was eventually set up within the Office of the Prime Minister (OPM), operating through the office of the Permanent Secretary, OPM, under the direction of a Chief Information Management Officer. The concept for the establishment of CIMU was proposed in the 1999-2001 ISSP for the Public Service, which Cabinet approved in November 1998. Subsequently, CIMU was established by Government in February 1999 to:

- Provide leadership and vision for ICT in the Public Service
- Promulgate policies and standards on the use and application of ICT in the Public Service
- Ensure compliance to such policies and standards as well as carry out value-for-money reviews on investment made in ICT to date

The purpose of CIMU is to regulate and give strategic direction to the establishment of information systems within the public service as well as setting up an Information Management Unit within each ministry. CIMU is focusing on information-sharing, developing the standards and regulatory framework, value for money audit returns on those investments and consolidating and maximising existing information systems. It is organised into five departments, which are the following[39]:

1. The ICT Governance Department, whose purpose is to establish the ICT policy and standards framework within the Public Service, and where appropriate for the broader Public Sector and government agencies. The ICT governance framework is defined to be all encompassing, in that it does not create artificial differentiation in terms of singling out and separating e-government and other ICT policy areas from the holistic ICT environment. This department is also responsible for the articulation of the ICT architecture. With the enactment of the Data Protection Act, data and information architecture cannot be divorced from privacy issues. In fulfilling this function, this department will work with the Office of the Director General, OPM, which is

[39] Source: www.cimu.gov.mt

responsible for data protection compliance within the Public Service, to facilitate the achievement of the data protection implementation and compliance process in relation to ICT within the Public Service.

2. The Strategy and Planning Department, which is directed towards the articulation of the macro ICT vision and strategy and also towards communication and dissemination of the strategic and governing ICT framework across the Public Service. This department is to draw up an ICT strategy formulation and ICT investment assessment methodology and integrate both methodologies and related processes within the newly set up Information Management Offices, thus ensuring an integrated approach towards ICT within the Public Service. In fulfilling this function, CIMU will continue to play the leading role, in conjunction with the Budget Office at the Ministry of Finance, with regards to formulating recommendations to the Office of the Prime Minister and the Ministry of Finance respectively in relation to the annual ICT ministerial budgets. A primary assignment which this department has embarked on the articulation of an ICT Strategic Plan for the Public Service for the period 2003 - 2005.

3. The Knowledge Management and Communications Department. Knowledge Management (KM) is a term that describes the systems that an organisation uses to acquire, create, capture, store and share knowledge. This new department was created in January 2003 to lead the introduction of KM in the Public Service. It is developing KM concepts in CIMU and the Public Service and formulating strategy for enterprise content management and electronic records management in the Public Service. It is also responsible for the management of two key corporate websites of the Public Service: the Government Portal (www.gov.mt), which was launched in 2002, and the corporate intranet. The www.gov.mt portal is the formal Government of Malta access point to electronic services and e-government. Amongst other facilities, the portal comprises a large number of government services and also an 'A to Z' Directory with links to all government ministries, departments and entities. The portal is being continuously updated and enhanced, and the Portal and Content Management Unit manages the feedback that is received through the portal itself. Corporate data management is also within the department's mandate and for this reason the department is the business owner of the corporate data repository. This Department has also been entrusted with the national co-ordination of the EU's Interchange of Data between Administrations (IDA) programme.

4. The Information Security Department. In January 2003, the Prime Minister designated CIMU as the InfoSec Authority for Malta. The InfoSec Authority is responsible for:
   - Ensuring that procured security products used for communication and information systems are certified against acknowledged criteria by an appropriate international evaluation or certified body
   - InfoSec education and training at various levels of personnel within the Authority and within the government departments and for updating users on InfoSec issues
   - Providing users and security/system administrators with security operating procedures
   - Requesting security screening from the National Security Authority of personnel dealing with communication and information systems

5. The Compliance and Agent Management Department, which has two major activities. Firstly, there can be no ICT governance framework if there is no entity responsible for its attainment. Thus, achieving compliance – either by communication, enforcement or corrective action – is a critical component of the CIMU philosophy. Secondly, CIMU delegates a number of its process roles stemming from ICT policies, such as auditing and core operational activities to constituent agencies, including MITTS Ltd. The management of the agent and the related operational activities, however, require focused management and this constitutes a fundamental task of this department. To fulfil these functions, a number of teams were set up with specific terms of reference, as follows.

a) Information Management Officers' (IMOs') Forum:

- To enable CIMU to communicate to IMOs corporate initiatives underway and their status
- To enable CIMU to obtain feedback from IMOs on corporate assignments prior to formal submission for OPM approval
- To enable CIMU to discuss with IMOs issues relating to CIMU activity and ICT in general
- To enable IMOs to provide feedback to CIMU on ICT matters across the Public Service
- To enable IMOs to discuss with CIMU issues relating to IMO/CIMU/agent activity and ICT in general

b) Corporate Architecture Team:

- To research and document the ICT architectures currently in use in systems across the Public Service
- To pursue opportunities for the integration of existing and new architectures into a corporate ICT architecture for the Public Service
- To identify dependencies between existing and proposed information systems, both internal and external, assess their impact on the architecture, and advise on consequent changes to the corporate architecture
- To collaborate with other CIMU Teams in the definition of the plan for the development of standards required for the implementation of the architecture and their enforcement

c) Policies and Standards Team:

- To solicit user and private sector input in the formulation and review of the Public Service ICT policies and standards
- To propose priorities relating to the ICT governance policy and standards programme of works to be adopted
- To review and propose amendments to Public Service ICT Governance policies and standards
- To ensure that such policies and standards are necessary, relevant, open, realisable and implementable

d) ICT Security Team:
   - To participate and shape the design of a security strategy for the Public Service
   - To steer the implementation of the security strategy across the Public Service
   - To review ICT security policies and standards prior to submission to OPM for approval
   - To issue best practice, policies, standards and guidelines to Public Service departments
   - To perform management reviews and audits of security framework within the Public Service

e) Investment and Planning Team:
   - To research and document the existing ICT investment regime across the Public Service
   - To establish a common methodology for the appraisal of the costs, benefits and risks of planned ICT investments
   - To establish priorities for investment in ICT across the Public Service, mainly on the basis of the ISSP and the ICT plans submitted by Ministries
   - To formulate holistic advice to Government on the size and apportionment of all ICT-related budgets

In March 2001, CIMU issued policies and standards related to government website designs, hosting and maintenance, and the use of generic e-mail accounts. Furthermore, upgrade of software and hardware took place so as to secure the government's IT network (MAGNET), which interconnects all government ministries and departments.

The increasing use of MAGNET as well as the attainment of e-government has made the government invest substantially in projects related to the MAGNET. These included:

- A technology audit, directed towards the physical network, network usage and service provision
- A new design for Remote Access Service Facilities, an exercise aimed at providing MAGNET users with improved remote access via the telephone line. In this sense, modem speed was increased to 57.6k with the number of modems increased 15-fold
- The revamping of MAGNET, where MITTS is on an ongoing basis researching and planning upgrades to the MAGNET to allow for the provision of enhanced current services
- Storage Area Network, where MITTS is seeking to procure a networked storage solution, whereby all storage will be securely located centrally

Meanwhile, Government has undertaken a number of new initiatives on on-going strategic and corporate projects such as the VAT system, the Inland Revenue system and Departmental Accounting system. These included:

- The Web Development Framework, which is a technical specification of the platform that is to be used for the deployment of an initial set of 10 flag-bearer e-government services. The Framework will facilitate the provision of a variety of e-government

services over the internet ranging from information-based to transaction-based, in services over the internet, including form downloads and electronic payment

- Phases 1, 2 and 3 of the automation of the Tax Compliance Unit (TCU) - where within the first phase of the project a computer network with MAGNET connectivity was installed that enabled the day-to-day running of the TCU. This enabled the TCU to initiate the process of defining its working policies and operational framework. During the second phase the TCU was in a position to communicate electronically in "read-only" mode with main sources of data providers such as VAT, Vehicle Registration, Common Database, Department Accounting System, Registry of Companies and the Capital Transfer Duty

CIMU is to undertake proof-of-concept studies and pilots prior to the submission of recommendations relating to new ICT Policies, Standards and Technologies. In this regard, CIMU has entered into an Agency Agreement with MITTS Ltd. for the use of its ICT Laboratory for such purposes. MITTS Ltd. was set up to embark on a wide-ranging programme of public service reform through the introduction of modern technologies and systems. It has a number of objectives, including the development of an IT culture within the public service by establishing and maintaining an information technology infrastructure for the Government. A key focus of its work is the expansion of MAGNET, the Government's Wide Area Network, as well as the development of other information systems and their successful implementation. Another important aspect of its work is to ensure that the maximum level of technology transfer takes place through intensive training (hand on and classroom) in Systems Design methodologies and Systems Programming and other relevant techniques. The work continues with the implementation of an e-government programme currently under way.

B3.4 The Commitment of Private and Public Actors

In 2001, Government issued an international call for proposals for the establishment of a strategic partnership for a period of not less than seven years to design and implement e-government services in the country. Following an extensive evaluation process, Government, on the recommendation of a specially appointed adjudication team, designated a consortium led by Compaq as the preferred consortium for the undertaking of negotiations directed at leading to the setting up of the strategic partnership, in January 2002. Negotiations with the same consortium started in March 2002 and were concluded the following October. On the basis of the recommendations of the negotiation team, Government eventually concluded that it would not continue with its efforts to establish a strategic partnership with the consortium or with any other third party, in spite of the fact that the consortium showed a genuine commitment to participate in this partnership and to bring value to Malta through its participation. This decision was prompted by the rapid technological advancements in the field of e-government and the constant changes in the ICT industry itself, which supported the notion that a different approach to the initiative would be more beneficial in the long-term.

In fact, early in 2003, the Maltese government announced that it had dropped the idea of entering into a single strategic partnership to set up e-government services and it would instead forge individual alliances with several major international firms on a number of different projects. This strategy creates scope for entering into 'best of breed' partnerships and 'twinning alliances' with major international firms, as well as leading local firms, on specific e–government related initiatives, with the aim of gaining access to cutting-edge e-government

technology, proliferating the information society in Malta and strengthening the entire indigenous ICT industry. Government believes that the recently adopted outsourcing policy in the e-government programme was a great success and the local ICT private sector has certainly proved that it can meet even the most stringent ICT-development quality standards. In this respect, Government is expected to ensure that, as it accelerates its outsourcing efforts, the local ICT industry is an active player in the path towards the attainment of a first class e-government model in Malta, with a view to engendering further the local private sector in line with the objective of establishing Malta as a regional ICT centre of excellence. In this regard, it is pertinent to note that Malta has been singled out by the World Economic Forum in its *Global Information Technology Report 2003-2004* as one of the few middle-income countries which have attained a high level of sophistication of e-government. The only other middle-income country that has attained the same level among current EU Member States and Acceding Countries is Estonia, according to the same report.

B3.5 Specific Important Actors

With a view to reaching its ambitious IST goals, the Maltese Government has signed a wide-ranging long-term partnership agreement with US software giant Microsoft Corporation early in 2003. Under this arrangement, Microsoft will provide direct technical and financial assistance for the development of ICT within the public administration. The Maltese government will also be one of the first in Europe to enrol in Microsoft's Government Security Programme, which is a new initiative that was launched by Microsoft in January 2003 that provides participating governments and international institutions with access to Microsoft's source code, with a view to improve the security of their software. The Russian and British governments have already signed up to the programme.

The agreement between the Government of Malta and Microsoft was reached following months of intensive discussions and sealed by the signing of a Memorandum of Understanding. The discussions were mainly focused on the rapid expansion of the immense potential of Malta to establish itself as a regional centre of excellence for software development especially now with its full accession to the single European market. This move is expected to attract a number of independent software vendors (ISVs) to set up their operations in Malta hence contributing to the creation of more opportunities for Maltese youths in Malta. Microsoft agreed to invest heavily in Malta and in Maltese students and employees with a view to being a key player in the further development of the country's information society and economy. The agreement covers a number of areas of cooperation and will be strongly contributing to the electronic vision established and developed by Government during the last two years. The agreement covers several areas:

1. First technology centre of excellence (TCE) in the region: local and foreign software development companies will have access to the source codes of the latest releases of Microsoft operating systems, access to the global marketing and technical support networks and a host of other related services to be able to build their applications more effectively and market them successfully. The TCE will be open both for local software development companies and also foreign ones. Microsoft will be putting its closest-guarded secrets in the TCE, namely its source code and a high degree of its intellectual property. The TCE will generate wealth in real terms for Malta in two direct ways:

a) Local software houses: If a local company succeeds in developing a product based on Microsoft products and manages to sell it and support it through the Microsoft channels, the returns are enormous given the global reach of the multi-national corporation;

b) Foreign independent software vendors (ISVs): These can be either charged for using the TCE or the centre will share in the revenue realised from the successful development and sales of the developed product. Moreover, ISVs setting up operations in Malta will be also opening up a large number of employment opportunities for Maltese IT specialists. It is pertinent to note that currently, a large number of foreign ISVs are migrating their applications from the Windows 2000 platform to the Windows XP environment. This offers a unique and timely niche that Malta can tap, especially following full EU membership.

2. The Government of Malta will be one of the first governments in Europe to be enrolled in the Government Security Programme. This will provide a wide and invaluable range of technology-related benefits to Government's ICT agencies including access to source code and expansive disclosure of Microsoft technical information. These tools will enable Government to step up the efficiency and security of its internal and e-government systems. They will also provide unique research and development opportunities for employees within MITTS Ltd.

3. In its bid to eradicate the digital divide and to boost the ICT skills of Maltese students, Microsoft will be subsidising over 98% of the cost of Microsoft Office XP Professional and Visual Basic Studio software. Apart from the software itself, Microsoft will be also providing the full upgrades of newer versions in the following three years. Microsoft accepted the Ministry's request to make this subsidy available for all Maltese students in primary, secondary, post-secondary and tertiary education – a headcount of over 70,000 students. Normal retail prices of similar packages are in the region of €500 and €875. Under the subsidy arrangement, students would pay a nominal price of about €7.50 for each of these packages.

4. The installation of the latest version of an educational package in the form of an electronic interactive encyclopaedia, Microsoft Encarta, in each classroom in primary schools, computer laboratories in secondary schools, public libraries and Internet centres in Local Councils.

5. The localisation (translation and customisation) of Microsoft Windows XP into the Maltese language. The next releases of the XP operating system and Microsoft Office will include Maltese as a standard language.

6. The setting up of a Microsoft IT Academy in Malta offering over 25 high-end training specialisations and certifications to Maltese students and employees. The Academy will be offering training in the University of Malta, the Malta College of Arts Science and Technology (MCAST), the Swatar Training Centre and also at the Employment and Training Corporation (ETC). Microsoft will be providing all the necessary software and training expertise.

7. A programme of cooperation in making ICTs more accessible to persons with some form of disability. This cooperation will be in the form of direct assistance to individuals with disabilities via the provision of selected software at a heavily

subsidised price and also in the form of the development of specialised software for persons with visual and/or hearing impairments.

8. The establishment of a fellowship in Governance between the Institute of Public Administration and Management at the University of Malta and Microsoft, whereby Microsoft will provide direct technical and financial assistance for the development of ICT governance within the public administration.

9. An unprecedented joint effort to establish Malta as a best-practice location for the protection of Intellectual Property Rights (IPRs), hence further enhancing the country's image and reputation as a software development hub. The protection of IPRs is a critical success factor in the positive development of any software development industry. It is mutually agreed that at this specific point in time, in which the global ICT industry is facing budgeting constraints and serious security threats, Malta could be promoted as a country which strongly respects and actively protects intellectual property rights. Microsoft will be providing software, equipment, training and continuous technical support to the key Maltese agencies involved in this effort.

10. Microsoft will be employing their first Maltese employees in Malta. The first position to be created is that of the Business Development Manager who will be primarily attracting international business for the technology centre of excellence.

Whilst it is difficult to quantify the exact total value of the agreement, from a conservative calculation, it is estimated that Microsoft will be investing over €51 million in Malta and in Maltese students over a period of three years. Microsoft has expressed its satisfaction that the experience with the Government of Malta was extremely positive and that the framework agreement reached with Malta would serve as an excellent launching pad for the country's software development industry. The rationale underlying Microsoft's strategic decision to invest so heavily and aggressively in Malta is attributed to three primary factors, namely, the common long-term ICT vision of the Government of Malta and Microsoft, the rapid development of the Maltese information society and Malta's accession to the EU.

Key Points

From this overview of the development and implementation of national IS policies, it is evident that Malta has achieved quite a lot in a relatively short span of time in this respect. Importantly:

- The Government of Malta is committed to making the country a model for e-government and an ICT centre of excellence
- Although Malta started late in information management, it has caught up remarkably well over the past two years, registering progress on all fronts, including the legislative framework
- Both local businesses and the Maltese public have responded positively to the initiatives led by Government and the e-Malta Commission to promote the development of the IS&E across all sectors of the Maltese economy and society

These factors militate in favour of further development of the IS&E in Malta and suggest that the ambitious IS goals that Government has set for this country may be well within reach.

Unfortunately, policy implementation has not been effective in the wider S&T context. Notably:

- The national S&T policy, which could have served as a backdrop for the comprehensive development and assimilation of ICTs, was never implemented
- MCST, the entity responsible for overseeing the implementation of the national S&T policy, has not been given adequate resources to fulfil its mandate

EU membership is expected to give rise to several opportunities for funding for MCST, but Government needs to take immediate action to realign the national S&T policy and to empower its long overdue implementation such that Malta may be able to take advantage of these opportunities to the full.

Indeed, the prospects for Malta as an IS&E within the EU look favourable and effective policymaking can greatly contribute towards enhancing these prospects. More specifically:

- Government's successful outsourcing policy offers ample scope for further development of the local ICT industry, particularly the ICT services sector, and could stimulate private sector investment and innovation
- The wide-ranging long-term partnership agreement that the Maltese Government has secured with software giant Microsoft promises a wealth of opportunities for technology acquisition that would substantially upgrade the country's technical human resource base
- The IS&E public consultation process that is currently underway could promote the formation of new partnerships that would provide an opportunity for relatively small organisations to pool in resources into extensive projects and be competitive even internationally

Malta really has the potential to become an ICT centre of excellence. Its exploitable strategic location at the southern periphery of the European Continent with easy access to Northern Africa and the Middle East could contribute significantly to this.

On the other hand, Malta faces some constraints that can hinder the sustainable development of the IS&E:

- Malta carries a legacy of lack of innovation and limited R&D capacity
- While Malta has invested in capacity building over the last couple of years, it may still fall short of an adequate supply of specialised resources to be able to keep up the pace in the highly dynamic ICT world.

Both Government and the private sector can help bridge critical gaps by entering into partnerships with leading international firms in the ICT industry.

C. INDUSTRIAL DEVELOPMENT AND COMPETITIVENESS

C1 Industrial Production

Analysis of the industrial production in Malta is hampered by the limited availability of industry statistics. To date, industry statistics based on the NACE classification have only been published for the years 1995 to 1998[40]. The sectors that are covered by these statistics, which are listed in Table C1, are grouped into three main categories, namely mining and quarrying, manufacturing, and construction.

Mining and Quarrying
14: Other mining and quarrying
Manufacturing
15: Manufacture of food products and beverages
16: Manufacture of tobacco products
17: Manufacture of textiles
18: Manufacture of wearing apparel; dressing and dyeing of fur
19: Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
20: Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
21: Manufacture of pulp, paper and paper products
22: Publishing, printing and reproduction of recorded media
23: Manufacture of coke, refined petroleum products and nuclear fuel
24: Manufacture of chemicals and chemical products
25: Manufacture of rubber and plastic products
26: Manufacture of other non-metallic mineral products
27: Manufacture of basic metals
28: Manufacture of fabricated metal products, except machinery and equipment
29: Manufacture of machinery and equipment n.e.c.
30: Manufacture of office machinery and computers n.e.c.
31: Manufacture of electrical machinery and apparatus
32: Manufacture of radio, television and communication equipment and apparatus
33: Manufacture of medical, precision and optical instruments, watches and clocks
34: Manufacture of motor vehicles, trailers and semi-trailers
35: Manufacture of other transport equipment
36: Manufacture of furniture; manufacturing n.e.c.
37: Recycling
Construction
45: Construction

Table C1: NACE Classification for Industry Statistics

[40] Prior to the adoption of NACE, industry statistics were compiled according to the International Standard Classification of all Economic Activities (ISIC).

C1.1 The Structure of Industrial Production

Industrial production at current market prices increased by an average of 2.7% annually between 1995 and 1998, surpassing €2.34 billion in 1998, as can be seen in Chart C1. Increases in gross output were mainly due to increases in the output of the manufacturing sector which accounts for over 90% of industrial production, and particularly in the NACE 32 sub-sector of manufacturing which accounts for around 40% of industrial production. Most of the output of this sub-sector is generated by a single company involved in the production of electronic chips, namely ST Microelectronics. Chart C2 illustrates the gross output volume indices for the main sectors of Maltese industry as well as the NACE 32 sub-sector. Apart from the electronics sub-sector (NACE 32), other important sub-sectors of Maltese industry are food and beverage production (NACE 15), clothing (NACE 18), furniture (NACE 36), and construction (NACE 45). The contribution of each sub-sector to gross output in 1998 is illustrated in Chart C3.

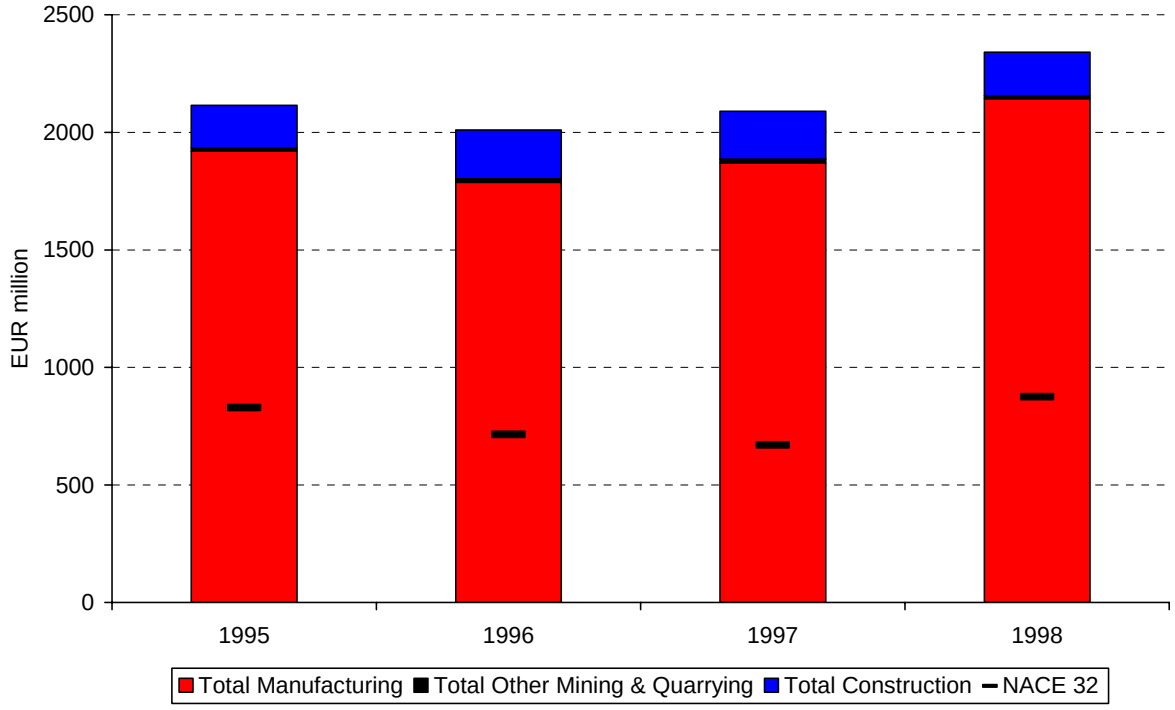

Chart C1: Gross output

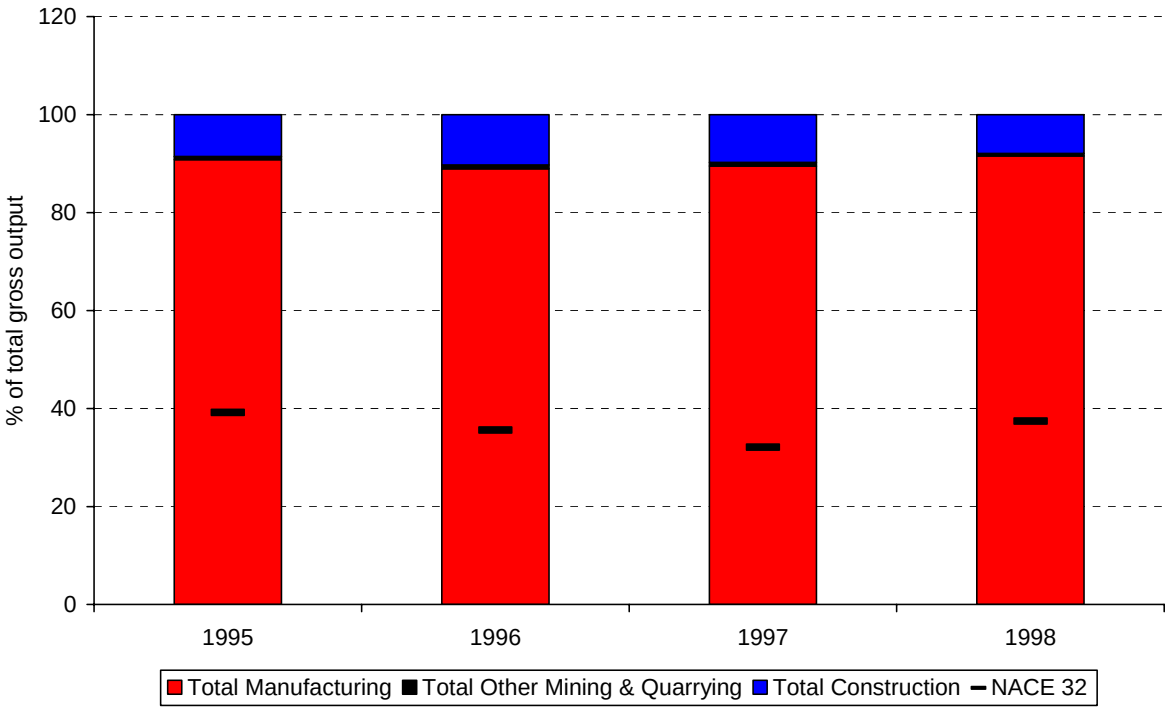

Chart C2: Gross output volume indices

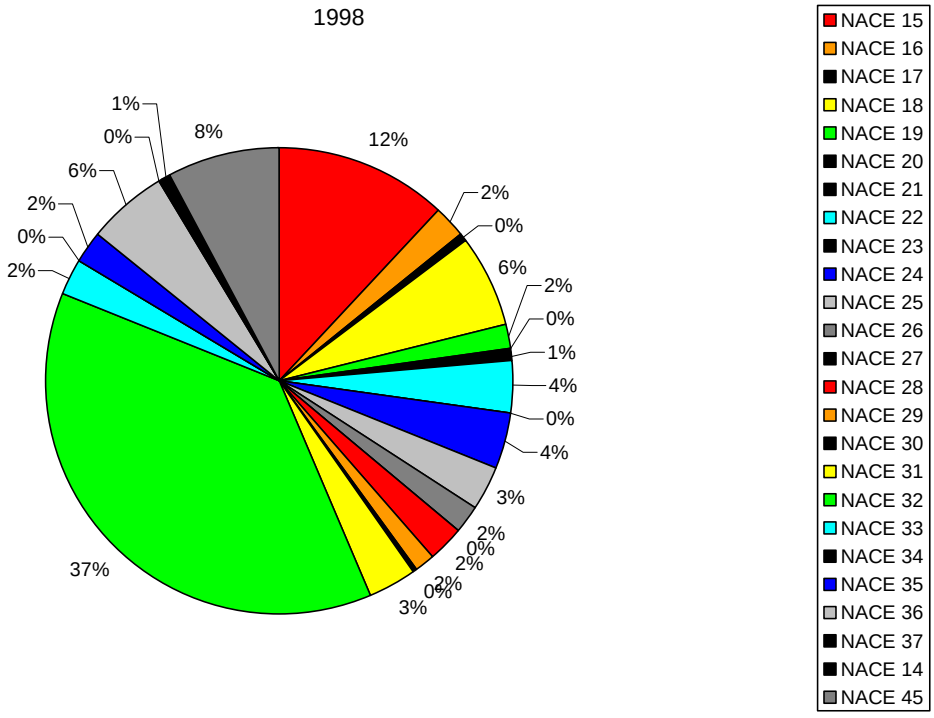

Chart C3: Sub-sectoral gross output volume indices

In terms of employment figures, the structure of Maltese industry is more balanced. The electronics sub-sector (NACE 32), which produces 40% of gross output, employs a mere 8% of industrial employees. The sub-sectors that generate most employment are food and beverage production (NACE 15), clothing (NACE 18), furniture (NACE 36) and construction (NACE 45), with the latter sector topping the list at almost 4,000 jobs.

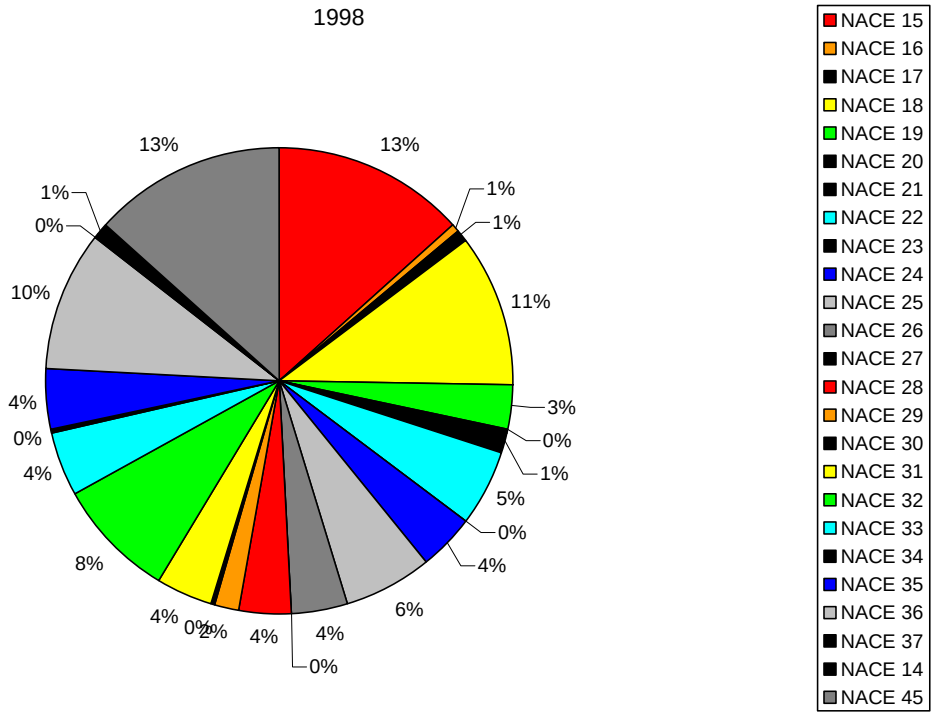

Chart C4: Sub-sectoral employment

Clearly, there are marked differences in value-added per employee across the various sectors of Maltese industry. Chart C5 shows the value-added per employee in each sub-sector in 1998. As expected, the electronics (NACE 32) sub-sector has the highest value-added per employee at €53,700 per employee, followed by tobacco production (NACE 15) at €50,005. As a result of the nature and volume of activity in the electronics sub-sector, the percentage of total value-added in manufacturing generated by the four high-technology industries, namely pharmaceuticals (NACE 24.21), office equipment (NACE 30), telecommunications and related equipment (NACE 32) and aerospace (NACE 35.3) is a substantial 22.4%, compared to the EU-15 overall mean of 8.2% that emerges from the Innovation Scoreboard 2002.[41]

[41] Micallef & Restall, 2002

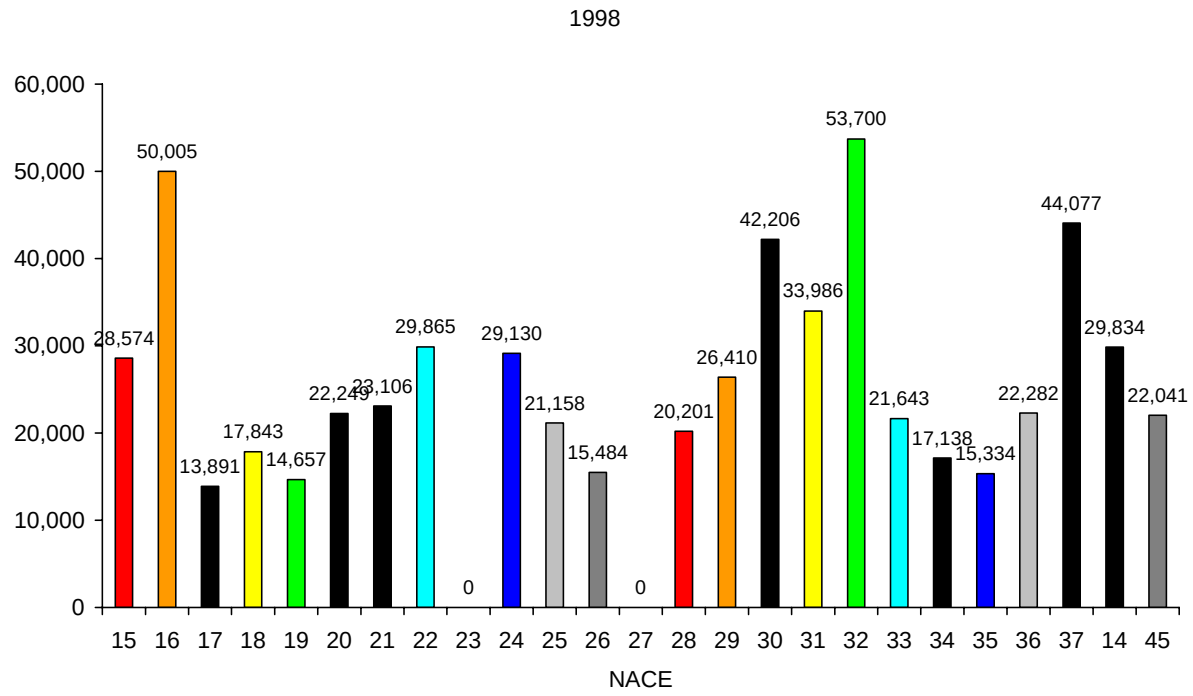

Chart C5: Sub-sectoral value-added per employee

C2 Industrial Development

Until some 40 years ago, Malta's main industrial activity was based on ship repair. Malta was at the time an important naval base due to its central position in the Mediterranean. Agriculture was widespread and most of our manufacturing outlets were small family run concerns. The winding down of the naval base meant that thousands of workers faced unemployment. The only options available were the industrialisation of Malta and the parallel creation of a tourist industry.

The promotion of industrial development was entrusted to the Malta Development Corporation (MDC), which is an autonomous government agency responsible for attracting and supporting FDI in Malta. Founded in 1967, MDC has since set up its own representative offices in Milan, Stuttgart and Munich. It also has a number of representatives in other countries such as the USA and Japan. Along the years, Malta has welcomed many companies from a wide range of sectors including light and heavy engineering, electronic components and assembly, plastics, pharmaceuticals, software and textiles. Today, the country has a thriving and profitable industrial sector, spread across ten industrial estates throughout the Maltese Islands, which generates 23% of GDP and one in every five jobs. Over 200 foreign companies in the engineering, electronic components and assembly, telecommunications, software, rubber & plastics, pharmaceuticals and medical products are operating profitably in Malta, including some world-renowned names such as ST Microelectronics (Malta) Ltd., Dowty O Rings [Dowty Automotive (Malta) Ltd], Baxter Ltd., Methode Electronics Malta Ltd, Playmobil Malta Ltd., De La Rue Currency and Security Print Ltd. and Carlo Gavazzi Ltd., have found Malta to be highly profitable. Other companies such as Prominent Dosiertechnik GmbH, Menrad Ltd. W.E.T. Automotive Systems (Malta) Ltd., Stainless Steel Products (Jacuzzi UK Group plc), and Toly Products Ltd. have developed significantly since

setting up their Malta operation. MDC claims that investors have realised that although there are cheaper foreign direct investment locations, Malta has definite advantages in terms of quality, rapid product turnover, short but specialised production runs, product development and sales and marketing into Europe and North Africa. Moreover, world famous companies based in Malta find the quality and productivity of the workforce second to none and continue to expand.

Maltese companies are regulated by the Companies Act 1995, the Malta Financial Services Centre Act and Commercial Partnerships Ordinance. A Memorandum and Articles of Association has to be filled both for a partnership and a limited liability company. The minimum share capital requirement for a company to trade in Malta is €1,200 authorised and €1,200 issued out of which 20% is fully paid up. The registered office must be located within the jurisdiction. A company must have at least two shareholders, though nominee services are allowed. A least one director and one secretary are needed and an annual general shareholders' meeting is obligatory. Prices that include all documentation necessary to incorporate a company range between €1,000-1,200. Companies seeking to set up new ventures in manufacturing and service industries or to expand their operation on the island are requested to submit a business plan on their proposed project to the Malta Development Corporation (MDC). Once the MDC reaches an informed opinion on the project's feasibility the investor is informed of the outcome. A favourable answer means that the investor is faced with a number of bureaucratic procedures since the concept of a one-stop shop does not exist. All permits and trade licences required need to be obtained from the police and trade department whereas water and electricity services and communication lines need to be obtained from three different corporations. This is a rather lengthy process that discourages the potential investor.

On the other hand, there are incentives to encourage the potential investor. MDC administers a competitive package of fiscal and other incentives targeted at manufacturing and service companies offered through the new Business Promotion Act (BPA) of 2001, which has superseded the Industrial Development Act (IDA) of 1988. The BPA was introduced at a time when certain benefits under the IDA were about to run out, and is hence intended to provide a smooth transition to a new system that is well compatible with international standards. The BPA is also an important instrument in the ongoing restructuring process, which is intended to attract new investment by means of tax concessions and other financial incentives that target a broad range of sectors rather than just the exporting manufacturing sector as did its predecessor since it provides incentives for all industries demonstrating growth and employment potential that are engaged in manufacturing, repair, improvement or maintenance activities. Under the BPA, producers for the home market enjoy the same advantages as exporters because it is intended to motivate productivity growth regardless of where the firm's product is sold. For example, the incentives under the forerunning IDA compensated Gozo businesses for additional transport costs only when products were for export. Under the BPA, such benefits are extended to all Gozo producers, regardless of their market. The present legislation emphasises the enhancement of competitiveness across the economy over and above the importance of export markets for our industry. Competitiveness is the key to export as well as home success. In fact, under the BPA, specific sectors are identified on the basis of their value-added, their contribution to technological improvement, and their innovative capability as well. Among these are manufacturing, waste treatment, software development, and research and development, including the design or development of goods or the development of production processes or methods. All these activities qualify for reduced rates of corporate taxation. For a new firm, the rate of tax is 5% for the first seven years, followed

by a rate of 10% for the next six years and 15% for the next five years. Thereafter, the firm will pay the normal rate of 35%, having benefited from a reduced tax rate for eighteen years. Upon adopting the BPA incentives, an established firm pays 10% for six years and 15% for the following five years before having to pay normal rates.

The BPA widened the scope of financial incentives to include intangibles, subject to government policy. For example, certain companies' expenditure of a capital nature incurred in the acquisition or development of technology or expertise can be financed through loans at subsidised interest rates, loan guarantees, and benefit from a reduced rate of tax on reinvested profits or grants. Such intangibles also qualify for investments tax credits. Under the old scheme tax credits were oriented only to export activity and were not concerned with innovation and technology development. The new tax credit, which is intensified for SMEs, is mainly related to new or expansion investment. The firm will however have the option of calculating its credit based on either the amount invested or based on the jobs created as a result of the investment. In addition, when employing a person who is disabled or has been unemployed for over a year and is over 40 years of age, a company may deduct a substantial percentage of the person's wage cost from taxable income as an additional deduction. This is further to the deductions already allowable under the Income Tax Act. Such a deduction is also applicable for the employment of persons, who have been unemployed for over two years, have been made redundant because of restructuring or who were previously employed with the public sector. These incentives are intensified if the employers re-train these individuals.

Over the past few years, the restructuring of enterprises has become a key objective for the preparation of the economy for EU accession. Apart from the challenges of globalisation, Malta's small enterprises are faced with the challenge of competing in the domestic market from an unprivileged position, as protective levies that were previously enjoyed by Maltese businesses have been gradually eroded. The primary target of restructuring is in fact the domestically-oriented business sector, amongst which the key players are the food and furniture industries. The Institute for the Promotion of Small Enterprise (IPSE), which is answerable to the Ministry of Finance and Economic Affairs, was founded in 1995 with the aim of overcoming the difficulties mentioned above as well as instilling a new culture and change of mentality. IPSE was set up specifically for the purpose of assisting targeted sectors in their restructuring through financial packages aimed at facilitating investment and the provision of technical expertise, and to support start-ups along the same lines. Malta identifies with the fact that sustainable competitiveness requires entrepreneurial businesses that can establish strong positions in markets through innovative products. However, the start up stage has a high failure rate, generally due to poor planning, products not attuned to the market, inadequate financing and technical skills and lack of business experience.

Local non-export-oriented SMEs and in particular small micro-enterprises also experience difficulty to find suitable premises. Some of the reasons are scarcity of industrial land since Malta is a small island, the relative restrictive attitude of the Planning Authority regarding the allocation of zones for industrial use, MDC's policy to reserve industrial estates for export-oriented projects and the growing problems for SMEs located in residential areas. Until now MDC has had a virtual monopoly on all industrial land and premises in Malta and certainly most of the prime sites. While some privately owned industrial sites do exist, these sites tend to be small in scale and few in number. Since the private sector is not able to obtain suitable building sites for industrial development, either through direct purchase or leasehold, the private property development market in Malta has been distorted if not destroyed. The lack of

private sector participation has been caused in largely because industrial land for private development is not available. Up until 2001, MDC granted a rent subsidy to its tenants to further attract and encourage investment, but this subsidy has since been removed so as to be in line with the *acquis*.

IPSE strongly believes that there are two basic criteria that a business must fulfil to be successful: it must have a clearly laid out business plan and it must join forces with competitors within the same sector for the common good. One of the strategies in this regard is to help firms form industrial clusters with the aim of exploiting external economies of scale and creating scope for specialisation. The idea of business clusters and networks is underdeveloped in Malta, so much so that, local entrepreneurs are sceptic to join forces in the same sector as they fear that their competitors will take advantage over their competitive edge once they share their know how. In addition, there is no national mechanism or special financial support that attracts businesses to form such networks. As a way of encouraging business networks to occur, IPSE conducts a number of Sectoral Analysis Reports to determine what opportunities exist in the sector. It is then responsible for giving the necessary counselling for such ventures to materialise. The process is ongoing in all sectors; Sectoral Analysis Reports have been conducted on a number of sectors including the wine sector, the processed fruit and vegetables sectors, the meat processing and the bakery sector. IPSE is actively trying to instil a positive approach among SMEs, encouraging them to get together and pool in their resources. This strategy has to date had a limited effect on some small sectors, but it promises to be an important aspect of the restructuring of the furniture sector which is currently under way. The furniture sector was expected to be the sector to be worst hit by the removal of protective levies in all sectors expect for the agro-food sector. For this reason, IPSE commissioned a report on the furniture sector; at the time of the sectoral report, there were 940 registered furniture companies, most employing just two or three, but there were also some of a medium size by international standards. As a result of this study, IPSE brought furniture firms closer together and, according to the Chairman of IPSE, today there is enough furniture making equipment in Malta to triple the output. The first and only business network in this sector and in Malta emerged very recently. Indeed, SMEs can start influencing their environment in terms of skills, technology transfer and support activities. IPSE is also trying to promote the philosophy that building on these clustering activities will help Malta's SMEs become internationally competitive. True competitiveness does not emerge as a result of what one particular company is doing, but from the whole environment, which is much more difficult for another country to replicate.

Another initiative within IPSE's restructuring programme is the Kordin Business Incubation Centre (KBIC), which started operating in October 1999 on the basis of research on incubation commissioned by the MDC, and was officially inaugurated in July 2001. KBIC is funded and managed by the IPSE, with the collaboration of institutional partners, and is essentially a business development programme designed to assist entrepreneurs to develop and accelerate their start-up businesses in a wise and cost effective manner. It was in fact set up to identify, attract and nurture start-up projects that fall within a number of targeted sectors. These are ICT, design and development of equipment systems as well as product design, projects that are related to renewable energy technologies, biotechnology and other innovative projects that are seen to bear some uniqueness for Malta. Admission into the KBIC programme is preceded by an information exchange meeting whereby the entrepreneur explains the basics of the proposed project. If the project is deemed to be eligible and feasible to support, then the incubator provides an application form, which is a simplified fill-in business plan. Evaluation of proposals takes about three weeks to be assessed and once

accepted the entrepreneur is admitted for about six months in pre-incubation. This is the time when assistance in the preparation and submission of a business plan is provided. Once the business plan is evaluated and accepted the entrepreneur becomes a full tenant. Generally, full tenancy is for a three-year period. The support services provided for start-ups include counselling, strategy development, business planning, training and networking. In addition, the incubator provides space, together with ready-made infrastructure for new ventures to start operating. The latest effort to save businesses from failing was the introduction of the Kordin Business Incubation Centre (KBIC) by IPSE. The KBIC is able to accommodate up to 57, innovative start-ups in units ranging from $25m^2$ to $150m^2$ in area. Enterprises at KBIC have access to business counselling and specialised assistance. The practical assistance and advice that the incubation centre offers to business start-ups facilitates the development of learning organisations as well as innovation initiatives. The performance of the tenants is monitored by way of frequent interaction on an informal basis and formal performance reviews that are undertaken at least on a quarterly basis. Since September 2001, over 100 information exchange meetings and over twenty group-briefing sessions were held. A number of tenants have also been accepted, among which is Kinetix IT Solutions in the ICT sector.

Box C1: Kinetix IT Solutions

Kinetic IT Solutions is active in the field for delivering a wide range of solutions, encompassing major Local Area Network (LAN), Wide Area Network (WAN), telecommunications and server technologies. It designs range from small, single-site installations to complex multi-site, international networks, utilising a wide variety of WAN carriers and technologies. 'Best-of-breed' technology is used to create the networks, namely, Cisco, 3Com and others. Also, it delivers a wide range of server solutions, storage area networks, Remote Access Services (RAS), Virtual Private Network (VPN) solutions, high-security firewall and Demilitarised Zone (DMZ) installations, complete with data encryption and other security features.

Ultimately, the aim of KBIC is to increase the innovative capacity of the country. It combines the 'hands-on' concept of providing a portfolio of business support services to start-up enterprises together with a focus on innovative new-economy businesses. The kick-off model of this project is that of a classical mixed technology type of incubator. However, the vision of the project goes beyond this since KBIC is intended to become an innovation centre within a couple of years and there are also plans to eventually transform the area around it into a science park. This development can only materialise with the participation of private investment. On the other hand, the availability of different forms of capital financing for the right ventures is still underdeveloped in Malta and enterprises still depend predominantly on individual and bank finance. It is planned that the Malta Enterprise Board, which will bring together MDC, IPSE and the Malta Export and Trade Corporation (MECTO), will create a mechanism that would lead to the creation of a seed and venture capital. Since January 2004, MDC, IPSE and METCO have in fact been merged into Malta Enterprise, which is intended to be the focal point for enterprise in Malta. Its role is to act as a single point of contact for all entrepreneurs considering trade, investment or commercial links with Malta.

Government recognises that innovation is an essential element in business restructuring[42]. Within this context, industrial policy in Malta encourages transnational corporations to locate

[42] See White Paper on Industrial Policy issued by the Ministry for Economic Services, 2001.

their research in Malta, and encourages them to spin out new start-up ventures. This, following the experience of a number of foreign investors in Malta, among which ST Microelectronics, whose Malta operation began on account of tax incentives as a back-up for an Italian facility but has nowadays developed into a research centre in its own right involved in the development of 'designer chips' for specialised custom uses. Research institutions in Malta are also identified for tax concessions under the BPA.

Government also recognises the need to stimulate growth of new firms. The EU's Business Environment Simplification Task Force (BEST) initiative for the candidate countries seeks an environment where the conduct of business activity is rendered as simple as possible. Two Maltese institutional mechanisms have been identified under this programme, as set up to reach this objective. The first one is company registration. Company registration works on a one-window basis, where all the necessary documents can be filed at the same time and required fees are paid instantly. Fees vary according to capital size. The Company Register is available electronically, and information about registered firms can be accessed via the Internet against a fee. Once the legislation on digital signature will be adopted, company registration will be possible electronically. The second implementation was the initiative at the Ministry for Economic Services with the introduction of a Small Business Unit (SBU). The SBU objective is to help small businesses and the self-employed get a better service from service providers. Its role varies from facilitator of communication, to provider of information, and educator. One of the top priorities at this unit is to try to accumulate knowledge and expertise on small businesses, and help small businesses prosper. SBU meets with government authorities where it conveys feedback and finds solutions to specific problems.

Another important element of business restructuring is a substantial programme of privatisation of companies with Government participation, including activities such as banks, lotteries, transportation and telecommunications. Finally, enterprise restructuring in Malta is being determined by the liberalisation of markets and the removal of protective measures. In the late 1980s, quotas on imports were removed and replaced by levies. A number of controlled sectors, including the financial markets, were completely liberalised during the 1990s. This liberalisation programme should be completed by 2004, when any remaining levies on imports, including those on agricultural products, should be removed. The agricultural sector is to be compensated for the removal of protective measures by funds allocated specifically for the purposes from the Government budget. It is not clear whether such funds are to serve as a price subsidy mechanism or are to be directly utilised for the restructuring of the sector.

C2.1 Declining and Expanding Sectors of Industrial Production

In the 1970s, Malta had a thriving textile industry that was attracted to Malta by the low operating costs, particularly cheap labour, which the Islands afforded at the time. By the early 1990s, most textile factories were closing down and moving to cheaper countries in North Africa and Asia, as the operating costs in Malta were rapidly rising. Investment that had relied exclusively on low costs has by now virtually disappeared, but investment that relied on technology and skills has thrived and prospered.[43] The notable examples are engineering, electronics, telecommunications, rubber & plastics, pharmaceuticals and medical products.

[43] Cordina, 1993

These sectors are doing well, with many of the existing successful companies continuously expanding their operations, exploring new markets and forging new business partnership with leading companies worldwide.

C3 Changes in the Structure of Services

As mentioned earlier on in Section A21, the service sectors have been developing at a faster pace than the other sectors of the economy. Transport and telecommunications have increased their share of GDP, albeit marginally, since 1990, while other service sectors such as insurance, banking and real estate, and private services have expanded steadily. The only service sector which has not maintained its share of contribution in GDP is wholesale and retail trade. Sectoral statistics based on the NACE classification for the services sectors, similar to those which have been published for the manufacturing industry and construction, are not available.

C4 Investment

The share of investment expenditure in GDP has suffered a dramatic decline since 1990, suggesting that there may have been some crowding out of private investment by heavy Government spending that has been partly financed by repeatedly over-subscribed bond issues. Most of the major private sector investment projects have generally featured a substantial amount of FDI and were mainly in the manufacturing sector, which attracted most FDI since most tax incentives and other benefits were directly attached to export-oriented manufacturing activity, and in the tourism sector, where a number of strategic partnerships were formed between enterprising Maltese hoteliers and world-leading names in the hospitality industry.

C5 Market Size

The size of the Maltese market is unarguably small, probably too small for many businesses to be able to reap scale economies to their full extent even if the firm enjoys a monopoly. As a result, many markets are oligopolistic, with a small number of firms having a large share of the market. Duopolies are also quite characteristic of the country, which incidentally also has a bi-partisan political system, with the most evident duopolistic markets being those of banking, mobile telephony, wine production and beverages production. The local market conditions are such that business that cater for the domestic market are bond to remain small, and often venture to activities somewhat related to their main line of business to generate higher turnover, and it is only companies that manage to penetrate the export market that have the potential to grow large enough to be able to benefit fully from scale economies.

C5.1 ICT Market Size

The share of ICT markets, which include office machines, data processing equipment, data communication equipment and telecommunications equipment, plus related software and telecom services, expressed as ICT expenditure as a percentage of GDP, was of 4.1% in 2000.

This is very low by EU standards, when the EU-15 overall mean stood at 6.85% and the lowest value for this indicator in an EU country was 4.46%. ICT expenditure, which is a fundamental feature of knowledge-based economies and the driver of productivity improvements, is in fact listed as one of the main weaknesses of Malta in relation to innovation activity.[44] On a positive note, the share of expenditure on data communication equipment and telecommunications equipment in Malta accelerated during the period 1999 – 2001, and an increasing trend was also observed for the share of expenditure on office machines and data processing equipment as well. The share of expenditure of software increased marginally.[45]

C5.2 International Cooperation and Competition

International cooperation is forged along two main lines. For the small firms focusing primarily on the domestic market, international cooperation generally takes the form of authorised representation of international brands locally. Arrangements of this kind facilitate both the take-up of latest technologies as well as the assimilation of organisational practices of international standards. Local representatives strive to promote a corporate image that matches that of the international companies that they represent, and in so doing constantly innovate themselves as business organisation, their marketing techniques and their product support infrastructure. For the larger firms, which are mainly foreign-owned and export-oriented, international cooperation is central to their functioning. Technology transfer is more tangible in these cases, with Maltese companies being generally on the receiving end. Those companies that have managed to develop, not only as a cost-effective and efficient production plant within an international group of companies, but more so as forerunners within their group are more innovative and are in a position to exploit the multidimensional benefits of multilateral technology transfer with related parties.

In the international scene, all Maltese companies, including the larger and better established companies, are small players, and hence exposed to intense competition from the cheap labour regions of North Africa and Asia in terms of price, and from Western Europe, Japan and the US in terms of quality. Effectively, Maltese exporters are price-takers in the international markets, with the qualified exception of ST Microelectronics that exports highly specialised ‘designer’ chips.

C6 Major Sectors of Innovation Activity

While some sectors, like engineering, electronics, telecommunications, pharmaceuticals and medical products are by their very nature more innovative than others, there is generally a low propensity to innovate.

In an exclusive interview that was held with Gene Gretchen, CEO of ST Microelectronics (Malta) Ltd., he openly affirmed that no sector in Malta can lay claim on innovation, mainly because no culture of innovation is fostered. By admission, ST Microelectronics has its own rigid set of principles to which its employees have to adhere when tackling a problem, as do

[44] Source: trendchart.cordis.lu
[45] Micallef & Restall, 2002

most organisations of the same scale. The CEO also noted that these systems have a tendency to push up the productivity levels of mediocre individuals while restraining the smarter employees who are brilliant enough to find new and better ways of doing things. The latter are then encouraged to flourish by being sent on specialised training abroad. Notwithstanding the prudent statements made by the CEO of ST Microelectronics (Malta), the activities of the local electronics sub-sector in which this company is the major player push up the sales share of "new-to-market" products in the manufacturing sector to a staggering 37.7% for Malta, which is well above the EU-15 overall score of 6.5%.[46]

In a separate interview, the IT Manager of Playmobil Malta Ltd., a renowned toy manufacturing company, commented with respect to innovation in Maltese industry that the level of investment is low. This is mostly attributable to the small size of the Islands. People may be capable of innovating but the funds to support innovation are limited. Investment in innovation is largely concentrated in Playmobil's Headquarters abroad, as is the case with many other foreign-owned companies. Yet, through these companies, innovative technologies are gradually transferred to Malta as well. For example, Playmobil is currently introducing 'demand-flow' technology in Malta. The IT Department at Playmobil Malta develops in-house software, but mainly for administrative applications. The IT Manager remarked that that is not easy to invest in innovation while working towards meeting cost and efficiency targets, indicating that Maltese companies tend to focus more on cost-cutting and being more efficient, rather than on pure innovation. Possibly, in the process of cutting down on costs and improving efficiency, Maltese companies are indirectly innovating operational methods, but because their objective is not innovation for its own sake, they may not realise that this kind of micro innovation is innovation too. Out of a total of 693 enterprises that were surveyed in the first-ever Community Innovation Survey (CIS), the results of which were published in March 2003, nearly 62% responded. Of these 428 enterprises, 19.2% claimed that they have introduced new or significantly improved products on the market. Only 14% affirmed that they have introduced new or significantly improved production processes.[47]

One reason why Maltese foreign-owned companies in particular may be somewhat oblivious to internally enerated innovation is that they are generally geared towards technology acquisition from their mother companies abroad, rather than on setting technological standards themselves. Some companies are managing to overcome this attitudinal constraint. For example, in a separate interview with the IT Manager at Baxter Ltd., it emerged that this company has been concentrating on trying to sell its local expertise on data mining. Baxter in Malta was the first branch within the Baxter group to work through Voice over IP and achieve cost savings through ICT improvements such as fax to e-mail solutions.

C7 The ICT Industry

C7.1 The Structure of the ICT Industry

According to the latest published industry statistics there were just 27 enterprises operating in the ICT manufacturing industry in Malta in 1998, out of a total of 2,512 enterprises in the manufacturing industry. This handful of ICT manufacturing enterprises accounted for €895 million of gross manufactured output, which is equivalent to over 40% of the manufacturing

[46] Micallef & Restall, 2002
[47] NSO News Release No. 40/2003

sector's gross output. Of this, €858 million was generated by the NACE 32.10 sub-sector, in which eight enterprises were operating among which ST Microelectronics (Malta) Ltd.

The same small economy market conditions prevail in the ICT industry. The relatively big companies, notably in the ICT manufacturing industry, are foreign-owned, 100% export companies. Most hardware is imported by local retail companies, of which there are quite a number. As a result, competition in ICT retail is rife and prices for the end-user are generally affordable and fairly comparable to prices in developed countries. Software companies are generally small, and develop systems targeted at the small-to-medium sized high-end businesses that cater for the statutory obligations of businesses under Maltese law. Some software companies act as agents of established foreign software brands and focus on tailoring off-the-shelf packages for particular users.

With regards to telecoms, Maltacom is the only landline telephony provider and thus retains the whole fixed-line market. It is also the sole provider of ISDN and ADSL through one of its subsidiaries, even though ADSL is marketed to the final consumer by a number of Internet Service Providers (ISPs). There are several ISPs, one of which is another subsidiary of Maltacom, all of which lease lines from Maltacom. The market for Internet services is reasonable competitive, even though Internet penetration in households is not very high by European standards. Some ISPs are also venturing into voice over IP (VoIP) services, which could put pressure on Maltacom's fixed-line telephony prices. One company, Melita Cable, provides cable television and cable Internet. There are two mobile telephony companies, Vodafone, which was the first mobile telephony provider, and Go Mobile, another subsidiary of Maltacom. Some intense competition exists between these mobile telecoms duopolists, yet competition seems to be more concentrated on marketing and product roll out rather than prices, which, with the exception of those of text messaging, remain high by European standards. Some argue that the size of the Maltese market, which remains small even though high mobile telephony penetration rates have been reached, is bound to inhibit prices from falling to European levels. Meanwhile, a licence for a potential third mobile telephony operator is still open.

C7.2 Employment and Value-Added in the ICT Industry

The ICT manufacturing industry generated 10% of employment in the manufacturing sector in 1998, employed 2,716 persons out of a total of 27,261 that were employed in the manufacturing industry. Of these, 2,315 were employed in the NACE 32.10 sub-sector.

In terms of value-added, the ICT manufacturing industry accounted for €139 million of the total of €660 million for the manufacturing sector, hence 21%. The NACE 32.10 sub-sector contributed a staggering €125 million of this and registered the highest value-added per gainfully occupied person, with €54,123. The electronics sub-sector was followed by television, radio and telephony manufacturing (NACE 32.20 and NACE 32.30), which registered the second highest value added per gainfully occupied person with €47,221. There were just five companies operating in this sector, which together employed 151 persons.

C7.3 Investment in the ICT Industry

Out of a total of €93 million worth of investment reported for the whole manufacturing industry, 28% or €26 million were attributable to the ICT manufacturing sector, or more specifically the electronics sub-sector, since investment by the other ICT manufacturing sub-sectors was minimal.

C7.4 The Trade Balance of the ICT Industry

Due to the scale of activity of ST Microelectronics (Malta), the ICT industry, and particularly the ICT manufacturing industry, is one of the major importers and exports of the Maltese economy. While trade statistics based on the NACE classification are not available, the high value-added reported by the electronics sub-sector suggests that both the ICT manufacturing industry and the ICT industry as a whole enjoys a positive trade balance, even though substantial capital imports by ST Microelectronics and the mobile telephony providers to a lesser extent may mitigate the magnitude of this positive trade balance.

C7.5 Major Actors in the ICT Industry

There is one major actor in the ICT manufacturing industry, which is ST Microelectronics (Malta) Ltd. This company is a subsidiary of a major global microchip manufacturer that started operating in Malta in 1981, as a backup for an Italian facility. Over twenty years, it has now grown from a modest operation employing a few tens of people into a major player in the Maltese economy, employing 2,400 persons and generating around one-half of Malta's manufactured exports. In addition, the company makes use of the services of a number of other local companies, which are estimated to employ over 2,000 workers between them. It is also a research centre in its own right, developing up-market 'designer chips' for specialised custom uses. Recent statements by ST Microeconomics indicating that it wants to cut down the production costs of its Malta plant to Singapore levels has sent shivers across policy circles. The company has in fact informed the General Workers' Union (GWU), which is the largest labour union in the country, of its plans to reduce the production cost per hour from the present €9.90 to €7.40 in a bid to remain competitive. Proposals, which are being negotiated upon in view of the expiration of the current collective agreement on 1st April 2004, include reducing special shift hours and lowering the premium on rates of pay on Sundays and public holidays, cutting allowances, and a moratorium on wage increases and promotions for the next three years. While the company has made repeated assurances that is "intends to stay in Malta", the depreciation of the dollar and the increase in costs due to the appreciation of the euro as well as the general rise in production costs have been claimed to be threatening the competitiveness of the Malta plant.

Box C2: The ICT Manufacturing Industry

The Maltese ICT manufacturing industry is dominated by a single multinational company, ST Microelectronics (Malta), which accounts for about one-half of manufactured exports. This fact renders the Maltese economy particularly vulnerable, to such an extent that the voluminous presence of ST Microelectronics

in Malta may be regarded with suspicious diffidence, especially when looked at from outside the country. Undeniably, ST Microelectronics is one of the important cornerstones of Malta's economy. Yet, economic activity is still fairly diversified with one-fourth of output being generated by the manufacturing sector and around one-third by the services sector.

Many have questioned whether Malta would be able to survive without ST Microelectronics. This company is contributing positively to the trade balance of the country since it is the main exporter (it is one of the principal importers too), while generating 2,400 jobs which provide employment for close to 2% of the labour force. Since a third of this company's employees are graduate engineers and technicians, it absorbs most of the technical resources of the country. This has led some to argue that other companies of a similar size cannot set up in Malta because there are not enough technical resources available. Without ST Microelectronics, Malta would have a larger trade deficit and a pool of technically-skilled resources available for employment. The real question is not what would happen if ST Microelectronics had to leave the country but which factors could lead to its dismantle as well as why has this company set up in Malta in the first place and which factors have contributed to its successful operation and continuous expansion on the Island. The answers to these questions hold the key to attracting other companies to establish themselves in Malta, thereby diversifying the economic risk of the country.

There are a number of players in the ICT services sector. One of the major players is Maltacom, which is the sole landline telephony provider and which also has a number of subsidiaries providing related services such as ISDN, ADSL and dial-up Internet access services. Another two major players are Vodafone and Go Mobile, which is also a subsidiary of Maltacom, which share the mobile telephony market and are constantly promoting new products in attempt to increase their share of a market that is already very close to saturation. Melita Cable is a licensed monopoly of cable television and cable Internet. There are a number of ISPs and small software houses, but none of them may be identified as a major player in the ICT industry.

C7.6 Development of the ICT Industry

The ICT manufacturing industry has been dominated by ST Microelectronic (Malta) for a number of years, and mainly due to technical resource limitations, seems destined to remain so for a number of years to come. According to the CEO of this company, the future of the ICT industry in Malta lies in the "niche" approach. "We are now competing with Asian countries where the cost is a fraction of what it is in Malta." On the other hand, he claimed that widespread knowledge of foreign languages remains one of Malta's strongest advantages over its competitors, even though these are catching up in this respect as well.

On the other hand, there are a number of players in the ICT services industry, including one fixed-line telephony provider, the mobile telephony duopoly, the cable television provider, a number of ISPs, a few small software companies and some distributors and resellers. Increased deregulation of the telecoms sector, which is expected particularly if the telecoms regulation becomes more autonomous, will create space for a few more players in the ICT services industry. Meanwhile, the agreement that Government has secured with Microsoft

together with a number of private initiatives by budding software companies are expected to engender the ICT services sector in the coming years. The prospects for diversified development in the ICT services sector are more promising than for diversified development in the ICT manufacturing sector, especially since Government policy seems to be focusing increasingly more on the promotion of the ICT service sector.

C8 Multinationals

C8.1 The Presence and Role of Multinationals and Foreign Companies

In the interview held with the CEO at ST Microelectronics (Malta), it was noted that ST has contributed to Malta's industrial development along two major lines. Firstly, it has introduced best-practices in the field of training, total quality management (TQM) and environmental programmes, thereby setting the example and acting as a benchmark for the local manufacturing industry. Secondly, by demanding the use of best practices from its employees, it has facilitated the dissemination of these practices both by association and when employees leave the company, taking the know-how with them. The CEO at ST Microelectronics (Malta) claimed that, as a result, ST-bred managers are in high demand by the rest of Maltese industry. Meanwhile, ST Microelectronics constantly seeks to re-evaluate its position in Malta in terms of how it can add more value to the corporation as a whole. For example, one of the technological competencies of ST Malta is to design graphic user interfaces to raise productivity within the whole corporation.

Top officials in multinational and foreign companies widely agree that the role of these companies as contributors to industrial development is mainly through the training of their employees. According to the IT Manager at Baxter Malta Ltd., people are trained to international standards and when they eventually move out either to other industries or to set up their own business, they take a stock of knowledge with them. Importantly, multinationals tend to focus more on human resource development than the typical family-owned business in Malta, in the sense that a multinational is highly dependent on flexible and well-trained human resources, whereas in family-run businesses investment in human resources is often viewed as a "necessary evil". Multinationals also contribute in a special way when their employees in Malta participate in the globalisation of the whole group of companies, and this happens quite often since it is sometimes cheaper to operate group activities from Malta. This is because local skilled resources are still competitive price-wise, especially when compared to their Western European counterparts, a claim that was also made by the Managing Director of Crimsonwing (Malta) Ltd.

Box C3: Crimsonwing (Malta) Ltd.

"Crimsonwing (Malta) Ltd. was set up in 1998 and is a wholly owned subsidiary of Ascot-based Crimsonwing Group Ltd. We have a successful record of managing and delivering offshore IT resources for a wide range of systems development projects. We make it our business to offer the best possible offshore development services to our clients – a commitment that has been reinforced with the establishment of our Malta resource centre. Setting up in Malta made sense because fully qualified IT professionals are available at reasonable cost. This ensures high levels of quality and expertise in our systems development activity. It also enables us to offer the continuity and reliability so necessary for success." *John R. Wright, Managing Director*[48]

[48] Source: www.investinmalta.com

Baxter's IT Manager affirmed that Malta's strength was in supply chain management while he identified its main weakness to be the prohibitively high cost of the communications link between Malta and Europe. Baxter chose to set up its Headquarters in Zurich, Switzerland, mainly for tax purposes, and then outsource to internal plants such as Malta, depending on the required competence. But there are other companies that have set up their headquarters in Malta as well. One example is the NEM Group from Germany.

Box C4: NEM Group

"The company we founded in Malta, NEM Solutions, is the international marketing and sales branch of NEM Group which provides software solution services to international SME's and large companies. NEM was faced with increasing problems that were hindering growth prospects, hence the setting up of NEM locally. Malta is a place where skilled multi-lingual technical people are available at a fraction of German labour costs, added to the fact that our North African clients tell us they feel comfortable doing business here. We soon realised that it made sense to centre all technical and marketing operations in Malta. Meanwhile, Fujitsu Siemens Computers appointed NEM as its Global Strategic Hosting Partner. This agreement will see both our organisations co-operating to deliver Application Hosting and ASP services to customers across the Middle East, North Africa and the Mediterranean… Malta is central, safe, the working environment is professional and life here is good. Moreover, the Malta Development Corporation provided immense support."

Uwe Schoenfeld, General Manager[49]

The IT Manager at Playmobil Malta Ltd. also agreed that multinationals make an important contribution through the training of their employees, quoting the example of this toy-manufacturing company, whose employees are highly trained. He noted that there is relatively low labour turnover, suggesting that training Maltese employees generally pays foreign companies that set up in Malta.

C8.2 The Contribution of Multinationals and Foreign Companies to IST-Related Developments

While the IT Manager at Playmobil Malta Ltd. claimed that multinationals do not have a direct role to play in the dissemination of ICT, the IT Manager at Baxter Malta Ltd stated that they ought to have a role in its dissemination locally but it is not effective at the moment. This is partly because there is no official industry benchmarking in Malta. To overcome this problem, he suggested that there should be more networking between industrial IT Managers. They should create a forum to formalise individual collaborative efforts that are currently being undertaken informally. For example, Baxter would like to introduce the use of handheld computers on the factory floor and its IT Manager is checking out what has already been done at the national airline company, Air Malta. Benchmarking on a local scale could engender the contribution of multinational and foreign companies to both IST-related and other developments. The IT Manager at Methode Electronics (Malta) Ltd. affirmed that the role of multinationals in the dissemination of IT is twofold; multinationals have a role in providing

[49] Source: www.investinmalta.com

ICT services directly to external customers as well as an internal role in providing ICT services to customers within the organisation, both locally and internationally.

In the interview held with the CEO of ST Microelectronics, it emerged that over and above the traditional role of keeping employees abreast with leading technology through worldwide training with the intention of increasing productivity, multinationals do have another less traditional role based on a commitment to bridging the digital divide. Indeed, the CEO of ST International sits on the UN Committee for bridging the digital divide which aims to equip the disenfranchised sections of the community with knowledge of IT tools such as the internet. Malta was the first site in which initiatives of this type starting being implemented within ST internationally. Among these is the provision of free internet courses for 1,000 Maltese citizens by the end of 2003.

C9 Competitiveness

Malta has several strengths that have contributed to its industrial development over the past decades. These include:

- Its exposure to international trade
- Its telecommunications infrastructure
- The adoption of quality standards compatible with the EU
- Its relative proximity to the European market
- Its proximity to and knowledge of North African market
- Natural endowments with regard to tourism.

These factors, coupled with a stable political and economic environment, have enabled Malta to attain the satisfactory level of development that it currently enjoys.

On the under hand, Malta displays a number of weaknesses which impinge on its competitiveness. Among these shortfalls are:

- Malta's insufficient attractiveness to FDI
- Inadequacies in basic infrastructural services
- Shortcomings in the entrepreneurial culture
- Insufficient R&D activity
- High transport costs

A number of competitive weaknesses arise directly out of Malta's small size. Notably:

- Malta has limited natural resources endowments
- It is highly dependent on imported industrial supplies
- The Islands have a fragile ecosystem, which imposes environmental constraints

A recently-appointed task force assigned with the task of drafting of a competitiveness strategy for Malta has identified the following ten golden rules for achieving competitiveness (Briguglio & Cordina, 2003):

- Maintaining a stable and resilient macroeconomic environment
- Creating adequate and predictable legislative environment

- Putting in place adequate infrastructural services
- Promoting of education and investment in human capital
- Fostering of innovation and research and development
- Providing public administration services efficiently and transparently
- Balancing wage levels, productivity and taxation
- Preserving the social fabric and fostering of social cohesion
- Exploiting market opportunities
- Attracting investment from local and foreign sources

These recommendations must be considered in the light of the on-going industrial restructuring process, which is based on market liberalisation, the attraction of investment, privatisation and improvement of innovative capabilities. One of the main hurdles to restructuring is the mentality of local entrepreneurs, which are often geared towards serving protected market niches and tend to view the concepts of restructuring and innovation as threats rather than opportunities.

Key Points

Malta has several strengths that have contributed to its industrial development over the past decades. These factors, coupled with a stable political and economic environment, have enabled Malta to attain the satisfactory level of development that it currently enjoys. Notably:

- Malta has a fairly well-balanced industrial structure
- It has a sizable, largely export-oriented and high value-added, manufacturing sector
- The services sector is growing at a faster rate and becoming increasingly less concentrated around tourism, as various other sub-sectors, such as telecoms and financial services, are developing

On the under hand, Malta displays a number of weaknesses which impinge on its competitiveness, of which a number arise directly out of its being a small island state, such as high transport costs. Moreover, there are:

- Inadequacies in basic infrastructural services
- Shortcomings in the entrepreneurial culture
- Insufficient R&D activity

The on-going industrial restructuring process is based on market liberalisation, the attraction of investment, privatisation and improvement of innovative capabilities. One of the main hurdles to restructuring is the mentality of local entrepreneurs, which are often geared towards serving protected market niches and tend to view the concepts of restructuring and innovation as threats rather than opportunities. The more interesting sectors for future development are:

- The ICT industry, which appears to afford some opportunity for Malta to develop new niche markets, particularly in ICT services
- Other specialist sectors such as pharmaceuticals and the marine sector in particular, where Malta has the potential for comparative advantage and could also attract FDI

Malta faces a number of threats, particularly on the manufacturing side:

- Malta's competitiveness on the international front is eroding and becoming increasingly more pressing on the national policy agenda
- One company in the electronics sub-sector accounts for a large share of manufacturing output and exports.

It is only by becoming more competitive that Malta can attract more investment from both local and foreign sources and diversify its industrial activity.

D. RELEVANT ECONOMIC ACTIVITIES FOR IST APPLICATIONS

D1 IST Spill-Over Effects

The Malta Communications Authority (MCA) has highlighted the contribution of the communications sector to the local economy during the period from 1999 to 2003, in its Telecommunications Market Review published in June 2004. The analysis mainly reports investment, output and profitability. It claims that 27% of the output of the telecommunications sector, which accounts for more than 90% of the total turnover in the communications industry, was consumed as an input by the rest of the Maltese industries during the period 1999-2003. As a whole, this output represented an average of 1.3% of the overall intermediate goods purchased by Maltese industries during this period. It also claims that the communications industry has made a significant contribution to economic activity in its own right, with the value-added generated by the communications industry accounting for 3% of GDP between 1999 and 2003. In addition, gross revenues increased from Lm75 million in 1999 to Lm104.5 million in 2003, spurred mainly by the telecommunication sector, and while the sector was in synchrony with the economic cycle, the growth rate of revenues from communication services managed to outperform that of the Maltese economy as a whole. In 2000, while the export-led growth in gross output of the economy stood at 11.7%, the communications industry achieved a growth rate of 21%. The year 2000 was in fact an exceptional year for the telecommunications sector, characterised by a surge in demand, high investment rates and the entry of new operators in the market. In 2003, the growth in the turnover of the communications industry was close to 4%, compared to just over 2% for the economy as a whole. The turnover from telecommunications services increased from 4.4% of GDP in 1999 to 5.3% in 2003, and remained consistently higher than the ratio reported for the EU-15 countries, which hovered at between 3% and 3.5%.[50]

The dominance of the telecommunications sector renders the local communications industry highly capital intensive and characterised by substantial investment flows aimed at technological upgrades as well as the maintenance of the existing capital stock. The investment rate of the communications sector, calculated as the ratio of investment in the communications industry to total turnover, has consistently been roughly double that registered for the Maltese economy as a whole. Between 1999 and 2003, the investment rate of the communications industry averaged 30% while that of the whole economy stood at 12%. The investment flows of the communications industry have also contributed significantly to the capital formation of the Maltese economy, as on average they accounted for 7% of total investment over the same period

The industry is also characterised by high profitability rates. The Gross Operating Rate (GOR), which measures profitability by showing how much of the value added is left after the labour component of production has been compensated as a percentage of total turnover, of the communications sector has been roughly twice that recorded for the whole economy. This may be due to the market imperfections existent in the industry, which may permit higher profit margins, but also reflects the higher capital intensiveness of the communications industry. The GOR of the telecommunications sector for the EU-15 in 2000 stood at 25.8%, 1.2% higher than the rate reported for Malta for the same year.[51]

[50] Malta Communications Authority (2004)
[51] Malta Communications Authority, 2004

D1.1 The Level of ICT Investment in Businesses

Recently, the Government commissioned MISCO International and KPMG to conduct a survey directed specifically at assessing ICT-usage in businesses, with a view to ensuring that its policies effectively address the needs of the local business environment. The following statistics came out from this study, which was carried out between January and February 2002 among 250 businesses. Annual investment in ICT by Maltese companies ranges from €1,250 to €62,500 according to firm size. The study shows that, on average, companies employing up to five workers invest €1,250 a year in ICT. Investment rises to €3,750 in the case of firms with a workforce of six to twenty employees, and to €8,750 in the 21-50 employee category. Where the workforce is composed of between 51 and 100 employees, ICT investment rises to €22,500, and then to €62,500 where the number of workers exceed 100. This indicates that larger companies tend to invest more than proportionately more in ICT than small enterprises.

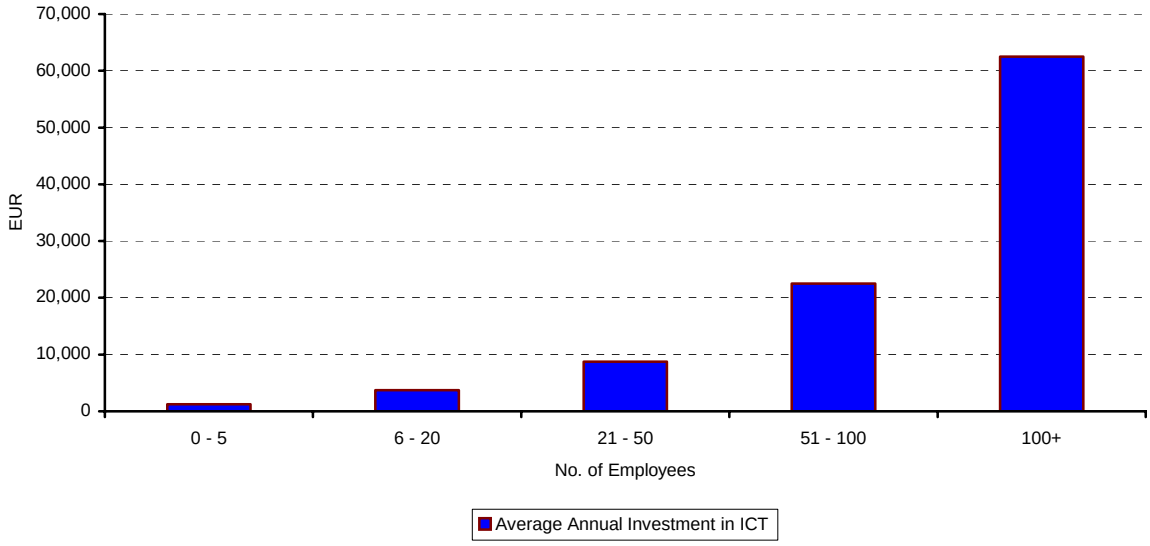

Chart D1: Investment in ICT by Maltese companies

It transpires that there are three factors that would encourage investment or further investment in ICT. These are efficiency, the need to keep up-to-date through constant upgrading, and tax incentives or exemptions. Nonetheless, only 18.3% of respondents were aware of the tax incentives provided for investments made in connection with ICT under the Business Promotion Act, 2001.

D2 Innovation

Most of the innovation programmes in Malta are directly modelled and dependent on EU mechanisms. In the context of the KBIC programme, IPSE is in the process of formalising a local network with the European Business Angel Network (EBAN) and the European Business Innovation Centre Network (EBN). Malta's participation in the EU Research and Technological Development programmes is seen to be essential for the encouragement of innovation in the community. Such programmes provide the linkages required for the joint development of technology and its transfer from foreign partners. The establishment of a

European Innovation Relay Centre (IRC) in Malta is also a valuable stimulant of innovation. In practice, it is found that a main hurdle in the implementation of these programmes is the mentality of local entrepreneurs that is essentially geared towards family-run concerns serving protected market niches. The concepts of restructuring and innovation are often viewed as threats to an otherwise stable business environment, rather than as opportunities to be exploited in an unavoidably more competitive global business environment. This issue is being tackled through contacts with sectoral representatives in industry aimed at informing the local entrepreneur of developments in their industry in other countries and to anticipate the changes necessary for business in Malta.

The "European paradox" of a relatively good research capability but weak indigenous innovation applies strongly in Malta. The University of Malta, which is made up of ten faculties and a number of interdisciplinary institutes, is virtually the sole tertiary education institution in Malta. It is also a focal point of Malta's S&T community since it is the institution within which most research is carried out. Over the past years, the University has been undergoing a major process of development with the strengthening of existing faculties and the setting up of a considerable number of specialised departments and research institutes active in different sectors of S&T. The academic staff of the University constitutes 0.5% of the labour force. Although there is sustained research activity at the University, the increase in student numbers in recent years has meant that teaching has tended to occupy a substantial part of academic resources. Research work of a science or engineering nature that can have some bearing on innovation efforts being undertaken is primarily focused on projects involving international collaboration with Universities abroad which finds little applicability within the innovation efforts of local business. For instance, ongoing projects include research on multimedia communications in collaboration with the University of Lecce, the design of integrated circuits and microsystems in collaboration with the University of Pavia, research on optoelectronics in collaboration with the University of Hong Kong and research on Advanced Heat Treatment in collaboration with the Universities of Bologna, Catania and Palermo.

As noted earlier on, the Maltese business sector can be split into two distinct segments. The export-oriented sector is foreign-owned and highly innovative, but generally tends to import its innovation from abroad or to conduct it in-house. On the other hand, the domestically-oriented sector is in dire need of restructuring and innovation, but generally at a less sophisticated level than that which is produced by University research. It is for these reasons that, generally speaking, there are very weak links between the research community and industry that are limited to the provision of human resources rather than focused on producing research aimed at promoting indigenous innovation.

There are some notable exceptions to these general observations. For instance, the Department of Manufacturing Engineering within the University of Malta is occasionally commissioned to design tools and other equipment for major industrial firms operating in export markets. The Department also responds to the needs of these firms by running Diploma courses in Total Quality and Industrial Engineering. Another example is the setting up of an Environment Engineering Innovation Award by the Department of Mechanical Engineering at the University in collaboration with a leading environmental management firm in 1998. The Department of Electrical Power and Control is involved in the exploration of alternative energy sources with a number of local firms, while student dissertations are occasionally used by local firms in improving their operations.

These collaboration activities between University and industry are in general the result of individual initiatives by university staff members, or individuals in industry having links with university staff members. There is hence potential for consolidation and expansion of such collaboration. A report on the interaction between University and industy in Malta concluded that "one of the main objectives of future university-industry interaction must be promoting and enhancing innovation capabilities in industry, particularly in SMEs. However, this requires a more structured approach to university-industry interaction, particularly in collaborative research activity and in design and development work. This in turn requires a specific funding programme, preferably as part of a national RTDI strategy, with a long-term outlook and sustainability. This funding is necessary in order to put university-industry interaction in RTDI on a sound basis, to increase S&T expertise at the University, to develop further human resources with RTDI capabilities, encourage SMEs themselves to invest in RTDI, to encourage more interdisciplinary collaboration within the University itself, and to make possible university-industry collaboration involving also foreign partners when required. This RTDI activity is an essential part of a restructuring economy."[52] A national RTDI programme was in fact launched in March 2004 (See Section G3).

It is a fact that Malta University Services, a company owned by the University to service business needs, is far more oriented towards educational activities than towards research. The same holds for a committee set up between the University and local industry, which is mainly geared towards fulfilling human resource needs. Meanwhile, complementing the University's research are research organisations directly funded by Government, private sector R&D and international research centres. The main institutes and centres with S&T interests are the Institute of Agriculture, the Institute of Energy Technology, the Institute for Masonry & Construction Research, the Cleaner Technology Centre, the International Ocean Institute, the Institute of Water Technology (IWT), and the Centre for Communication Technology (CCT). The later offers media support (hardware and software) to all the Faculties, Departments and Institutes of the University of Malta in the fulfilment of their teaching and research functions. It carries out research and promotes scientific work in the area of communication studies while collaborating with other institutions in the provision of training and assistance with project work in the media field. It is also involved in the development of a sound and vision library and educational technology workshops.

Malta also has a number of clubs, societies and associations concerned with the promotion of S&T. These include the Malta Chamber of Scientists, Group of Professional Engineers, British Medical Association (Malta Branch), Dental Association and the Federation of Professional Bodies. There are a number of Maltese scientific and technical publications but the majority of local researchers still prefer to publish their work in journals of international repute.

Yet, collaboration between the research community and domestic industry is thwarted by the fact that, owing to the small size of the Maltese economy, research bears more fruit when undertaken in an international context rather than to specifically serve the small scale of domestic industry. On the other hand, domestic industry has restructuring and innovation priorities that do not typically match the research work being undertaken. As an effect of these factors, and perhaps also partly as a cause, there exist no formal research community/business co-operation programmes in Malta to disseminate and promote the application of research findings. The examples of co-operation cited above are few, sporadic

[52] Micallef, (2002)

and accidental, and constitute a relatively small part of the innovation efforts of the companies serviced. There also exists a perception that, given the small size of the Maltese economy that restricts the potential benefits of interactions between the University and local business, the present state of affairs may be optimal for both parties. It would indeed be more beneficial for the University and local businesses to tap into supranational, especially European, research and innovation networks that are more suited to their specific capabilities and needs.

The striking disparity between the propensity to innovate of Maltese SMEs, defined as companies having 20 to 249 employees, and their EU counterparts emerges clearly in the Innovation Scoreboard 2002. While 44% of EU-15 SMEs were reported to have introduced new products or processes through either in-house activities or in combination with other firms, only 16.6% of Maltese SMEs did so. This percentage is well below the lowest percentage registered in an EU country, which was 20.1%. Moreover, only 5.1% of all manufacturing SMEs, including non-innovatives, had any cooperation agreements with other independent enterprises or institutions in the three years before the first-ever Community Innovation Survey (CIS), which was launched in 2001, compared to 11.2% in the EU. This indicates that, over and above the fact that the knowledge creation process is weak, knowledge transfer from research entities to companies and between companies is very limited. It has been pointed out that R&D institutional capacity needs to be funded appropriately to build up potential for knowledge transfer to SMEs.[53] A recent report published by CORDIS, outlining the challenges for innovation policy in seven of the CCs among which Malta, states that innovation policy is not yet a focus of decision-makers' attention in Malta. The key conclusions of the innovation policy profile for Malta relating to the same study are that:

- The support framework for innovation in Malta, encompassing Government, society, business, institutions and NGOs requires further development in order to be effective
- Innovation efforts require better research community industry co-operation and improved local and international networking
- Lacunae in human resources are a major constraint to R&D and innovation activities in Malta[54]

D2.1 Trends in Innovation

The efficiency of the generation and application of knowledge depends on the degree and reliability of the protection of intellectual property – patents, copyrights and trademarks. Effective intellectual property protection is an essential cornerstone for creating an attractive investment climate. Firms planning to develop and market innovative products will not invest without assurance that their trademarks are protected. In view of this, local legislation concerning intellectual property rights has been recently updated to reflect current practices within the European Union. Nevertheless, obtaining a patent can still be a time-consuming process. The cost of patents varies according to the number of years for which the patent is held, from €60 for four-year patents to €180 for fourteen-year patents. Table D1 shows the applications made during the last ten years for trademarks patents and designs, and the revenue collected from these applications.

[53] Micallef & Restall, 2002
[54] Island Consulting Services, 2003

Year	Trademarks	Patents	Designs	Revenue (€)
1990	791	28	40	122,334
1991	947	27	9	143,737
1992	919	25	32	120,133
1993	845	24	30	117,279
1994	974	42	52	156,895
1995	1,284	24	9	150,034
1996	1,415	24	30	168,201
1997	1,443	46	59	195,544
1998	1,604	34	14	231,239
1999	1,469	83	24	235,014
2000	1,615	116	34	256,861
2001	2,840	133	10	422,714

Table D1: Applications for trademarks, patents and designs, and revenue collected[55]

All patents that are granted in Malta fall under the Maltese jurisdiction irrespective of whether these are made by local or foreign applicants. Pertinently, the majority of patent applications are filed by non-residents. As is evident in Table D2, there has been a marked surge in the number of patent applications filed by non-residents since 1999.

Year	Filed			Granted		
	Residents	Non-Residents	Total	Residents	Non-Residents	Total
1994	21	21	42	3	17	20
1995	11	13	24	8	11	19
1996	6	18	24	2	10	12
1997	22	24	46	0	2	2
1998	8	26	34	7	21	28
1999	11	72	83	10	25	35
2000	23	93	116	21	68	89
2001	26	107	133	19	78	97

Table D2: Patents filed and granted[56]

The number of EPO and USPTO patent applications in high-tech classes, which include pharmaceuticals, biotechnology, information technology and aerospace, is extremely low, as shown in Table D3. These figures points to very low R&D activity that leads to knowledge generation and to commercial products.

[55] Source: Industrial Property Office (Malta)
[56] Micallef & Restall, 2002

Year	EPO High-Tech Patent Applications	USPTO High-Tech Patent Applications	Total
1996	1	n/a	1
1997	0	1	1
1998	0	0	0
1999	1	0	1
2000	0	0	0
2001	0	1	1

Table D3: EPO and USPTO high-tech patent applications[57]

D2.2 R&D Expenditures

Until recently, there was no organised, regular collection and compilation of data and indicators regarding innovation activity in Malta. Sporadic reports on Science, Technology and Innovation relied on indirect indicators for economic activity, education, government finance and social statistics compiled by the National Statistics Office (NSO). The NSO is now engaged in compiling data specifically intended to measure scientific, technological and innovation activity in Malta with the first results being published in 2003. Towards this end, a number of surveys are already being conducted by the NSO. These include the Community Innovation Survey (CIS) III, encompassing the Obstacles to Innovation Survey, which was launched in 2001 by the NSO with the cooperation of MCST, the base year for the collection of statistics being 2000. The exercise is part of a national R&D audit involving two main tasks. The first task is a quantitative audit covering R&D and innovation statistics. The second task is a qualitative audit covering the R&D setup and evaluations of excellence in particular sectors. Related to these are a number of other tasks, namely compliance with the EU Benchmarking Exercise and the Malta Innovation Relay Centre project. Ultimately, R&D indicators are expected to be used to examine the impact of innovation and technological change on economic growth, establish the main determinants of innovation, and outline the role of public policy in the strengthening of innovation and economic performance. It is expected that the indicators to be published for Malta would include those listed in Table D4.

[57] Micallef & Restall, 2002

INDICATOR	DESCRIPTION
R&D Inputs	**Expenditure**
1. GERD:GDP	Government spending on R&D as a percentage of total government expenditure Percentage of GERD financed by business
2. BERD:GDP	Business enterprise spending on R&D as a percentage of total GDP
R&D Inputs	**Personnel**
3. RSE:NLF	Research scientists and engineers as a percentage of national labour force Total R&D personnel FTE (full-time equivalent)
4. NUSO:TUD	S&T Departments in universities as a percentage of all university departments
5. STPG:TPG	Graduate and research students in S&T as a percentage of total graduate students
6. STUG:TUG	Undergraduate students in S&T as a percentage of total undergraduate students
7. PGA	Post-graduate S&T students studying in EU, USA, Japan and Canada
R&D Performance	
8. SCI:NAT	Number of articles by author according to the Scientific Citation Index as % of the total (all countries) Number of publications by year
9. NAT:PAT	Number of patents per 10,000 of the population Total number of patents by year
10. STUG:TUG	Number of S&T students as a percentage of total number of students Percentage of female students

Table D4: Expected R&D Indicators for Malta

D2.3 Private and Governmental Contribution to R&D

Some data regarding private expenditure on R&D has been garnered through the CIS, the first results of which were published in March 2003. The published figures measure total expenditure on a number of different activities of relevance to innovation, including in-house and extramural R&D, machinery and equipment linked to product and process innovation, spending to acquire patents and licences, industrial design, training and the marketing of innovations. The radio, television and communication equipment sector (NACE 32), which includes the electronics sub-sector in which ST Microelectronics features predominantly, accounts for the largest share of innovation expenditure, with a hefty 68.4% equivalent to over €150 million in 2000, most of which is expenditure in the form of acquisition of machinery and equipment. The post and telecommunications sector (NACE 64) ranks a distant second with 15.4%, €35 million in 2000, most of which consists of expenditure on equipment related to mobile telephony. Innovation expenditure in food and beverage production (NACE 15) in 2000 stood at around €6.5 million, half of which was spent on training, marketing and design. The rubber and plastics sector (NACE 25) spent around €5.5 million, most of which on machinery and equipment. Innovation expenditure in sectors like paper (NACE 21), printing (NACE 22), chemicals (NACE 24), and medical, precision and optical instruments (NACE 33) averaged €3 million. By EU standards, R&D expenditure by the business sector (manufacturing and services) is very low at just 0.12% of GDP compared

to the EU-15 average of 1.28%.[58] Yet, innovation expenditures as a percentage of all turnover in the manufacturing sector stands at 7.8% for Malta, well above the EU-15 average of 3.7%. This indictor is grossly influenced by the activities of ST Microelectronics in the electronics sub-sector.

The CIS results which were published in March 2003 point to economic factors in general as the main obstructions to innovation expenditure. Nearly 20% of the respondent enterprises felt that innovation costs were the major deterrent, while for another 18.3% the high economic risk associated with innovation investment was the foremost inhibiting factor. A lack of adequate financial resources was cited by 16.3% as their greatest obstacle to this type of investment.[59]

A 2001 amendment to the Income Tax Act provides for 120% of any expenditure on scientific research carried out in Malta incurred by persons in any trade, business, profession or vocation to be deductible from total income for the calculation of income tax due. This amendment widened the scope for such deduction to all enterprises.

Data for public expenditure on R&D, including the funding of higher education institutions, is not yet available. A specific questionnaire has been sent to public entities in this regard and the first results are expected to be available in the last quarter of 2003. Data for public expenditure on education (see Section G1) indicates that the governmental contribution to education compares well to that of other countries and the EU-15 average, but only part of this expenditure goes directly into R&D, and that part may be relatively small.

D3 Sectoral Technological Development

D3.1 The Role of Specific Sectors in Take-Up

IT solutions have generally been sought first by the larger businesses which have the financial capacity to invest in such technologies. In this context, banks together with foreign-owned export-oriented companies have contributed significantly to take up. With respect to fixed telecommunications technologies such as ADSL and ISDN, which are in the domain of Maltacom, and network solutions, such businesses have led the way in generating demand and stimulating take-up. Lately, Government has also assumed the role of creating the critical mass required for faster take-up of new technologies. The agreement that the Government has reached with Microsoft could also facilitate take-up of software related technologies.

The mobile telephony duopoly is leading technology take-up from the supply side, largely stimulated by the apparent strategy to compete in terms of product roll out rather than price. The take-up of ICT services is “still low” according to the CEO of Vodafone Malta Ltd. During an exclusive interview carried out during the course of writing this monograph, he attributed this fact mainly to low affordability levels in comparison with Western Europe noting that SMS messaging has practically substituted voice calling in Malta precisely because it is much cheaper than a voice call. In the first quarter of 2004, the Maltese sent over 83 million SMS messages. An SMS message costs as little as €0.05 in Malta, much less than in most European countries where the cost of an SMS message is closer to that of a voice call.

[58] Micallef & Restall, 2002
[59] NSO News Release No. 40/2003

It must be mentioned that the cost of voice calls in Malta is among the highest in Europe (see Section E).

The number of mobile phone subscribers reached a peak of nearly 280,000 in the last quarter of 2002. The number of subscribers in the first quarter of 2003 was 16.5% higher than in the same quarter of the previous year. Total mobile-to-mobile call time was 40% higher, with messaging increasing by a similar amount. At the end of March 2004, the number of mobile phone subscribers stood at 291,380. The year-on-year growth rate for the same quarter was 6.1%, down from 16.5% a year before, indicating that while mobile phone penetration is still on the rise the market may be approaching saturation when 72% of the Maltese, compared to 80% of EU citizens, are subscribed to a mobile network. Total revenues from mobile operations are reported to have increased from €83 million in 2002 to just over €100 million in 2003, representing a substantial increase of 21.4%.[60]

D4 History of Investment in IST and its Effects

The information society is fairly new, though rapidly developing, in the Maltese Islands precisely because there is no long-standing history of investment in IST. The effects of the recent drive for investment in IST are largely still to be felt.

Key Points

On the positive side:

- Malta appears to have a relatively good research capability, even though indigenous innovation is weak
- Proliferation as well as use of mobile telecommunications has accelerated over the last couple of years, even though operators claim that take-up for the more innovative services is low and the market is close to saturation

Yet, it is an undeniable fact that Malta has a very weak tradition in innovation and R&D and such activity remains constraint by cultural as well as financial considerations:

- There weak links between the research community and industry as well as between the more innovative, export-oriented, foreign-owned businesses and the domestically-oriented sector
- Both public and private expenditure on R&D is low

The IST sector can nonetheless exploit a number of opportunities:

- Government has assumed the role of creating the critical mass required for faster take-up of new technologies
- The agreement that the Government has reached with Microsoft could facilitate take-up of software related technologies

These opportunities may be threatened by a number of critical factors:

- Due to the small size of the country, the provision of certain services may not be economically viable at a price that does not prohibit its take-up

[60] Malta Communications Authority (2004)

- While Government has assumed the role of creating the critical mass required for faster take-up of new technologies, the current state of public finances may impose severe constrains on the extent to which it can possibly fulfil this role

It is evident that Malta is too small a country to rely on domestic demand for the development of a sector such as that of IST applications, which typically presumes a strong element of R&D and innovation. It is only by looking for niche market opportunities, as well as business partnership arrangements, beyond the local shores that the development of IST applications can be economically feasible for Malta.

E. IST PENETRATION

According to International Telecommunication Union (ITU) figures, Malta had 207,269 fixed telephone lines in operation and 276,859 mobile telephone subscribers in 2002, when its population was estimated at 396,000. Malta is hence among those middle-income countries in which the number of mobile telephone lines has surpassed that of fixed telephone lines, as a result of extremely rapid growth in mobile telephony penetration over the past few years. In fact, mobile telephone subscriber growth was calculated to be 637% between 1999 and 2002, compared to a mere 5% growth in fixed telephone lines in operation over the same period. The number of personal computers was estimated at 90,000 in 2001 while the number of Internet users was estimated at 99,000. These figures translate into an increase of 29% in the number of personal computers between 1999 and 2001 and a staggering growth of 230% in Internet users over the same period.

Prior to discussing penetration levels in various sectors of the Maltese economy and society, it is pertinent to consider the cost of telecommunication services in Malta, which is bound to impinge on IST penetration levels to a greater or lesser extent, depending on the price elasticity of demand of the various sectors.

Malta's telephony charges are among the highest in Europe, for both international and domestic fixed line telephony, as well as for fixed to mobile telephone calls. Malta ranks among the countries with the highest charges for local fixed calls during peak hours. A comparison between EU member states and acceding countries, illustrated in Chart E1, shows the cost of a three-minute domestic call in Malta is higher than in fifteen of the current and future EU member states including France, Sweden, Italy, Germany, the Netherlands and Denmark. It must be noted that Malta's pulse-based charging system for local calls makes a three-minute call dearer in comparison to the other countries than a call that is closer to the duration of a full pulse, which is five minutes long during peak time. The effect of pulse charging is even more evident when comparing the cost of three-minute calls during off-peak hours. In fact, the Maltese rates for a three-minute local call during off-peak hours are the second highest, after those of Finland, as seen in Chart E2.

For international fixed line calls, Malta's charges are exceptionally high in comparison with tariffs in Europe. Malta's international rates are in fact much higher than those of any other European country, as is evident in Chart E3. Dial-up Internet costs are about four times the minimum in EU member states, although they are close to the average for acceding countries. For fixed to mobile call rates, captured in Chart E4, Malta ranks fifth at both peak and off-peak rates.

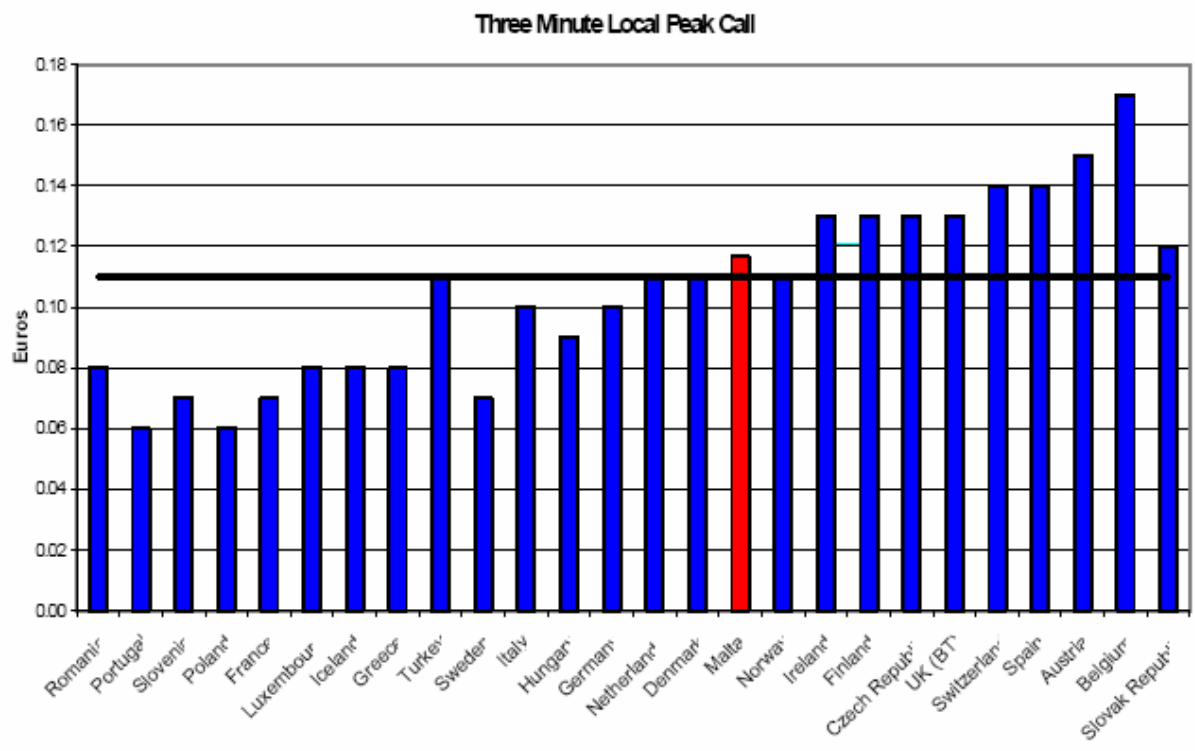

Chart E1: Three-Minute Local Peak Call Rates[61]

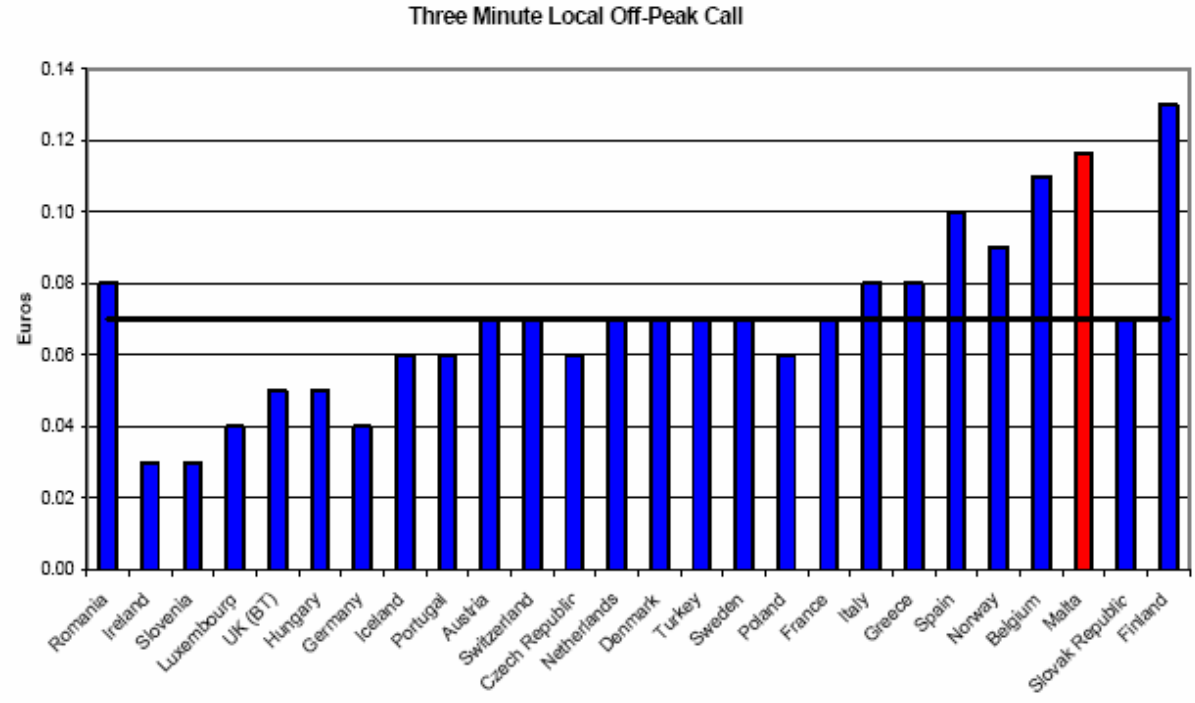

Chart E2: Three-Minute Local Off-Peak Call Rates[62]

[61] Source: Malta Communications Authority, 2004
[62] Source: Malta Communications Authority, 2004

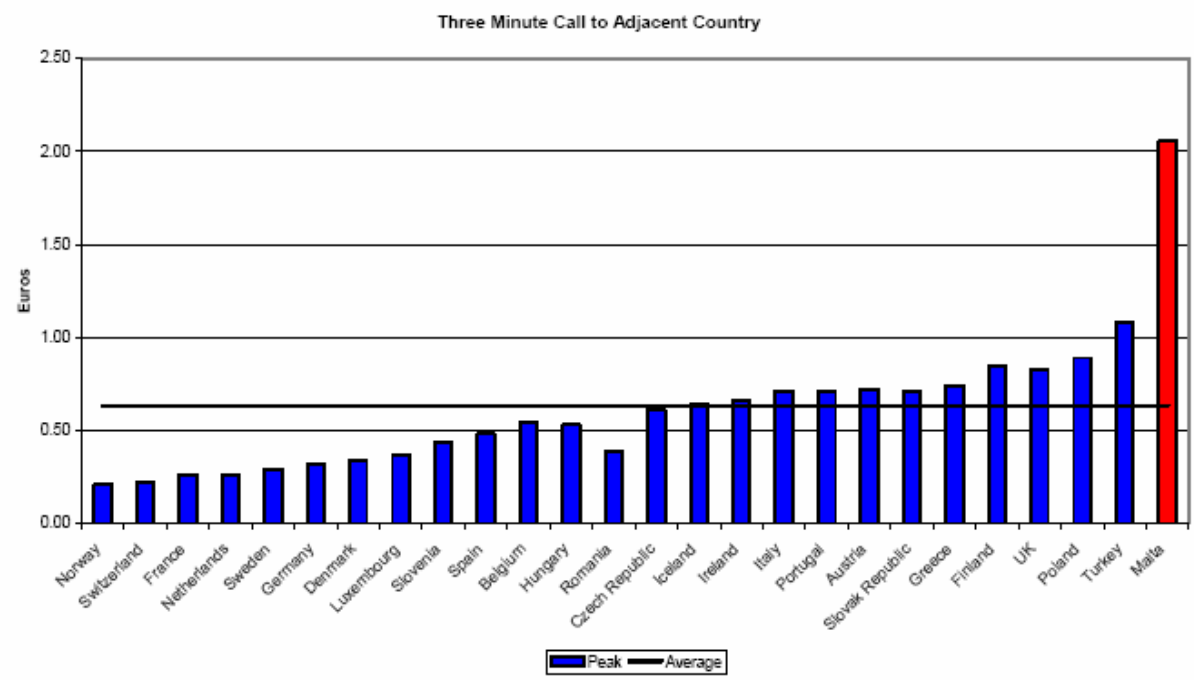

Chart E3: Three-Minute International Call Rates[63]

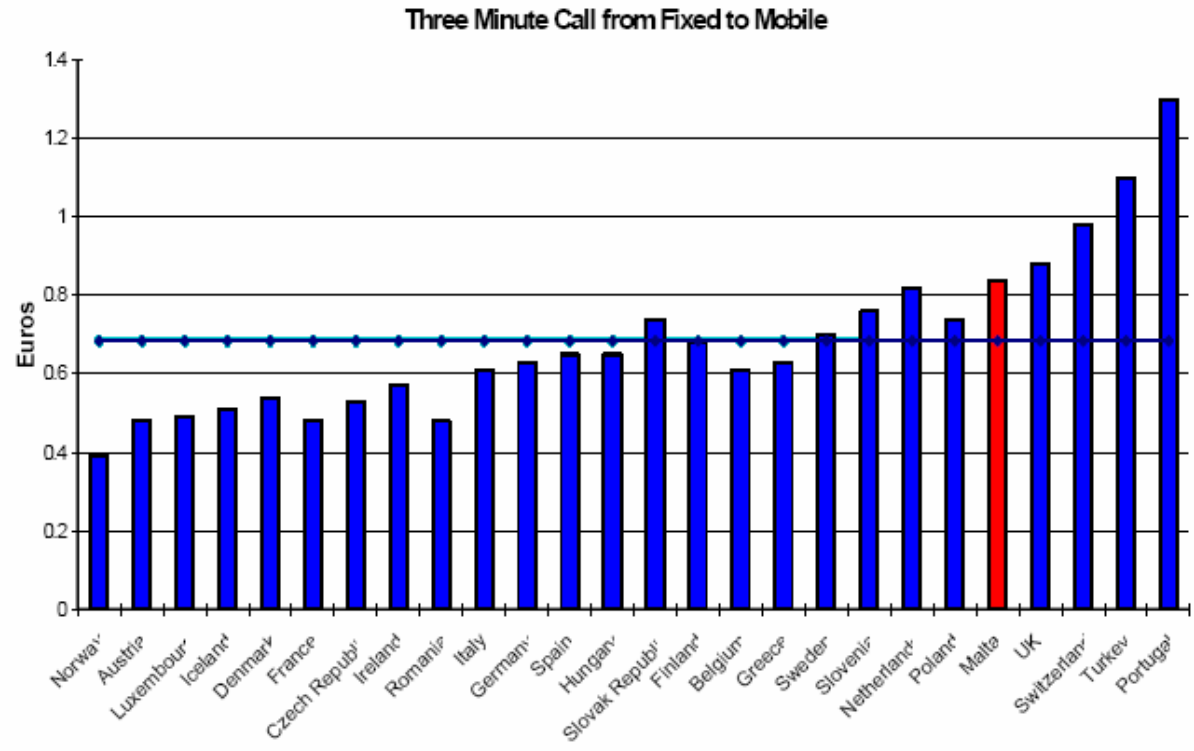

Chart E4: Three-Minute Fixed to Mobile Call Rates[64]

[63] Source: Malta Communications Authority, 2004
[64] Source: Malta Communications Authority, 2004

E1 IST in the Major Services Sectors

The major service sector in Malta is tourism. Malta, a country with a population of a mere 400,000, receives close to 1,200,000 tourists every year who generate close to €600 million in gross earnings. Around two-thirds these tourists visit the islands between May and October, to relish the obvious attractions of the Mediterranean summer and the Maltese beaches. Tourism is hence seasonal, in spite of the fact that Malta enjoys mild winters and the local authorities have been trying to promote Malta as an all-the-year-round holiday destination. Over 80% of tourists come from the EU. While tourist arrivals have stalled over the past couple of years, against the backdrop of an international economic slowdown coupled with travel security concerns, the number of cruise passengers visiting Malta has increased steadily over the past few years to over 340,000 cruise passengers in 2002. The Maltese Government has embarked on a project to construct a new sea passenger terminal in the Grand Harbour, which is one of the finest natural deep-water harbours in the world, to accommodate this promising industry. It is expected that, within a couple of years, Malta will be in a position to receive its visitors in a state of the art terminal equipped with all the amenities this discerning market calls for, including adequate IST facilities. At the other end of the market, tiny Malta is also a popular destination among Scandinavian and Italian students for English language summer courses, with a couple of the more popular sandy beaches being transformed into mini-Ibizas throughout the summer evenings.

Many operators in the tourism industry make use of ICTs, particularly Internet, to market their services to potential clients from all over the world. These include tour operators, hotels and farmhouses, the national airline which operates scheduled flights to Malta from over 40 destinations, and the Malta Tourism Authority itself which administers a number of websites promoting the Maltese islands. It is possible to book flights and accommodation in a number of hotels on-line, as well as to hire a car and obtain information about the main tourist attractions including ongoing events. It is, however, still not possible to book seats at the National Theatre on-line, for example. Nonetheless, the local tourism industry is one of the most electronically visible of all industries in Malta.

E1.1 IST in Telecommunications

In 1992 Malta became one of the first countries in the world to completely digitalise its network. This achievement led to Malta being described as the ‘role model’ for rapid development in telecommunications at the 1994 World Telecommunications Development Conference in Argentina. And, as both public and private investment in telecommunications increases rapidly, that description is still valid today.

The transformation of the telecommunications sector began in the late eighties, when the arena was dominated by Telemalta, a public company with a monopoly in fixed-line telephony. Its antiquated infrastructure was in no shape to support any of the innovations in communication technology that were taking the rest of the world by storm. Malta was lagging behind as Europe, Asia and the US connected with ever-increasing efficiency and speed. By 1988, a development plan was prepared, with the assistance of the International Telecommunications Union, for the expansion and modernisation of the national and international telecommunications system. In 1990, the first phase of this plan was

implemented and included the supply and installation of eleven digital switching AXE10 telephone exchanges, with a total capacity of 74,000 lines as well as the installation of 100 km of optic fibre cable to reinforce the infrastructure of the new digital telephone switching local exchanges. By 1992, Malta's entire fixed-line telecommunications infrastructure had been upgraded to the new, state-of-the-art digital system, and by 1995 the company was able to inaugurate an optic fibre submarine cable between Malta and Sicily that allowed high speed connectivity for all forms of voice, data and video communication into the global arteries that converge in Milan, Italy. Swiftly followed by further upgrades and additional improvements to the infrastructure, the years between 1995 and 2000 saw a constant improvement in service and the introduction of the latest technology and facilities, both for private and commercial customers. Facilities like line of sight satellite, leased lines, VPNs, ADSL connections and ISDN were offered, and adopted by local companies and institutions almost immediately. Meanwhile, Telemalta began to see the fruit of the previous decade's work, and in 1998 the name of the company was changed to Maltacom, and 40% of the equity owned by government was sold off during an initial public offering that same year, with the shares being listed on the Malta and London Stock Exchanges. Maltacom is still Malta's only provider of land-line telephony.

The complete overhaul of Malta's telecommunications infrastructure over the last 15 years or so has had an enormous impact on the way people work, live and play. Vastly improved telephone connections have allowed and facilitated the adoption of evolving technologies, creating the backbone for a thriving telecommunications-dependent information society that in turn powers the island's ambitions to become known as the ICT centre of the Mediterranean. The Maltese Government's investment in the national telecommunications infrastructure since the late eighties has led to the creation of a new industry sector that has served local professionals and foreign investors in all fields of business.

In the meantime, in 1990, the privately owned Telecell, now re-named Vodafone, had begun operating the island's first mobile telephone service, under licence conditions that granted them a monopoly until 2010. However, developments in the telecoms sector meant that by the year 2000 government had to think again. The year 2000 was a watershed year in the liberalisation of the telecommunications sector. The authorities realised that for the industry to progress further the only way forward was to dismantle monopolies and open the field to competition. As a result of these changes Maltacom was divested of its monopoly on fixed-line telephony in 2003, while Vodafone's monopoly was cancelled with immediate effect. The rapid, consequent entry into the market of Malta's second network operator, Go Mobile, Maltacom's mobile telephony subsidiary, allowed consumers to reap, for the first time, the benefits associated with competition. Go Mobile, immediately taking advantage of liberalisation, broke Vodafone's ten-year monopoly, precipitating a drop in prices of over 50%. This drop in prices led in turn to a staggering growth of 367% in the number of mobile users in just a few months, taking the total number of mobile telephone subscribers at the end of 2000 to 110,000. At the beginning of 2003, the two operators claimed to have 220,000 subscribers between them, which would mean that mobile phone penetration was at around 55.5% of the population.

The other major player in the telecommunications field, Melita Cable Television, currently Malta's only cable television provider, has also just reached the expiry date on its monopoly. It was expected to concentrate its efforts on using its state-of-the-art cable network to enter into the fixed-line telephony and interactive television markets, but loss of investment has forced the company to postpone these plans indefinitely. In the meantime, however, initial

competition for Melita is expected from Maltacom, who have signed an agreement with the British firm, Yes Television plc, to facilitate the technical aspect of its planned Video on Demand service.

The changing scenario necessitated updating legislation to cater for the newly created environment. January 2001 saw the appointment of a new telecommunications regulator, Joseph V. Tabone, whose reputation for being decisive and future-oriented ensured his appointment was welcomed by a sector still re-grouping after the upheavals of the previous twelve months. He was assigned with the ardent task of resolving issues such as open access to privately owned infrastructure and accusations of unfair competition by the leading players in the industry.

To the Maltese consumer, liberalisation of the telecommunications sector has brought myriad benefits, including a wider choice of service offerings, lower prices, more innovative services and accelerated adoption of new technologies. Privatisation has seen the Telemalta dinosaur evolve into the more efficient and competitive, Maltacom, which continues to invest in new technologies such as high speed data services, ISDN and optical transmission – all assets that strengthen its position in anticipation of the competition it faces since 2003. Maltacom has indeed come a long way from the old Telemalta the late 1980s. According to its top management, back then, it was inconceivable that Telemalta would continue to survive without its monopoly framework. It is now at the forefront of technological change and progress. Moreover, it has ventured into the area of mobile telephony. This market is currently experiencing exponential growth. The next growth area has been identified to be data transmission. Maltacom is also venturing into the area of multimedia after research and testing it for two and a half years.

The company considers itself to be a major player in innovation in terms of the services it provides. For example, it is now moving into areas such as wi-fi and ‘intelligent networks’. Moreover, one of its subsidiaries, Innovate, offers tailor-made software solutions and Application Services Provisioning (ASP). With regards to implementation capacity, Maltacom believes that there is currently enough capacity to satisfy the demand, and this can and will be increased as the demand necessitates. No less than 13 ISPs operate and provide ADSL and VoIP using Maltacom's infrastructure. Meanwhile, new opportunities are constantly being explored by several telecom operators, within the context of the full liberalisation of telecom services that is currently underway, in line with developments in Maltese legislation that are nearing the EU framework. Internationally, it has been reported that telecom companies have spent huge sums of money on licence fees and to gear up for 3G technology. In Malta, this newer technology is on its way but at a slower pace. The top management of Maltacom stated that the company's philosophy has been to try and approach 2.5G rather than 3G. In itself, this has enabled Maltacom to be at the vanguard of technological progress, particularly on the MMS side of technology, which is almost at 3G level. Maltacom believes that the provision of a better ICT infrastructure for industry to operate in has important spill-over effects across the whole economy.

In 2003, Government decided to introduce a service of Internet booths that allow access to the Internet at public places. Maltacom, together with its subsidiary Maltanet, supported this venture by providing the necessary equipment to make it work at a technical level. Maltacom has also set up a training college with the aim of equipping its staff with the technical, leadership and management skills it requires. The principal function of this college is to contribute to the development of human resources in the telecommunication sector through

distance learning technologies. This college offers training to both local and foreign students who want to specialise and obtain certifications in the area of telecommunications and also provides e-learning facilities to overseas students in various subjects related to telecommunications. A case in point is a course in investment decisions and fundamentals in telecommunication, which was launched recently.

On the international front, Maltacom has given a tremendous boost to Malta's visibility in the Global Telecommunications Network. This is evidenced by a series of prestigious appointments which include the current Chairmanship of the European Telecommunications Network Operators (ETNO) which is the strongest lobby group in the Industry at the EU, and the vice Chairmanship of the Commonwealth Telecommunications Organisation and the Chairmanship of the Gender Issues at the last World Telecommunications Development Conference held by the International Telecommunication Union (ITU) in Istanbul during 2002. Maltacom and the ITU have a long history of very close friendly and professional ties which reached a climax when in 1992 Malta was singled out as the first country in Europe to have a 100% digital system with a national state-of-the-art fibre optic transmission system, thereby graduating Malta into the ranks of the telecommunications developed economies. The pertinent infrastructural backbone was to serve as the platform for all the emerging new services that are current being introduced. These achievements paved the way for Malta to be chosen as the venue for the 1998 ITU's World Telecommunications Development Conference and the establishment in Malta through the Maltacom College of an ITU Division of the Global Telecommunication University, which was given the highest profile through when Malta's Prime Minister Hon. Dr. E. Fenech Adami and ITU's Secretary General Mr. Yoshio Utsami inaugurated the centre in March 2001. During a speech to inaugurate the ITU Global Telecommunications University and Training Institute at the Maltacom Training Centre in March 2001, Prime Minister Eddie Fenech Adami stated that, "We are on the brink of the new era of global interconnection. The provision of means to access the wide and ever increasing array of new technologies is essential in the achievement of the goal of universal access to basic communications." Clearly, the decision to locate the ITU's first regional institute on the island has given Malta's aspirations a further boost.

As the leading players on the local scene battle to win customers by offering the latest services and systems, the introduction of broadband technology and the reconfiguration of networks to improve coverage and allow for the introduction of next generation technologies, the establishment of an international training centre on the island can only serve to enhance the prospects for continuous improvement in the levels of services and efficiency offered to consumers.

Press reports dated July 2003 claimed that Maltacom had proposed that its tariff for 1Mb of bandwidth for VoIP services increases from €60,000 to €235,000, while the tariff for bandwidth for Internet access would remain the same at €60,000. Industry sources stated that VoIP operators could face a daunting future if the proposed increase of nearly 400% in the cost for the provision of bandwidth for VoIP were to be approved, since such an increase will put enormous economic pressures on their operations and could force the majority, if not all, of VoIP service providers out of business as the cost would be too high to provide the service competitively. The sources also claimed that another proposal was made to designate VoIP connection numbers as premium numbers with the result that subscribers would be charged a higher premium to make a telephone call. Other sources contended that such a move, if implemented, would go against the concept of fair trade and EU legislation. Meanwhile, Maltacom's subsidiary, Datastream, presented a report to the Malta Communications

Authority requesting that bandwidth is split in two different types – to distinguish between bandwidth reserved for normal internet usage and bandwidth allocated for VoIP services. Maltacom tariffs have in fact been revised across the board following approval of their tariff rebalancing proposal by the Malta Communications Authority (MCA) in May 2004. The exercise was in fact one of rebalancing tariffs, substantially reducing overseas call rates to more competitive levels while concurrently increasing the cost of other services, and included the introduction of a VoIP surcharge to the tune of €24,000 per annum plus 11c per minute, which is not as drastic as VoIP service providers had anticipated almost a year before, but still material. But the issue remains is not yet closed, especially since MCA published a consultative paper regarding VoIP less than two months after approving Maltacom's new tariffs. The paper, entitled 'Voice Over IP: Regulatory Principles for Innovative Services', is intended to address issues such as service definition and classification, quality of service, pricing, reliability, availability, numbering and billing as well as determining service providers' responsibilities and obligations.

It is interesting to see how VoIP has taken the local telecoms market by storm. The service was launched towards the end of 2002 and between the first quarter of 2003 and the same period in 2004, use of VoIP services increased by a staggering 400% to 5.6 million minutes. Gradually, more service providers have entered the market, heightening competition and creating greater awareness about VoIP services through their marketing. Significantly cheaper international rates combined with improved retail distribution and availability of prepaid VoIP cards are deemed to have fuelled the growth of VoIP, against a backdrop of declining international minutes on the Maltacom, Vodafone and Go Mobile networks.

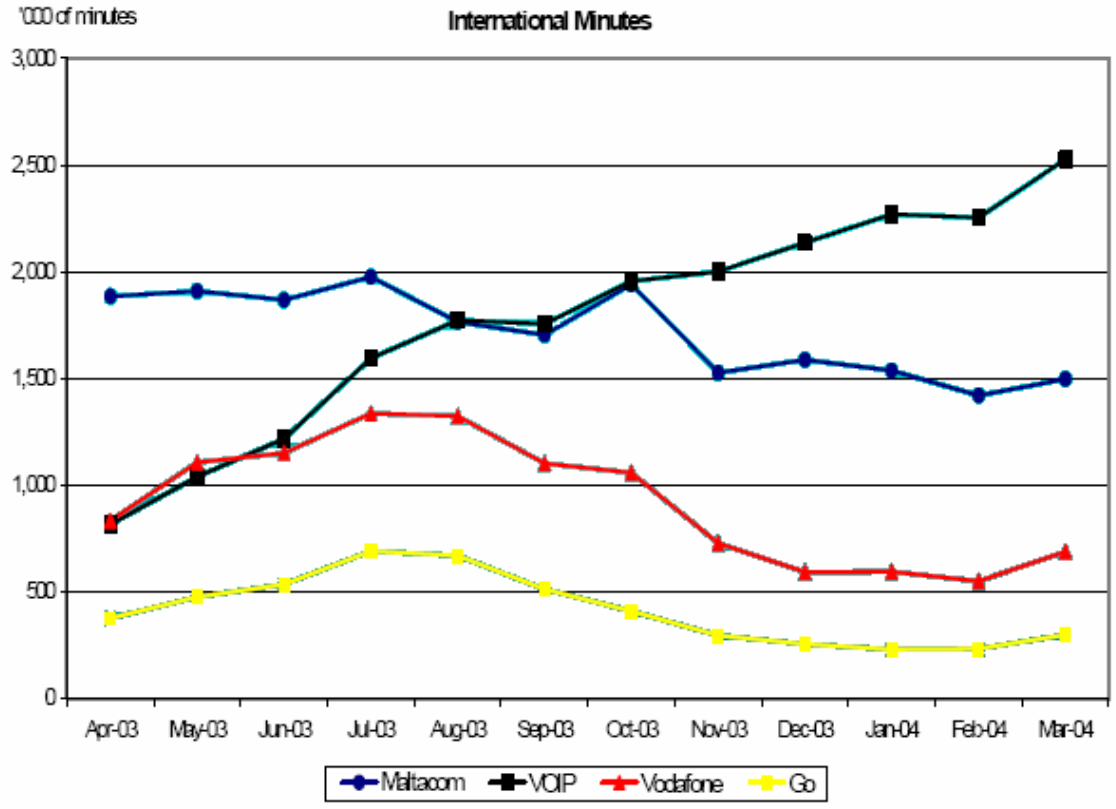

Chart E5: International Minutes[65]

[65] Source: Malta Communications Authority, 2004

E1.2 IST in Transport

IST penetration in transport services is still generally low. The transport sector in Malta is one of the least developed, least efficient and most expensive sectors in the economy, partly because of the small size of the market which limits the possibility of scale economies and partly because it is one of the most regulated sectors. The road network covering the islands is extensive, with over 1,500 kilometres of roads within an area of just 316 km^2, which reflects the high degree of urbanisation and population density of the country. The quality of the Maltese roads is at best described as fair, with some secondary roads badly in need of repairs. A German consultancy firm employed by government to make recommendations as to how to improve the road network estimated that it would require some €240 million to bring Malta's road network up to Northern European standards. The road repair process is an ongoing, albeit slow-moving project that experiences frustrating delays mainly due to the limited availability of funds for this purpose. It is hoped that now that Malta is a member of the EU, funds for this purpose will become available through the special aid programme. Possibly, some funds could also be made available for an adequate IST infrastructure to support transport services, particularly public transport. Internal public transport is catered for by an aging fleet of public buses, some dating back to the 1960s. Whereas tourists look at them with a certain amount of amusement, the locals have long given up on them and usage has dropped rapidly, increasing the use of personal means of transport on already congested roads. After extended bargaining, an agreement has been reached between bus owners, who operate the umbrella of an association which holds a legal monopoly on scheduled public road transport, and the authorities to introduce new user-friendly buses by March 2004. These new buses, together with greater operational efficiency ideally incorporating ICT usage, could encourage people to start using public transport more readily thereby relieving some of the congestion on the roads.

Transport between the two main islands of the Maltese archipelago, Malta and Gozo, is catered for by the Gozo Channel Company, which runs a regular ferry service between the islands. The company has recently upgraded its fleet adding three new state-of-the-art ferries designed and constructed specifically for the company by the Malta Shipbuilding. The Gozo Channel Company administers a well maintained website which gives up-to-date information about its service.

Malta has one airport, the Malta International Airport, which handles over 31,000 flights operated by over 50 different airlines, and over 2.6 million passengers annually.[66] A number of major international airlines, such as Lufthansa, British Airways, Alitalia and Emirates operate regular scheduled flights to and from Malta. Malta is also serviced by its own national airline, Air Malta, which was set up in 1973 and operates scheduled direct flights to some 45 destinations in Europe, North Africa and the Middle East. It is possible to book flight tickets with Air Malta online as the airline has a website which compares quite well to the websites of major international airlines.

[66] Malta International Airport

E1.3 IST in Financial Services

There are two major banks in Malta, namely HSBC Malta and Bank of Valletta (BOV). HSBC is a global banking group that bought over what was already one of Malta's major banks in 1999, while BOV is still locally owned with the Government being the majority shareholder. Both banks have more than 40 branches spread all over the Maltese Islands, which are networked together using industry-standard ICT. HSBC Malta has gradually adopted parent company software across its operations, since it was deemed necessary to have an operational infrastructure similar to that of HSBC branches worldwide, backed by a compatible ICT framework. They do, however, use the services of local IT companies as well, and specific companies have been identified by senior officials of the bank to be delivering highly satisfactory IT support services.

The major banks in Malta have historically sought to increase their market share in the banking sector by opening branches in almost every locality. With financial liberalisation, banks can now compete on several fronts other than the quality and proximity of their branches. Branches are in fact expensive to run and banks have been encouraging their customers to make use of technology-based banking facilities rather than queue at branches. The rapid increase in the use of ATMs, which may be found in just about every town and village, by most customers means that many people across generations are opting to use technology-based facilities. Recently, HSBC established a Call Centre as a main delivery channel of the bank. In an interview conducted specifically for this study, senior officials of the bank stated that HSBC has taken a deliberate policy to be phone-based in relation to their customers and the services it offers rather than Internet based because they believe that the demand for phone-in services is much higher than that for Internet banking. The bank has PC-banking facilities for business customers. Customer response to these services has been "positive across the board." HSBC now intends to move gradually more towards Internet banking, by introducing progressively more technologically advanced services. The sole setback to e-banking was claimed to be the huge investment required from the bank.

The other major bank, BOV, has been moving at a faster pace in this regard. BOV has in fact launched m-banking on 10th December 2003, fully conscious of the widespread use of mobile phones in Malta where two out of every three people own a cell phone. BOV customers can now effect banking transactions, view account balances and access a wide array of services through their mobile phone. This new service delivery channel constitutes yet another first for Malta and follows on the success enjoyed by BOV's Internet, Telephone and Call Centre Banking services launched just under a year before. BOV's m-banking now forms an integral part of Bank of Valletta's 24x7 suite of services. Access to this channel is safeguarded by the state of the art security system provided by the BOV Secure Key. A state of the art customer service centre supports all these four delivery channels. Over 16,000 customers have subscribed to BOV's 24x7 suite of services since the project first went live in December 2002. These have so far generated over 1,100,000 transactions through the system. While launching m-banking, the Chairman of BOV proudly stated that, "More and more of our customers are realising that, used in conjunction with our network of ATMs spread all over Malta & Gozo, our state of the art technology solutions have empowered our 24x7 subscribers to unprecedented levels so that visiting a BOV branch becomes necessary only when face-to-face interaction is truly necessary. The launch of m-banking consolidates BOV's position as the market leader in the provision of IT-based financial services. Moreover, this new concept of 'banking on the move' compliments our bank's philosophy of anticipating customer needs

and lifestyles by offering not only products and services but also delivery channels that are in line with current and perceived future needs. We are conscious of the increasingly sophisticated needs of our customers who require instant and straightforward access to service their financial needs."

The new m-banking service is available to those mobile telephony users who already subscribe to Bank of Valletta's 24x7 channels. Vodafone and Go Mobile subscribers may access the WAP portals of both these Mobile Service Providers and thereafter simply select the BOV m-banking icon to access the service. As in the case of Internet, telephone and call centre banking, the new m-banking channel gives access to an array of banking services 24 hours a day, seven days a week. Customers may view accounts balances, including those of their fixed deposit accounts and loan accounts. Transaction history related to particular accounts, transfer money from one local currency account to another, the payment of credit card instalments, as well as deposit funds into loan accounts are also available, as is the payment to third parties, the latter even if these have accounts with other local banks. Other services available are utility payments, such as telephone bills, water and electricity, cable television, Internet subscriptions and insurance premia. Other services available through BOV's m-banking channel include the stop payment of lost or stolen cheques, the ordering of chequebooks and statements, up-to-date information on rates of exchange, as well as information on the location of BOV's ATMs. Another facility that should prove popular with users is the 'currency converter' where the value of the Maltese lira may be compared to that of other major currencies and vice versa.

The new m-banking service is also expected to prove popular with business customers who subscribe to BOV's Internet banking. Transactions generated via the latter channel may now also be authorised and signed off via BOV m-banking. This added feature means that, thanks to his or her WAP phone, a signatory will be able to authorise any transaction when and where convenient with the same level of high-tech security provided by the BOV Secure Key system.

During an interview with senior officials of BOV, it transpired that the bank actively involved in the EU's Sixth Framework Programme (FP6). In terms of software development, it has even gone so far as to produce and sell Annual General Meeting (AGM) software for voting use. Meanwhile, the leading banks in Malta are currently discussing a joint investment in having common point of sale terminals. This will be mutually beneficial in terms of shared costs of investment and maintenance. The banking sector has also been approached by Government to introduce an online electronic point of sale (EPOS) system.

E2 IST in Major Manufacturing Sectors

Recently, the Government commissioned MISCO International and KPMG to run a survey directed specifically at assessing ICT-usage in businesses. The main purpose was to gauge the business use of the Internet, which is far different from its general use, and to ensure that what the government was doing was in line with what the people needed. From this survey, it emerged that two out of every three businesses that use the Internet carry out IT related training. In most cases, training is carried out both on the job and by sending staff on specific programmes.

Almost 71% of the Internet users interviewed said it was very likely or at least likely that they would make use of an e-market place given the right environment. In addition, about two of every three Internet users said that in principle they were prepared to invest in the necessary infrastructure that would enable them to receive payment by credit cards for orders on line. Moreover three out of four were prepared to seek the appropriate certification from their ISP to claim that their site was secure. Concern over the provision of information through the Internet is high particularly insofar as credit card numbers of financial information go. This applies to both government and private organisations. Despite the fact that the study indicates that there is a high percentage of businesses that do not use the Internet to conduct financial transactions, nearly 60% of non-users said they would consider it. The major reason cited for the non-use of the Internet for financial transactions were that the net is not considered to be secure and because there is no use for it in the business. Notwithstanding all this, users said that they perceived considerable benefits through the use of e-commerce, such that e-commerce would provide a larger shop window, faster transactions and access to larger and diverse markets.

Internet is used to send e-mails and for research purposes. Just under 70% of respondents who are Internet users had a corporate website and 43% of these offer transactions via their site, providing customers with the possibility of ordering online. This was considered an important marketing tool for 80% of these users. Over 71% of internet users were familiar with the existing government website and favoured the idea of having a government portal through which all government services will be accessible, indicating that their preferred method of obtaining an e-government service was by address their request directly to the department or ministry concerned and that they were ready to correspond via e-mail with Government. The likelihood of businesses using the services offered by a government portal seemed to be very high and expectations by Internet users were all business related: employee tax and NI returns, port licensing facilities/customs and VAT returns.

E3 IST in Public Services

One of the strategic objectives of the Ministry for Information Technology and Investment is to "strengthen the role of ICT in Government not only to improve service delivery but as a tool of extending democracy and accountability, eradicating clientalism and realise efficiency gains."[67] In furtherance of this aim, three tactical areas have been identified for this Ministry to work on over the coming years, namely:

(i) the use of ICT as a powerful management tool within the whole public sector, as an efficiency-realisation mechanism and as a measure to improve the quality of working life;

(ii) the proliferation of e-Government services; and

(iii) making the Internet a more secure place and introduce authentication mechanisms and trust-proliferation vehicles.

The effort to proliferate e-Government services is now a three-years-young project that has made a number of public services available electronically. These include:

- Servizz.gov: To submit questions, suggestions and complaints to public entities over the Internet (www.servizz.gov.mt)

[67] Source: www.miti.gov.mt

- Public registry: To order and pay for birth, marriage and death certificates online and receive them at home (www.certifikati.gov.mt)
- eExams: Students can apply and pay for their exams online (www.exams.gov.mt)
- Local Enforcement System: To pay contraventions issued by Police Officers and Local wardens on the Internet (www.les.gov.mt)
- Court Services: To check the status, sitting dates, deferrals and all information related to any civil case proceedings in the Law Courts (www.justice.gov.mt)
- Sentenzi online: A collection of the most important judgements since 1944 (www.justice.gov.mt)
- Laws of Malta online: A daily updated repository of all the primary and secondary legislation (www.justice.gov.mt)
- Marriage grants : Newly married couples can apply for their Marriage Grant online (www.msp.gov.mt)
- Services for the Elderly & Persons with Disability: Senior citizens and persons with disability can apply for a number of benefits over the Internet (www.msp.gov.mt)
- Acquisition of Immovable Property: Online services on the acquisition of immovable property in Malta by non-residents (www.aip.gov.mt)
- eLicences: To renew licences issued by the Trade Licensing Unit, the Malta Tourism Authority and the Malta Transport Authority (www.licences.gov.mt)
- Inland Revenue Services: To calculate tax due and lodge corporate tax returns with the Inland Revenue Department (www.ird.gov.mt)
- eVAT: To order manual fiscal receipt books, register for a VAT number online and submit VAT returns electronically (www.vat.gov.mt)
- eRents: A convenient and secure way to pay online your rent bills for government property in Malta (www.gpd.gov.mt)
- eLibraries: An online catalogue that it lets you browse all the books in all the Public Libraries (and the National Library) both in Malta and Gozo. Library patrons can renew their books' loan period as well as check the availability of the book online (www.opac.library.gov.mt)

More services are expected to be added soon. The include www.police.gov.mt, which would enable Maltese citizens as well as foreign residents in Malta to file 'non-urgent' reports with the Malta Police online through the new Police Services website, www.vetturi-licenzi.gov.mt and www.passaporti.gov.mt, which would offer vehicle license and passport license renewal services respectively.

E3.1 IST in Educational Services

During an interview held with Lawrence Zammit, Director of Technology in Education within the Ministry for Education, it was observed that several changes have taken place in the secondary and tertiary education sectors. In 1994, Prof. Juanito Camilleri drafted a report, entitled 'A National Strategy for Information Technology for Malta', that was funded by the EU's second protocol. This "rigorous" report outlined the directions for IT and dealt partly with the sector of Education. In parallel to this report, the EU provided funding for hardware and, with these financial resources, Government was able to furnish computer labs in all state

secondary schools. In 1996, the Minister at the time, on the advice of two Canadian consultants, went ahead with a programme to install computer labs in state primary schools. This resulted in one of the highest ratios of PCs to students in Europe (1 PC for every 7 students). Three years ago, it was decided that there should be Internet access in all primary and secondary schools. The project is three-quarters complete. It has proven to be particularly expensive because of the cost of networking in schools.

The Ministry of Education claims that, while it has invested substantially in hardware in schools, IT human resources are limited in supply and since government salaries are according to pay-scales that are fixed across the board and it is not possible to IT teachers to negotiate a higher salary than teachers of other subjects, it cannot compete with the private sector in attracting the required resources. Thus, with one personal computer (PC) for every seven students, Maltese government schools boast the highest PC per student ratio in Europe and all students have Internet access, their own e-mail address and their own personal web-space, but apparently there are not enough IT teachers available. This is partly because, due to lack of foresight and proactive planning, the University did not offer IT to undergraduates pursuing teaching careers before it was actually introduced in schools. Government is trying to bridge the gap by sponsoring undergraduate teachers who have an aptitude for IT for a part-time diploma in the subject and providing IT training for teachers after-hours, but funds to finance online resources and e-learning projects are limited.

When questioned about the lack of IT teachers in secondary schools being attributed to the unattractive salary, the Director of Technology in Education stated the Government will not discriminate between professional grade pay scales. Thus, he feels that private institutions will be the only feasible providers of IT education. This comes close to an admission that the Ministry of Education has partly abdicated the role of preparing students to pursue higher education in IT-related areas to the private sector and that, in future, the leading providers of such education will be private institutions. This position raises some concern because ultimately private tuition may not be financially accessible to everybody, and unless Government offers some form of assistance to promising students who may not have the financial means, such students may not be able to pursue careers in IT.

According to the Head of St. Martin's Institute for IT, a private IT education institute, there appears to be a general lack of interest in IT on the part of Maltese students. Indeed, it is often perceived as being a “difficult subject”. Moreover, this is compounded by the fact that parents instil in their children the sense that worthy careers are only to be found in law, medicine or accounting. IT is merely regarded as a subject as opposed to a tool. Thus, we have lawyers graduating in this day and age who do not know how to use a simple spreadsheet. Worse still, the computer is often regarded as an instrument to be used only if necessary to type documents. Some students even report having a phobia.

It was pointed out that the root cause of this starts much earlier. Parents should be the starting point for IT encouragement irrespective of whether the child opts freely for a traditional career or otherwise. The other – more serious – stumbling block is the lack of IT teaching staff. Naturally, in such a lucrative market, it does not make financial sense to settle for a teacher’s salary when one could be earning a substantially higher salary in the IT industry. This disparity in salaries, which arises directly out of the inflexible wage structure in the public sector, has crippled the provision of IT education in state schools. The result of this has been for Government to promote EDCL as opposed to the teaching of Secondary Education

Certificate (SEC) Level Computing. While the former is merely a course in how to operate MSOffice software, the latter provides the foundation for further IT studies.

On the other hand, the Chairman of the IT Board of Studies (BOSIT) within the University of Malta (UOM) observed that the level of Maths education, the foundation for any IT course, was "disastrous". Teachers are "not up to standard" and there is a severe lack of teachers in the subject. Moreover, there is minimal female participation in this field of study. In fact, from a survey carried out in 2001, it emerges that only 15.6% of IT undergraduates were female.

The results of this survey were established from the answers to questionnaires distributed to 145 Bachelor of Science in IT (BSc IT) students at the University of Malta. By July, 2001, 45 completed questionnaires were returned. The survey identified a number of significant issues: the low level of female representation in each of the streams, the number of students intending to pursue postgraduate studies overseas, the number of students intending to emigrate from Malta and the low number of graduates who will be available to the local IT sector immediately after graduating and for at least five years thereafter. These issues should be of concern, not only to the BOSIT and the UOM but also to Government and the local IT industry.

The reforms that have taken place so far with regards to IST in education have been "more than the best we could have achieved in the circumstances". Indeed, the IT infrastructure is in "top form" but it was pointed out that there are severe restrictions in the HR side. The trends are moving towards online resources and hopefully e-learning for teachers. However, this is a very resource-hungry exercise. One example is the school web-page initiative, which requires regular maintenance. Interestingly, the evolution of IT in education has focused on creating awareness at the primary level as well as the adult level, apart from the education of the secondary and tertiary levels.

E4 IST in Households

It has been argued that the much talked about "Information Society for All" can only be made possible if people have increased access to information and communications technologies. Consumption expenditure by households on telecommunications services increased in real terms from €120 million in 1999 to €173 million in 2003, mainly reflecting the significant growth in mobile and Internet penetration in Malta. This expenditure did not only grow in absolute terms, but more significantly, it grew in relation to other goods and services consumed by Maltese households. In fact, the share of expenditure on telecommunications services in households' total expenditure increased from 4.7% in 1999 to 5.9% in 2003.[68]

The increasing availability of these technologies has brought about changes in our society and culture. The sites of social change include home life, as well as workplaces, schools, communities and diverse organisations. The National Statistics Office (NSO) is fully aware of the increasing importance of statistical indicators that portray these changes and has in fact been collecting basic indicators since 2000. The prime objective of the NSO's survey on ICT usage in households, which was carried out in 2002, was to obtain relevant indicators from the people themselves. The results presented indicate who, how and how often are the people

[68] Malta Communications Authority (2004)

in Malta and Gozo making use of the modern technologies. It must be made clear that this survey was aimed at persons over the age of fifteen years and therefore, when we refer to population in the tables of this report, one must keep in mind that this term includes all the persons in the Maltese Islands aged fifteen and over. The first four questions in this survey were directed towards obtaining information on availability of ICT items within the interviewee's household. The remaining questions were aimed directly at the interviewee thus enabling the NSO to obtain information on the personal use and preferences of the individual in this sector.

The indicators on the availability of ICT items in the households immediately produced some interesting figures. Households with a desktop computer just surpassed the 40,000 mark, which means that in 2002, 38% of all households had access to a PC. The penetration of mobile phones in our society is already being recorded in the Information Society News Releases. This survey confirmed that a mobile phone has found its way into 74.5% of our households. The increasing penetration of satellite dishes connected to a TV was also confirmed as these amounted to 14.8%, or 19,110 households. Internet access in Maltese households was recorded at 31.3%. Regional indicators show that the highest penetration was in the Northern district with 36.9% of the households having access. Internet access in the Southern Harbour district was at the other end with only 23.8% of the households in this district having access to the Internet. The Innovation Scoreboard 2002, as well as that of 2003, identifies home Internet access and the positive trend in home Internet access as being one of the strengths of Malta. In 2001, the Internet penetration rate, which doubled over the previous year's level to reach 25.4%, was the third highest among CCs whose leaders in this regard, Estonia and Slovenia, hit the 30% mark.[69] It is pertinent to note that the increase in Internet penetration was much higher for Malta than for the EU-15, indicating that Internet penetration is well on its way to reaching the EU levels, as way be seen from Table E1.

Country	Level of Internet Access in Households (2001)
Netherlands	63.8
Sweden	60.7
Denmark	58.6
Finland	50.2
UK	49.3
Ireland	47.6
Austria	47.2
Luxembourg	43.0
Germany	38.4
EU-15	37.7
Belgium	36.4
Italy	33.5
Malta (2002)	**31.3**
France	30.1
Portugal	26.1
Malta (2001)	**25.4**
Spain	24.7
Greece	9.9

Table E1: Internet Access in Households[70]

[69] Source: trendchart.cordis.lu
[70] Adapted from NSO, 2003e

Information on the household income was also collected during this survey. This enabled the NSO to produce indicators related to accessibility according to the income bracket of the household. It is important to note that all tables with income categories relate to the accumulated income of all the household members. As expected, the lowest penetration of Internet was in the €0-€5,000 income group where only 3.7% of the households within this group had access to the Internet at home. The €19,000-€24,000 income group represents the highest accessibility group with 67.5%. The survey showed that 88,650 households still do not have access to the Internet. Interestingly, 58.8% from these households indicated that the main reason for not having Internet at home was that they considered the content not useful or not required. Only 3.4% or 3,050 households of those without Internet access indicated high access costs as the main reason.

The presence of Maltese-owned web sites on the Internet was also indicated. Persons having a personal web page totalled 9,790. Of these 59.6% were employed and 38.6% had a post-secondary level of education. As with other surveys carried out by the NSO, the education level relates to the highest completed level of education. A number of other indicators by educational level are also being presented. Another interesting figure was the number of persons having a personal e-mail address. This was estimated at 79,580. The survey results also distinguish between private and workplace related e-mail addresses. The number of persons with basic computer training stood at 30.5% of the surveyed population. Of these, 33.6% were in the 15-24 age group whilst, as expected, the lowest rate was the 55+ age group with only 10% having some sort of basic computer training. A very high percentage, 82.8%, of all students aged 15+ has attended basic computer training.

The use of computer is synonymous with the developments in the ICT sector. The survey showed that 34% of the total population indicated that they had used a computer during the reference period. Frequency indicators were also collected and these showed that 15.4% of the population used the computer at work daily. Results also indicated that 11.3% of the population used the computer at home on a daily basis. Computer users who used the Internet during the reference period were 82,880. This was equivalent to 26.8% of the total population and 78.7% of the computer users. Regional analysis indicated that out of the 82,880 Internet users, only 6.8% were from the Gozo and Comino district whilst the Northern District carried the highest percentage with 38.3%. The survey results also show that Internet users are more inclined to use the Internet at home or at work. Out of those that did access the Internet in other places, only 6.4% did so from a public library. Security issues during the use of the Internet were also investigated. A total of 9,870 persons claimed to have experienced security problems. This question was not restricted to the reference period only.

Indicators on reasons for using the Internet are also being presented. As in other countries, the sending and receiving of e-mails is very popular and 90.5% of the Internet users claimed to have used the Internet for this purpose. Purchasing over the Internet is still relatively low. Only 14.3% of those who accessed the Internet used it for this purpose and this figure represents 3.8% of the total population. The number of Internet users who accessed the Internet at home for work was also collected. Of the 15,310 persons in this category, 47.1% used the Internet to send work carried out at home to the work place (teleworking).

An analysis of the type of products bought on the Internet during the reference period showed that books, magazines and e-learning material are the most popular purchases. In fact 35.3% of the Internet buyers claimed to have bought these products from the Internet whilst the number of persons participating in lotteries and betting activities was negligible despite the

known partiality of locals for such activities. The survey showed that 17.2% of the persons who bought goods over the Internet claimed to have spent over €250. Of the total number of Internet users, 80% did not buy any products on the Internet. It was also estimated that 18.2% of the Internet users used a credit card to buy products or services. Of these, 78.1% were in the 15 - 34 age bracket.

The NSO is currently preparing for a survey on ICT usage in enterprises that should give a picture on the current usage of modern technologies by the local enterprises.

Key Points

IST penetration is comparatively high with respect to:

- Telecoms and particularly mobile telephony, which has proliferated rapidly over the last few years
- Financial services, which have traditionally been on the forefront of IST developments
- Public services, thanks to the e-Government drive
- Education services, where investment in the IT infrastructure has been substantial

On the other hand, IST penetration is weak or at best modest in the following sectors:

- Transport, which lags behind
- Tourism, where better and more innovative use of IST applications could be made
- Households, particularly the lower-income households

IST penetration is expected to increase if:

- The technology becomes more affordable for households and businesses as competition and/or regulatory policies pushes prices closer to European levels
- More businesses adopt IST technologies to reach the enlarged European market and/or to rationalise their operations

The major threat to higher IST penetration is:

- The natural monopoly that Maltacom enjoys with respect to fixed line telephony as well as a number of other services including ADSL broadband, which may keep prices artificially high and slow down the take-up of new technologies

F. INSTITUTIONAL CAPABILITIES AND REGULATORY BACKGROUND

F1 Regulation and Privatisation of Major Markets Affecting IST Industries

F1.1 Regulation and Deregulation

Malta is a relative latecomer in the field of ICT. Development in this sector was delayed due to the misguided policies that prevailed in the 1980s. There was in fact limited investment in ICT until a few years ago. The change in government of the late 1980s was eventually followed by considerable investment, with the driving motivations being EU membership and the recognition of the need for a knowledge-based investment. These dynamics impinged directly on regulation and deregulation policies in markets affecting IST industries, such as the telecoms market.

F1.2 Institutional Implementation Capacities

The Malta Communications Authority (MCA) came into being on 1st January 2001, assuming the previous responsibilities of the Office of the Telecommunications Regulator as laid out in the Telecommunications (Regulation) Act of 1997. The Authority is also intended to assume the regulatory function for posts and e-commerce. The main purpose of the MCA is to ensure a smooth transition to liberalised markets, to promote sectoral investment, to stimulate competition in the market and to safeguard the sustainability of those markets. The MCA is to remove existing barriers with the overall objective of ensuring sustainable competition and consumers' value for money. The approval by Parliament of the e-Commerce Act, earlier on last year, has added a whole new dimension to the field because the coming into force of the Act will mean that certain transactions carried out on the Internet will now have the force of law. According to the Chairman of MCA, the relationship between MCA and Government has been moderate so far but is moving towards greater independence on the part of MCA.

Several long-outstanding disputes between Maltacom plc and Vodafone Malta Limited have been amicably resolved in a mutually acceptable manner by means of an agreement that was signed between the two companies in July 2003. Some of the issues were the subject of judicial and administrative proceedings pending before the Malta Communications Authority, the Telecommunications Appeals Board and the Maltese courts. Much of the agreement reached between the two companies is technical, regarding issues such as the use of the international gateway and signalling systems. But this agreement did not address the big issue of Maltacom's shareholding in Vodafone, which is an issue with Vodafone International and not with Vodafone Malta.

F1.3 Privatisation Policies

Commenting on policy development in Malta in general and with respect to privatisation in the ICT sector in particular, the Chairman of MCA stated that policy in Malta tends to be reactive rather than proactive, even though there are encouraging signs that the policy attitude

is gradually changing to being more proactive. The impetus for the creation of MCA was EU membership, particularly since the telecoms sector was explicitly identified in the *acquis*. Government hence proceeded to formulating the liberalisation programme, relying on foreign consultative support. But the ICT sector's dynamic nature requires policy to be more proactive rather than to merely react in response to ongoing developments. The ICT sector is all-pervasive and hence reflects the underpinning of socio-economic development. Moreover, because ICT, by its very nature, is not constrained by geographical boundaries, the local ICT sector is constantly being affected by technological changes globally.

The Chairman of MCA feels that Government is ultimately the only major player who is committed to the policies being pursued, since the private players, namely Maltacom, Vodafone and Melita Cable, are not showing much commitment towards the liberalisation process. They are in fact considered to be "reluctant to open their networks". Admittedly, this is a costly exercise for these companies and MCA is hence planning to give a year's transition period for companies facing financial difficulties.

F1.4 Expected Effects of Policy on the Economy

Government's liberalisation programme for telecommunications, which was fully unfolded by the end of 2002, set out in clear terms an ambitious national agenda designed to end historic monopolies in fixed and mobile telephony, as well as in cable TV services. Paging services and cable television have been divested of their exclusive rights and a second mobile telephony operator has been actively competing in the market since December 2000. International gateway services, data services and the fixed telephony sector are also open to new entrants. The Maltese consumer had an insight into the manifest benefits of competition when Go Mobile, Malta's second mobile service provider, went operational. Over a couple of years, mobile penetration levels increased sevenfold, from 30,000 to 230,000. Today, almost one in two people own a mobile phone, and tariffs have been reduced by more than one third.

Internet service provision is a relatively new service industry locally with only a six-year history. In contrast to the fixed and mobile telephony and cable television market, the need for liberalisation was never an issue in this market, as no operator was ever granted monopoly rights. Since 1995 the uptake of Internet subscriptions has been encouraging and has grown steadily, with Internet participation now calculated to be approximately 35% of the population. Broadband Internet connections via cable and DSL (digital subscriber lines) were launched in 2000 and there has been a modest take up for both business and residential customers. Of the over 80,000 Internet subscriptions that were reported at the end of March 2004, nearly 25,000 were broadband connections. This means that broadband subscribers constitute 31% of the market and broadband penetration stands at 6.2%,[71] which is close to the EU average. This major progress in telecommunications capabilities and participation levels is a direct result of the liberalisation of the market where consumers now have choices and as a result are benefiting from lower tariffs and a better service.

[71] Malta Communications Authority (2004)

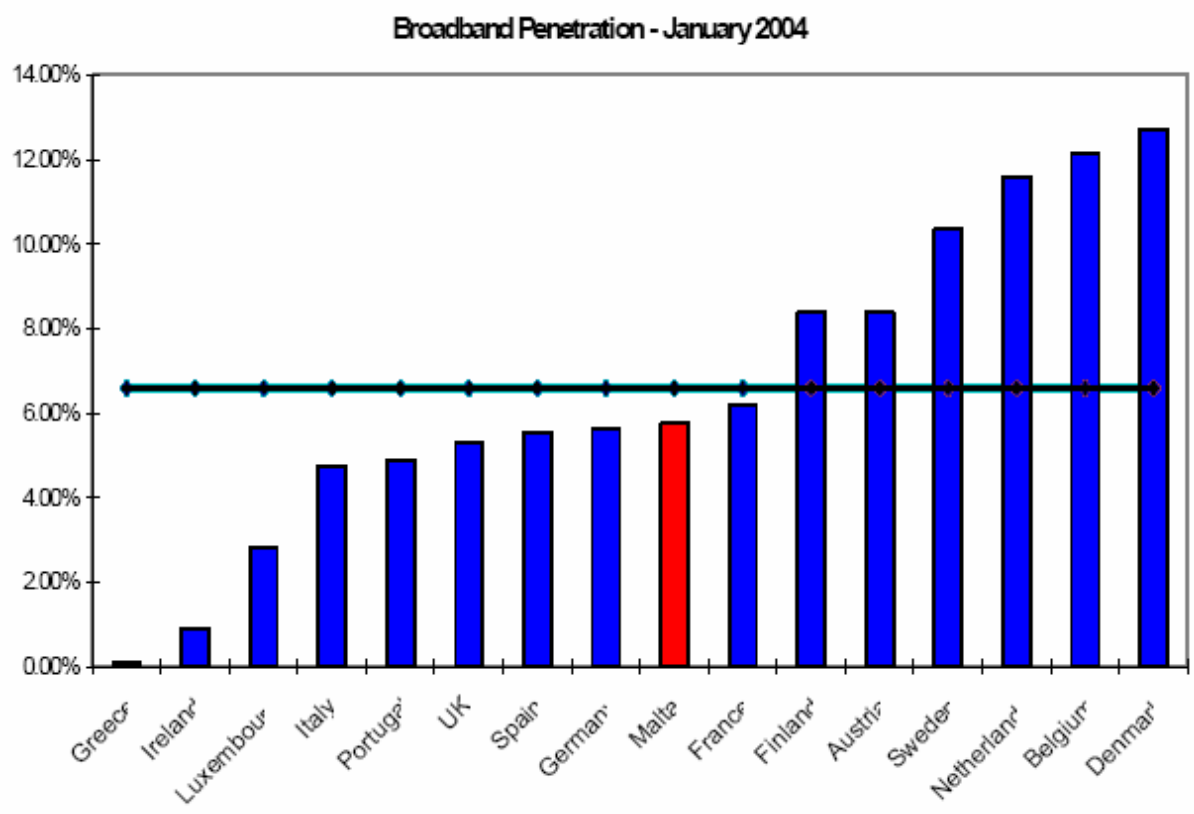

Chart F1: Broadband Penetration[72]

These initial but important outcomes of a regulatory presence in Malta augur well for the future. The liberalisation of telecommunications is vital in terms of the economic development of our country, because telecommunications constitute one of the critical underpinnings of our contemporary existence. The telecommunications sector is a sensitive one in which a stable environment is essential and crucial. In the past, Malta has missed out on business opportunities because it did not have the necessary infrastructure or because its costs were too high. A related vital consideration is the current reliance on a single physical connection to the outside world, this being a fibre-optic link between Malta and Sicily, co-owned by Maltacom and Telecom Italia. This is of concern to many would-be operators and investors and building redundancy is of the essence. Fortunately, there seems to be considerable interest in investments to address this by providing alternative links. Vodafone has in fact announced that it has contracted Alcatel to build a submarine cable between Malta and Sicily. According to the French company, Alcatel, the link will consist of a fibre-optic cable of high capacity that will be 250 kilometres long and will be laid at a depth of 3,000 meters. This cable will enable a considerable increase in data transmission and international voice telephony between Malta and the continent. Plans to upgrade to a Third Generation (3G) mobile system, using UMTS, are also being given due importance by the MCA and other agencies.

[72] Source: Malta Communications Authority, 2004

Key Points

IST penetration is comparatively high with respect to:

- The telecoms market has been liberalised
- The regulatory authority has been very active on the policy front and generally successful in handling disputes

The weaknesses of the local regulatory institutions are that:

- The are rather new institutions that are still in the process of developing their competencies
- They are not effectively independent from Government

Meanwhile:

- The second submarine cable link between Malta and Sicily is bound to generate interesting developments in the telecoms market, which could ultimately lead to more effective competitive in the market

On the other hand:

- Privatisation of Maltacom does not appear to be an imminent prospect and some of the inefficiencies characteristic of state-owned monopolies still linger on, threatening to impinge on the operating costs of the whole telecoms sector

G. EDUCATION, LABOUR SUPPLY AND IST-RELATED TRAINING

G1 Secondary and Tertiary Education

The secondary education sector in Malta comprises government schools, a number of Church schools and a few private schools. There are three types of secondary level government schools, namely, Junior Lyceums which are selective, streamed grammar schools that gear students for higher education; area secondary schools, which take in those students that do not make the grade for the Junior Lyceums, and other schools which are intended to lead students to take up a trade. Most of the Church schools and all the private schools are grammar schools. Students spend at least five years in a secondary school, from the age of 11 until the minimum school-leaving age of 16. There are several post-secondary education institutions in Malta. These include a number of government institutions and two Church schools that prepare students for tertiary education. There are also some government institutes that provide vocational and technical training. Private higher education institutions are also gaining ground.

Up to now, there is only one university in Malta, which is financed by Government and offers free tertiary education to all Maltese citizens having the appropriate pre-requisite qualifications. Recently, the Malta College of Arts, Science and Technology (MCAST) has been set up by Government with the aim of eventually offering degree courses as well. MCAST is intended to provide higher education in technical areas in particular.

Table G1 shows data for public expenditure on education for selected countries, including Malta. This data indicates that the governmental contribution to education compares well to that of other countries and the EU-15 average.

Country	Public Expenditure on Education as a Percentage of GDP (2001)
Sweden	8.3
Finland (2000)	6.0
Malta	**5.4**
EU-15 (2000)	5.1
Netherlands	4.9
UK (2000)	4.9
Ireland (2000)	4.5
Italy	4.5
Spain	4.4
Greece	3.5

Table G1: Public Expenditure on Education[73]

[73] Source: NSO, 2003e

G1.1 Achievements in Secondary and Tertiary Education

The percentage of the total population of working age, within the 25-64 age-bracket, having some form of post-secondary or tertiary education was found to be an extremely low 7% in 2001, compared to 21.2% in the EU-15. This indicates that the supply of advanced skills in general is limited and reflects the lack of opportunities for tertiary education that persisted in Malta for a significant number of years from the early 1970s to the late 1980s. The Innovation Scoreboard 2002 points to this factor as being one of the major setbacks for innovation activity. Encouragingly though, a significant number of Maltese undertake life-long training, either to consolidate on their formal education or to supplement the lack of it, particularly in the case of those generations who missed out on the opportunity to receive formal post-secondary or tertiary education. 9.7% of the population had participated in some type of education or training course, including initial education, further education, continuing and further training, training with their employer, apprenticeship, on-the-job training, seminars, distance-learning, and evening classes, during the four weeks in prior to a survey carried out in 2001. This compares well with an equivalent indicator of 8.5% for the EU-15. It also suggests that employers in the various sectors of the Maltese economy attach considerable importance to continuous training.[74] Participation in life-long learning is also highlighted in the Innovation Scoreboard 2002 as being one of the strong points for Malta.[75]

G1.2 Reforms in Secondary and Tertiary Education

Malta's education system is a legacy of the 200 years of British rule that came to an end in 1964 when Malta assumed its independence. For decades, developments in the education system were sluggish, culminating in severely restrictive policies such as the imposition of quotas on the number of students allowed to pursue degree courses at the University of Malta, a measure that was complimented by a subjective system of points, during the 1970s and 1980s. Such policies counteracted one of the few positive policies of the time which made tertiary education fully state-funded and free for all Maltese citizens, as it still is up to this very day. Due to the misguided policies of the 1970s and 1980s, Malta suffered a lack of adequately qualified personnel in many areas during the 1990s, when following a change of government in 1987, the economy started growing and demands on the labour force increased accordingly. At the same time, reforms in the education system aimed at encouraging more students to pursue tertiary education were implemented, generally with satisfactory results, particularly in the non-technical areas of study. Less success was registered in the scientific and technical areas, and as a result, Malta still suffers a lack of adequately qualified human resources in these fields.

One of the most momentous elements of the reforms of the last decade was the establishment of a national Secondary Education Certificate (MATSEC) in all subjects taught at Ordinary level as well as a national Matriculation Certificate, which is the general entry requirement for pursuit of degree courses, both under the umbrella of the University. Prior to the establishment of these certificates, Maltese students used to sit for Ordinary Level and Advanced Level examinations of UK universities such as the University of London and

[74] Micallef & Restall, 2002
[75] Source: trendchart.cordis.lu

Oxford. The syllabi for the national examinations have been broadly modelled on those of these UK universities, and at the Ordinary Level, the student has the option to take the standard paper or an easier one, in which case the maximum attainable grade would be lower but the chances of securing a pass mark are perceived to be greater. The full Matriculation Certificate requires passes in two subjects at Advanced Level and four subjects at Intermediate Level. These six subjects have to include at least one language, mathematics or a science subject, and a subject from the list of humanities. One of the Intermediate Level subjects has to be Systems of Knowledge, which features a fusion of elements of philosophy, history of art and scientific method as well as a number of artistic and scientific projects which the student has to undertake. This rather elaborate scheme was intended to produce prospective University students who have a broad spectrum of knowledge coupled with an appreciation of art and culture, some linguistic competence and sharper thinking skills. It appears that the system has been more effect in terms of broadening the knowledge spectrum and promoting cultural appreciation rather than improving linguistic and thinking capabilities, as many University lecturers complain increasingly more about the linguistic abilities of their students as well as their thinking skills.

Over the last decade, there have been some efforts to streamline tertiary education to fit better into European higher education systems, such as the European Credits Transfer System (ECTS). These efforts involved changing the structure of degree courses from a modular one to a credit-based one, and offering a more flexible curriculum of study that makes it a little bit easier for students to pursue part of their studies in other Universities under student exchange programmes. The streamlining exercise also entailed adopting the 3-5-8 higher education model proposed by the Bologna Declaration on Higher Education of 2000, to which Malta was also a signatory. According to this model, a first degree should be attainable within three years of study, a Master's degree after an additional two years, and a Doctorate after a total of eight years of study. The degree programmes offered by the University of Malta largely fit into this model.

Meanwhile, the last decade saw a consolidation of the University of Malta in terms of its Faculties and Institutes and the variety of courses that these offer, particularly at the undergraduate level. Many Faculties have grown tremendously over this period and are managing to offer a wider variety of courses to a much larger amount of students, with very modest resources. Some Faculties have also launched postgraduate programmes which are also attracting an increasing number of students as graduates are becoming more aware of the benefits of pursuing postgraduate specialisations. Yet, the number of postgraduate research fellows remains negligible and PhDs are few and far between. This may be one of the reasons why R&D activity is minimal, in spite of the potential attractiveness of the Island to doctoral and post-doctoral researchers.

The establishment of the Malta College of Arts, Science and Technology (MCAST) in 2001 was another important element of the reforms of the last decade. This College is intended to close the widening gap between basic and professional education and to promote technical and vocational training. Effectively, MCAST offers an alternative career path to a University degree, which may not be appealing to all students. Not surprisingly, it is receiving a good response, particularly from school-leavers who would otherwise seek jobs that do not require any particular skills, and which are becoming increasingly harder to come by. This augurs well for the future employability of Maltese youths.

G2 Mobility of Scientific and Technical Personnel

Employment in the medium-high and high technology manufacturing sectors of the economy[76] stood at around 7% of the total workforce in 2001, slightly below the EU-15 overall mean of 7.65%. Close to 45% of these workers are employed within the NACE 32 sector, reflecting the dominant level of activity by one multinational company in the electronics sub-sector. NACE categories 31, 33 and 24 are also of significant importance and together employ the same proportion of medium and high-tech labour as the NACE 32 sector. High-tech services, including post and telecommunications (NACE 64), information technology including software development (NACE 72), and R&D services (NACE 73) employed around 3% of the labour force in 2001, compared to 3.4% in the EU-15. Less than 20% of these high-tech service employees are employed in the IT sector while employment in R&D services is practically negligible. An increase in employment in IT services, particularly software-related, is required to surpass the EU mean.[77]

At a local level, job mobility is "rampant". Indeed, IT job promotions take place mostly by employees moving around between companies. On an international level, job mobility has been much slower. This is due to a number of reasons, namely, the cultural attitude of not wanting to leave home and secondly, the legal barriers for working abroad. Until Malta formally joins the EU, Maltese do not have an automatic right to work in other European countries. Thus, until 1st May 2004, the administrative and legal difficulties constrain the employability of Maltese abroad. After this date, it is anticipated that the IT industry in Malta will experience a brain drain. Although Maltese nationals will face tough competition from cheaper employees from the former Eastern bloc, their strong language skills including native English are considered to be highly desirable assets. In turn, it is expected that this drain on IT human resources in Malta will have to be compensated for by importing foreign expertise and labour in this sector. Indeed, the 2001 survey, when asked about their emigration plans, 44.4% of students said that they intended to leave Malta within the next 5 years. However, the results also showed that 66.7% of students intended to read a postgraduate degree up to five years after graduating. Of these, 52.9% selected "Abroad" as their preferred location for reading for this type of degree. This implies that there could be a positive side to this "brain drain" in the form of Post-graduates coming back to teach what they have learnt from abroad.

On the other hand, the IT private education sector will be positively affected by the anticipated increase in demand for its services. This is of particular significance because, in Malta, the opportunities to advance in IT research and development are severely limited mainly due to the fact that there are no corporation-size companies to fund such research.

The Director of Technology in Education of the Ministry of Education observed that in Malta there is a need for a "servicing industry". While programmers are necessary and useful, there should be a balance that includes people with different abilities such as technicians. These are in very short supply.

[76] These include chemicals (NACE 24), machinery (NACE 29), office equipment (NACE 30), electrical equipment (NACE 31), radio, telecom equipment and electronic components (NACE 32), medical and precision instruments (NACE 33), automobiles (NACE 34), and aerospace and other transport (NACE 35).

[77] Micallef & Restall, 2002

G3 Education and Innovation

Initiatives undertaken towards promoting a culture of innovation within the Maltese labour force may be broadly categorised into:

- Longer term academic training programmes
- Short-term training programmes
- Programmes intended to give practical business experience
- Initiatives towards promoting a training and innovation culture within enterprises

These initiatives are predominantly led by Government or Government-backed institutions. A number of private sector programmes are however also developing in response to a growing market demand. Although there is at present a dearth of data regarding the extent of activities under these initiatives, it is estimated that around 3% of the labour force is involved annually under at least one of the first three programmes above, generating a cumulative of 9% of the labour force since the inception of these programmes over the past few years. It is to be considered that at present, these initiatives are relatively novel, and while they could thus be satisfying a back-log in demand accumulated over the past years, participation in them could still be limited by the fact that their utility is still to be appreciated by the population at large.

The longer term academic programmes here considered to promote a culture of innovation are the MBA courses available in Malta. The principal programmes in this respect are offered by the Faculty of Economics, Management and Accountancy of the University of Malta and consist of:

- A full-time MBA course mainly frequented by recent graduates who opt to continue with their studies on a full-time basis
- A part-time executive MBA course for suitably qualified employed persons
- An e-MBA course that focuses specifically on electronic business issues

There are a number of other MBA courses generally available in Malta, those run by Henley College and the Maastricht School of Management being the most widely established. MBA programmes have been offered in Malta for the past 10 years and are considered to have contributed to the general upgrading of business and innovation skills of the labour force within the private and public sectors of economic activity.

The Malta College of Arts, Science and Technology (MCAST) opened its doors in September 2001 to provide technical education to full time students and on a part-time evening basis. Training is provided at a certificate level and is considered to be post-secondary but not of a graduate standard. It is aimed to satisfy the need for skilled personnel with technical and innovative abilities. The College consists of six Institutes concerned with Art and Design, Information and Communication Technology, Business and Commerce, Electronics Engineering, Building and Construction Engineering and Maritime studies. At present, this initiative is still at its inception and the Institutes have as yet the various Institutes have shown some evolution beyond the existing technical schools out of which they were conceived. The results of this initiative are thus as yet to be evaluated.

The specialised nature of skills required in a number of business areas are increasingly leading people to opt for short term courses that are directed to specific needs. The main providers of training in this field are:

- Malta University Services (MUS) Ltd, a private company owned by the University of Malta set up for the specific purpose of providing short term courses that have less of an academic and more of a practical content. MUS Ltd provides courses on Management Development, Computer Systems and Applications, Health and Safety at Work, Accounting Finance and Economics, Quality Management, and Professional Engineers Development
- The Employment and Training Corporation (ETC), a government institution whose mission is to contribute to reduce unemployment in Malta. ETC works towards its goals by improving information in the labour market and by providing training. ETC provides courses on Small Business Management, ranging from Entrepreneurship to Managing People to Managing Finance. Other examples of courses provided by ETC include Core Skills for Employment, Retailing Skills, technical courses on varied aspects ranging from Storekeeping to Refrigeration and Air-conditioning, and IT courses starting from basic skills to Java Programming to e-Commerce for Management
- The Institute for the Promotion of Small Enterprise (IPSE), a government institution whose mission is to assist in the restructuring of small business in Malta. Among the more important courses offered by IPSE are Business Planning for Small Entrepreneurs, Analysing New Business Projects, Obtaining ISO certification, Training the Trainers, Market Research Techniques, Utilisation of Information technology in Small Business, and e-Commerce opportunities
- A number of private sector providers of training services, such as MISCO, which specialises in management training, and Executrain which specialises in IT training
- The Foundation for Human Resource Development (FHRD), a sister body to ETC set up by Parliamentary Statute in 1990 specifically to promote training and human resource development in Malta, has a co-ordinating role in these activities by organizing a selection of the courses offered by the above institutions into a quarterly programme of events partly sponsored by Government which covers the following broad areas: Management, Sales and Customer Care, Skills Development, IT, and Miscellaneous skills. The University of Leicester provides consultancy in this respect. The role of the FHRD is discussed in more detail further on

Programmes intended to give practical business experience in Malta can be categorised under two principal initiatives. One is the Young Enterprise Programme, which entails a business competition for post-secondary schools on national and international levels. The other is the Kordin Business Incubation Centre (KBIC) that is being run by IPSE.

The Young Enterprise initiative was established in Malta in 1988 with a compliment of five teams that has since increased to around 30. Over 3,000 young people have participated in Young Enterprise since its inception, with an average of seven to eight schools per year. Fifty Business Advisers from the leading local companies volunteer each year to assist the teams. Young Enterprise Malta has achieved success in both European Trade Fairs and European Final Competitions. Ultimately, the Young Enterprise initiative is intended to serve as an educational experience and to equip students with skills that are required to create a viable ongoing business concern.

KBIC, on the other hand, is more intended to create a viable ongoing business concern rather than to merely serve as an educational experience. The practical assistance and advice that the incubation centre offers to business start-ups facilitates the development of learning organisations as well as innovation initiatives.

The Foundation for Human Resource Development (FHRD) has a leading role in promoting initiatives towards promoting a training and innovation culture within enterprises. The Foundation is a national, non-governmental organisation established to promote and support human resources development in Malta. The Foundation operates through a system of membership that is open to degree students, individuals, institutions and organisations of all sizes from the public and private sectors. The role of the Foundation is not as a direct provider of services but more as a catalyst to human resources development and as a co-ordinator of good policies and practices that aim to maximise the potential of people.

The foregoing discussion has listed a number of initiatives aimed at instilling an enterprise culture in the Maltese economy which would be conducive to innovation and business improvement, which are necessary to maintain the competitive edge in export business and to restructure domestic domestically-oriented business. These programmes are having an impact on the Maltese population and labour force, as they are reaching an ever-increasing number of individuals. It is nevertheless difficult at this stage to judge their effectiveness, as this would have to be seen in the light of the long-term development of the competitiveness of Maltese business.

Areas for improvement that can be identified at this stage are the following:

- Certain initiatives are still excessively linked to traditional academic training and not sufficiently responsive to dynamic business needs
- The implementation of initiatives by Government in terms of improved technical education may be overdue and the resources and commitment put behind the restructuring of traditional outdated and insufficient technical education may not be adequate
- Many of the programmes preach to the converted and are not being accessed by that section of the population that is accustomed to sheltered and subsidised environment, and is thus in greatest need to acquire an innovation culture
- These programmes may be complemented by greater efforts to instil an innovation culture in students at a relatively young age
- Greater use could be made of EU backed programmes to improve educational programmes aimed at promoting an innovation culture in Malta

The 428 responding enterprises in the first-ever Community Innovation Survey (CIS), which was carried out for base year 2000, employed 27,996 workers, of whom only 4.1% had received higher education. The sector that emerged to have the highest proportion of employees with a higher education background was the wholesale trade and commission trade sector (NACE 51), with 12%, followed by the financial intermediation sector (NACE 65) with 11.1%. The majority of researchers, a considerable 24.6%, were employed in the food and beverage production sector (NACE 15), while another 17.6% worked in the wholesale trade and commission trade sector (NACE 51). Expenditure on innovation in these sectors was reported to be marginal. The food and beverage production sector accounted for 2.8% of total innovation expenditure by businesses, while wholesale trade and commission trade

accounted for another 0.6%. Negligible innovation expenditure was declared by the responding enterprises from the financial intermediation sector.[78]

A recent report on innovation policy in Malta recommended that a National Research Technological Development and Innovation (RTDI) Programme is set up by the Government of Malta to be administered by the Malta Council for Science and Technology. Through the National RTDI Programme or otherwise, there should be financial support for scientific research in Malta along the whole chain of research and innovation, from basic research to near-to-market activities. The study affirms that industry research community collaboration is to be strengthened through specific initiatives.[79]

A national RTDI programme was launched in March 2004, with an announced budget of €700,000 for 2004, intended to fund between eight and twelve competitive and scientifically relevant projects falling under any of three sub-programmes, namely Capacity Building, Scientific Research and SME Collaborative Research. The programme is aimed at stimulating and building a culture for sustained scientific research and innovation activity by providing financial support for scientific research, ranging from basic and applied research to near-to-market innovation. It seeks to encourage public-private sector partnerships and cross-sectoral synergies, by providing financial support for scientific research over the whole research and innovation chain. Potential participants of the programme include SMEs, University, and other public and private entities including Foundations and Authorities. The funds are to be allocated on the basis of a public call for proposals, open to all legally established entities in Malta, and an external peer review system.

G3.1 The Research Performance of the Tertiary Education Sector

In terms of research, the Chairman of the Board of Studies of IT at the University of Malta stated that the University is well-equipped for research requiring resources such as libraries, e.g. historical research. However, insofar as scientific research requiring computing equipment is concerned, this is severely limited. Moreover, it has been very difficult to obtain financing because there is no coherent long-term research policy. This issue is currently being discussed but there is no policy yet. In the meantime, EU funding possibilities are being considered.

In an interview with the Director of Technology in Education of the Ministry of Education, it was observed that the fact that IT was introduced in schools before it was introduced in the BEduc Degree Course, left newly-graduates teachers somewhat out-of-phase, in terms of IT, with the students they were teaching. However, the Faculty of Education appears to be catching up and it was suggested that such situations could be avoided if trends are examined and University were to provide what is required. For example, next year a scientific evaluation will be carried out to assess the computer lab exercise in primary and secondary state schools.

[78] NSO News Release No. 40/2003
[79] Islands Consulting Services, 2003

G3.2 Issues of Technology Transfer and Innovation

Organisations such as the Commonwealth Network of Information Technology for Development (COMNET-IT) also contribute to technology transfer. COMNET-IT is a network organisation aimed at fostering the building and enhancing of networks of institutions and people through the mediation of computer networks. In an effort to encourage the transfer of technology and skills, COMNET-IT works on advancing literacy, especially among people from technologically-less advanced countries, in the use of IT-based communications networks as a means of improving and expanding communication between development actors. Since 1992, it has operated as a Commonwealth organisation under the supervision of the Management and Training Services Division (MTSD) of the Commonwealth Secretariat.

G3.3 The Role of the Academia in Innovation

This issue appears to generate different concepts of what the role of academia should or should not be. Some people believe that Maltese academia does have a role to play in the areas of innovation and attractiveness for FDI. Unfortunately, however, there is a significant "lack of entrepreneurial spirit". In Malta, an academic is considered to be "born not made". In other words, academics here have a tendency to become "professors" in name and live in an academic world far removed from the real world, with the consequence that they are never truly able to pass on practical, hands-on know-how. The role of academia as the Head of St. Martin's Institute for IT sees it should be fulfilled by people who are experienced in the field and who subsequently choose to spend some time lecturing and passing on their theoretical and practical knowledge to students.

On the other hand, according to the Chairman of the BOSIT, "the academia should not interfere with industry". While the role of University is to ensure that students are equipped with the necessary tools for students to work in industry, it was also acknowledged that professors need to be up-to-date. Nonetheless, it was felt that investment policy should not form part of academia. However, in the 2001 survey one of the main concerns listed by students vis-à-vis the relations with Industry was precisely that they wanted a closer association with industry together with longer work-phases.

G3.4 The Attractiveness of Academia for FDI

From an FDI perspective, the CEO of ST Microelectronics (Malta) Ltd. observed that a culture of innovation is not fostered at the University of Malta. Indeed, it is "frowned upon". The "chalk and talk" mentality tends to stifle innovation. Thus, while the general attitude towards innovation within management and engineering tertiary education is positive, the restrictive methodologies applied towards problem solving in undergraduate study in fields such as engineering are considered to "stifle innovation".

In general, the Directory of IT in Education of the Ministry of Education remarked that research performance in academia has been low so far. However, with the opening of a branch in Rome, he feels that it has been innovative as well as active in attracting foreign investment

in terms of "selling our knowledge" through the Maltese lecturers who lecture there. Moreover, he feels that the "EU orientation" will improve and broaden out outlook.

G4 ICT-Related Education

G4.1 Enrolment

The Chairman of the BOSIT commented that enrolment levels at the tertiary level in IT could be higher and this relatively low level is attributed to the education system not generating sixth-formers capable of entering University to pursue such courses in the first place. As Chart G1 clearly shows, enrolment levels in sciences are much lower than in humanities.

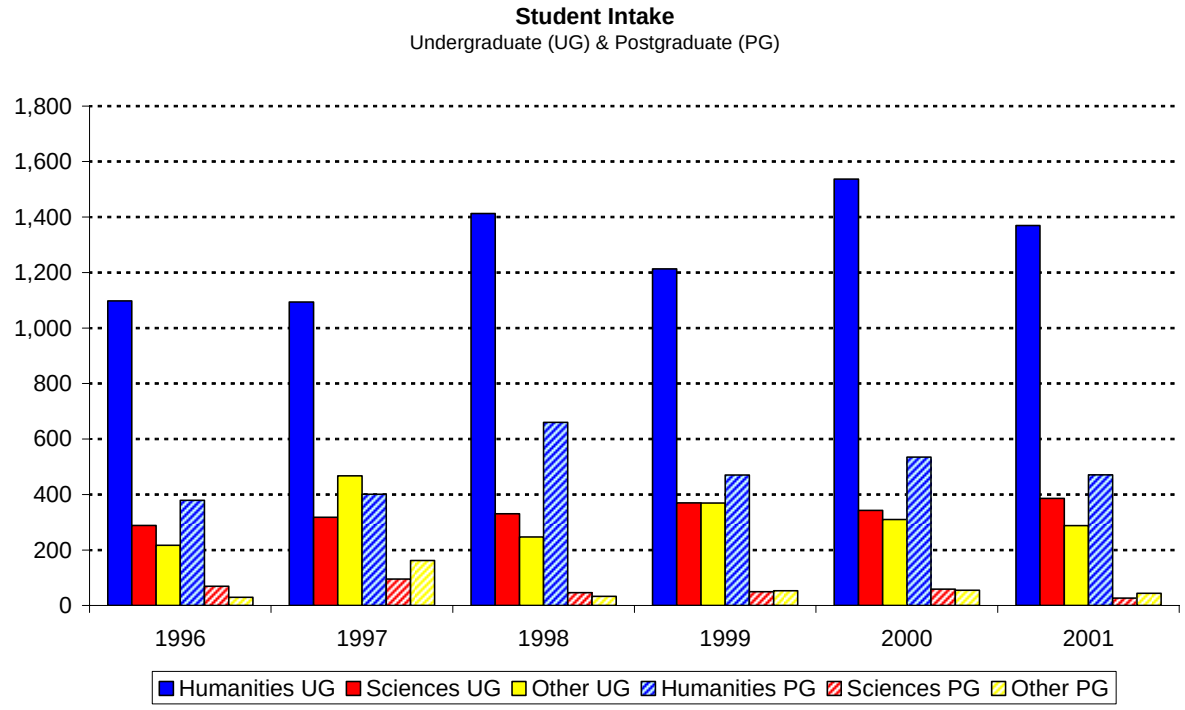

Chart G1: University Student Intake 1996- 2001[80]

On the other hand, the Director of Technology in Education of the Ministry of Education feels that the ECDL is a positive move and enrolment levels have confirmed this. An increase in the number of students taking Computer Studies at the Secondary Education Certificate (SEC) level in state schools is desirable. Nonetheless, it is not considered feasible for IT to be turned into a compulsory subject. Moreover, it was noted that SEC-level education is typically being done through private educational channels. The significant drop in interest between SEC-level and Advanced level is attributed to the heavy mathematical input of the subject and other more attractive career options. It is thought that the visibly higher earning potential in this field will serve as an incentive. Interestingly, there have been several successful adult ICT training courses organised by the ICT learning centre at the Ministry for Education.

[80] Source: University of Malta

G4.2 Institutional Resources

The institutional resources that have been set up have been very beneficial according to the Ministry for Education. These resources include: an ICT officer for primary and secondary schools, a training area and "support teachers" – ICT peripatetic teachers. The latter help the teacher to use ICT across the curriculum. The Director of Technology in Education emphasised the importance of IT as a tool rather than simply "another subject". In the primary schools, IT is used purely as a tool to improve mathematical teaching. However, there is an ICT focus group as part of the National Minimum Standards for curriculum that created guidelines for benchmarks for PC learning. In secondary schools, ICT applications such as MS Office, desktop publishing and drawing applications are used for the ECDL course. Online resources have also been introduced for teachers who also attend after-hours web-training. In fact, this training has been particularly successful in that over 1,000 teachers out of a total of about 6,000 teachers have attended on an annual basis.

In 1996, the University of Malta introduced courses leading to a degree in IT. From an IT infrastructure perspective, a network was set up on campus because there were the funds allocated for IT. This meant that the network was not set up because of a particular strategy. University does not control its funding; Government does. A board was created in 1989 with the intention of providing a strategic direction.

G4.3 Output

Science and engineering (S&E) graduates[81] as a percentage of the 20-29 year old population stood at a mere 6.1% in 2000, compared to 10.2% for the EU-15 in 2001. It is clear that still not enough students are choosing to study S&E subjects at the post-secondary and tertiary levels. It is widely recognised that this issue needs to be addressed with immediate urgency since a pool of S&E graduates are a prerequisite for increased R&D activity.[82] Encouragingly, the modest efforts that are being made seem to be bearing some fruit. While the Innovation Scoreboard 2003 identified the current number of S&E graduates to be a major relative weakness for Malta, it reported the trend for S&E graduates to be a major relative strength.

[81] From one-year diploma to PhD graduates (including diploma graduates of technical institutes) in life-sciences, physical sciences, mathematics and statistics, computing, engineering and engineering trades, manufacturing and processing, and architecture and building

[82] Micallef & Restall, 2002

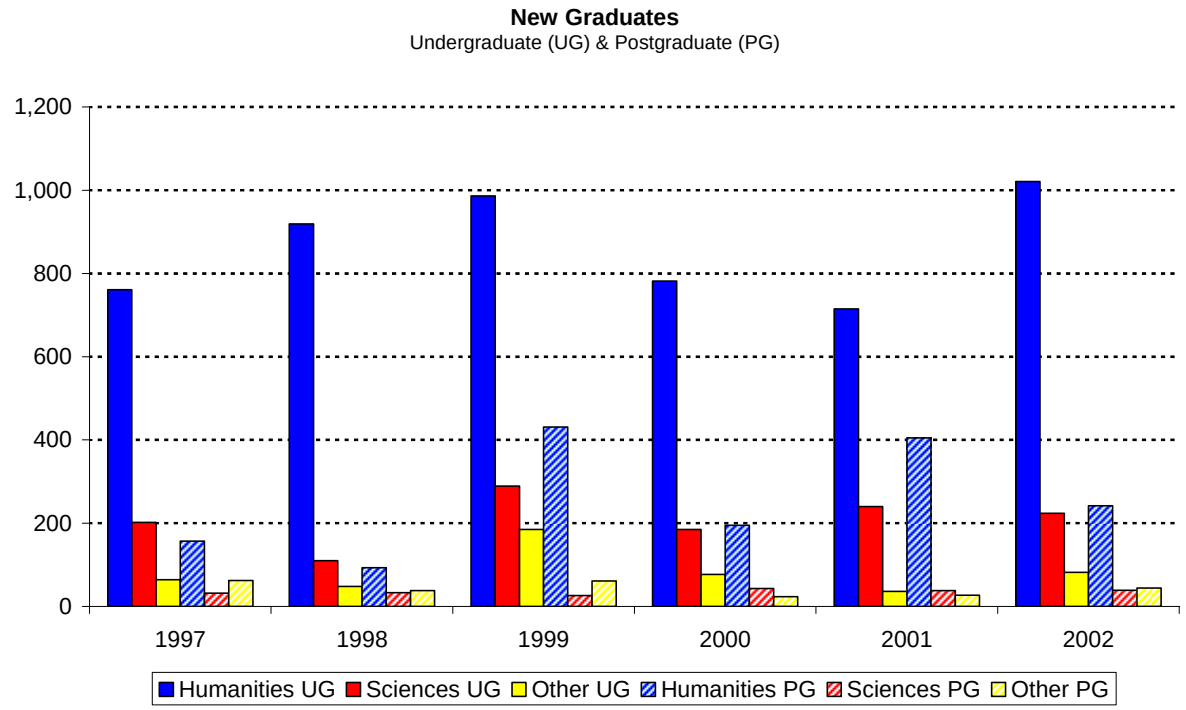

Chart G2: New University Graduates 1997- 2002[83]

The University of Malta claims to be very conscious of the need for its output of graduates to satisfy the demands of the economy. For this reason, it organises an annual Graduate Potential Seminar where developments in the labour market are discussed and programmes aimed at better fulfilling these needs are instituted. Yet, the University is generally reluctant to restrict entry into the more popular courses and does not offer any particular incentives to attract students to the less popular courses. This may be at least partly justifiable since the University, being an academic institution, may find it improper to deny a student from pursuing a particular course of study for its own sake, and ultimately incentives to attract students to particular courses should be a prerogative of Government rather than the academia. The University has a number of direct operational links with industry, particularly in the Commerce and Engineering fields, even though these may be too few and far between.

G4.4 Employment of the Newly-Trained

Out of every five businesses interviewed during the survey commissioned by the Government and conducted by MISCO International and KPMG to assess ICT-usage in businesses, three declared that they had not recruited any employees over the previous twelve months specifically for ICT-related tasks. Yet, it is a well known fact that the employability of human resources with ICT-related skills is among the highest, especially since the demand for ICT skills still surpasses the supply, at various levels and in different sectors of the Maltese economy.

[83] Source: University of Malta

Key Points

On the education front, Malta enjoys a number of advantages:

- Its education system is reasonably well aligned with both the Anglo-Saxon model as well as with the European model
- The language of instruction, particularly at the tertiary level, is English, and this facilitates internationalisation
- Enrolment levels have increased dramatically over the last decade, though mainly in humanities rather than sciences

On the other hand, there are some weaknesses which Malta has to mitigate:

- Malta has a relatively low number of graduates, particularly in scientific and technical fields
- Education is not contributing enough to innovation, partly due to the lack of popular interest in science and engineering, and partly because the education system fails to promote entrepreneurship among future graduates

There are a number of favourable prospects for Malta:

- EU membership is bound to increase both Malta's potential as well as the opportunities for internationalisation in education, and particularly in IST-related training
- MCAST is close in on a gap in technical and vocational education and this is bound to increase the employability of Maltese youths in the coming future

The major threat to higher education at the moment is that:

- The University may find it difficult to maintain its standards due to lack of adequate funding

H. NATIONAL AND REGIONAL DEMOGRAPHICS

H1 Age Distribution

Since the end of the post-war baby boom in the mid-1960s, all current member states and acceding countries of the EU have been experiencing perceptible ageing of the structures of their population. This phenomenon, which is closely connected with the decline in fertility, is being strengthened by the progress attained in life expectancy at higher ages. This development is jeopardizing social security systems that were designed for post-war population structures and constitutes one of the greatest challenges that modern societies have to face up to. Malta, which already has an ageing population, will experience acceleration in the ageing of its population, as will all acceding countries in the coming years. The aged-child ratio for the population of the Maltese islands stood at 68 old persons per 100 children in 2002, whereas the total dependency ratio stood at 46.09. Yet, Malta's population is still young by European standards. The 0-14 age group constitutes 18.9% of the Maltese population, whereas the 65+ age group constitutes 12.8%. The number of potential workers for each pensioner was 5.3:1 in 2002, project to decline to 3.1:1 by 2025. This statistic points towards the unsustainability of the present state pension system on which the vast majority of pensioners are reliant in future, which has been aptly referred to as the "pensions time-bomb" and which is prompting a badly-needed reform of the entire welfare system. The following charts illustrate the present age distribution of the Maltese population and how it is projected to evolve over the next 30 years.

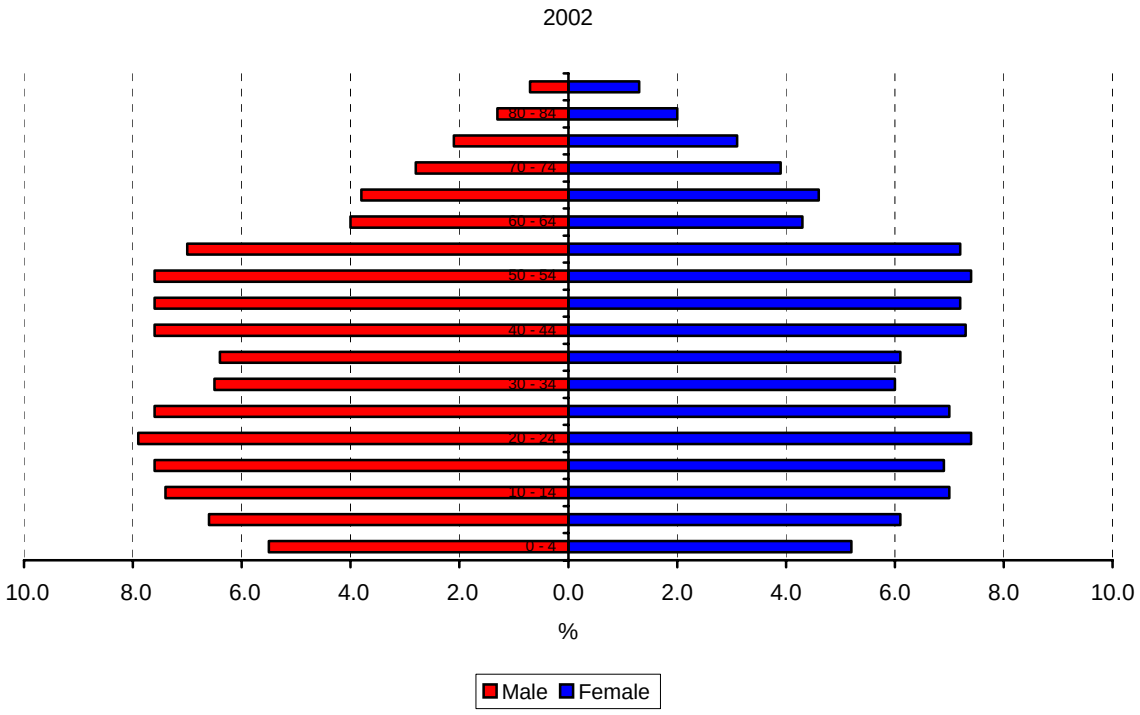

Chart H1: Age Distribution of the Maltese Population, 2002

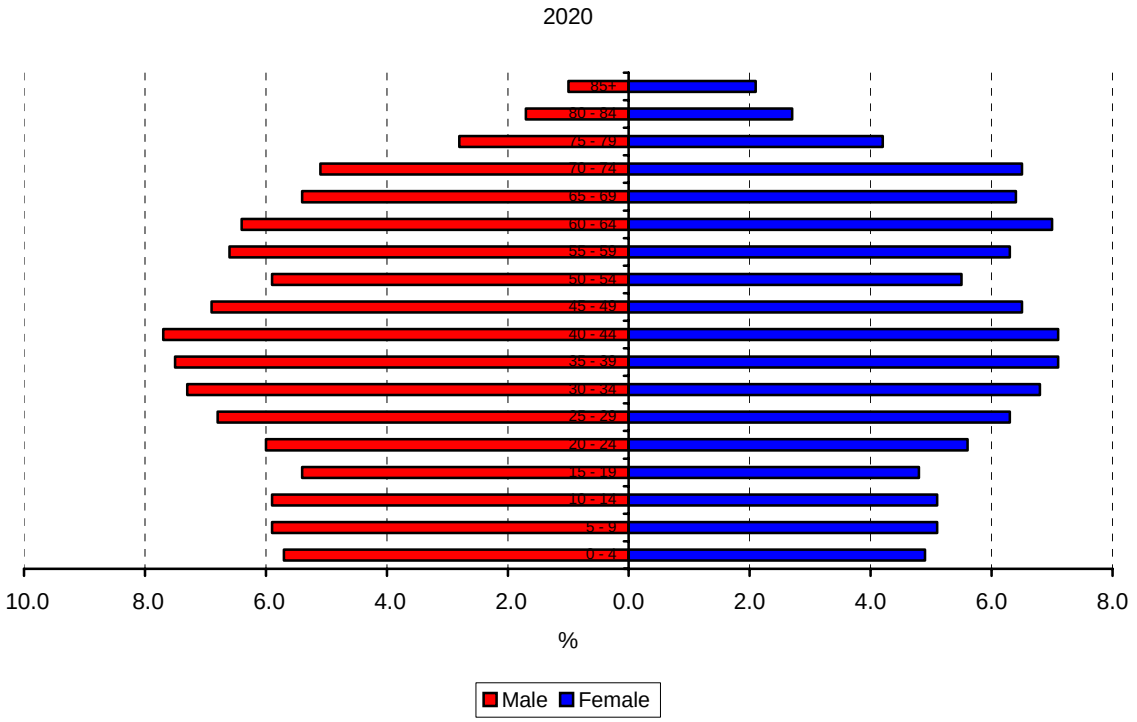

Chart H2: Projected Age Distribution of the Maltese Population, 2020

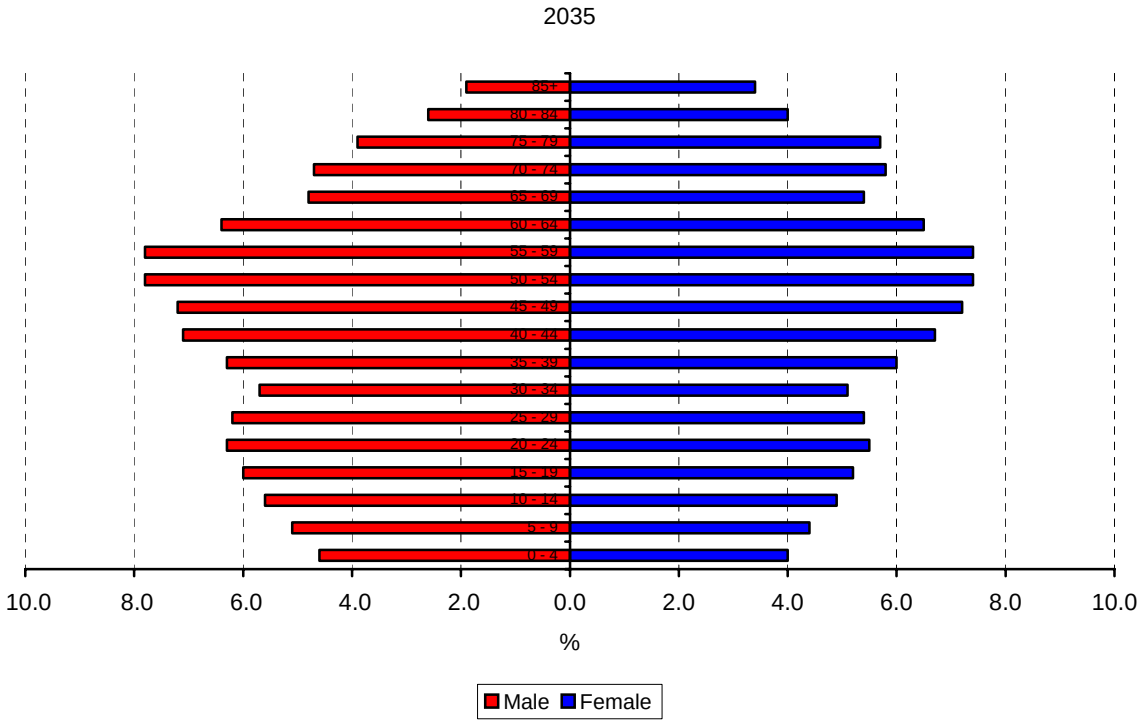

Chart H3: Projected Age Distribution of the Maltese Population, 2035[84]

[84] Source: National Statistics Office (Malta)

H2 Population Dynamics

The estimate of total population of the Maltese Islands, including work and resident permit holders and foreigners residing in Malta, for 2002 was of 397,296 persons of which 196,836 were males and 200,460 were females. Foreign residents account for around 2.6% of the total population. Population change is the net result of two demographic factors, namely the difference between births and deaths, and the migration balance. Both these factors have been positive during recent years, contributing to an annual population growth rate of 0.7%. With an area of 316 km^2, Malta has a population density of 1,257 persons per square kilometre, which makes it the most densely populated country in Europe.

The Northern Harbour District is the most populated district, with close to 31% of the population, as it includes the largest towns on the Islands including Qormi, Hamrun, San Gwann, Sliema and Birkirkara. Southern Harbour District localities such as Valletta and Senglea have long been seeing their population dwindle, whereas newer localities lying on the coast, such as St. Paul's Bay and Marsascala, have registered substantial increases in population in recent years. Although Valletta and Senglea have suffered a decrease in total population growth, both localities have been the most likely places within the Southern Harbour District to attract foreign residents. The total foreign population growth between 2000 and 2001 was of 7.6%. The Island of Gozo, inhabited by close to 8% of the population, experienced permanent foreign population growth of 18.9% between 2000 and 2001.

From the 1960s, the fertility rate of Western European countries has been constantly on the decline. With the forthcoming enlargement, the EU will incorporate countries that have remained on appreciably higher fertility levels than their western counterparts but still have a low fertility rate. This also holds for Malta, where there has been a continuous drop in the number of newborns born every year for the past years, albeit the decrease was marginal in the last couple of years possibly indicating that the total fertility rate will settle at a constant level for the coming years. The total fertility rate, which stood at 1.46 in 2002, is a relevant indicator to the future structure of the Maltese population. The crude birth rate dropped to 9.86 in the same year. The crude date rate stood at 7.85, the average for the past decade, while the infant mortality rate, which averaged 7.2 over the least ten years, stood at 6.0 in 2002. The life expectancy was 75.78 for males and 80.48 for females in 2002. The highest number of deaths in fact occurs in the 75-59 age group, and in the first quarter of the year, with the most common causes of deaths being diseases of the circulatory system, neoplasms and diseases of the respiratory system. The increase in life expectancy is being accompanied by an increase in health expenditures necessitating a reform of the health care system whereby the public sector and the private sector have to find their respective places in a new care system that reflects the realities of modern society.

The crude marriage rate stood at 5.8 in 2002, with civil marriages, as opposed to Catholic marriages, registering steady increases year after year. This is partly due to the fact that Malta, which is predominantly Catholic, is becoming a more open country and more locals are marrying foreigners, as well as a sign of the gradual process of secularisation of Maltese society as it becomes more exposed to foreign cultures.

Key Points

The demographic dynamic of the Maltese Islands mirror those of the rest of Europe. Malta has an aging population, as life expectancies increase while birth rates diminish.

The major threat arising from the present demography is that as the post-war baby boomers retire over the next decade, the pressure on the pensions' system will impose an impeding burden on public finances and the economy at large.

I. CULTURAL AND SOCIOLOGICAL FACTORS

I1 Changes in Employment Structures

Employment growth is sluggish in Malta when compared to employment growth in EU Member States. As in many other countries, it is higher for females than for males reflecting the rise in female participation. Chart I1 illustrates unemployment growth rates for Malta and EU Member States.

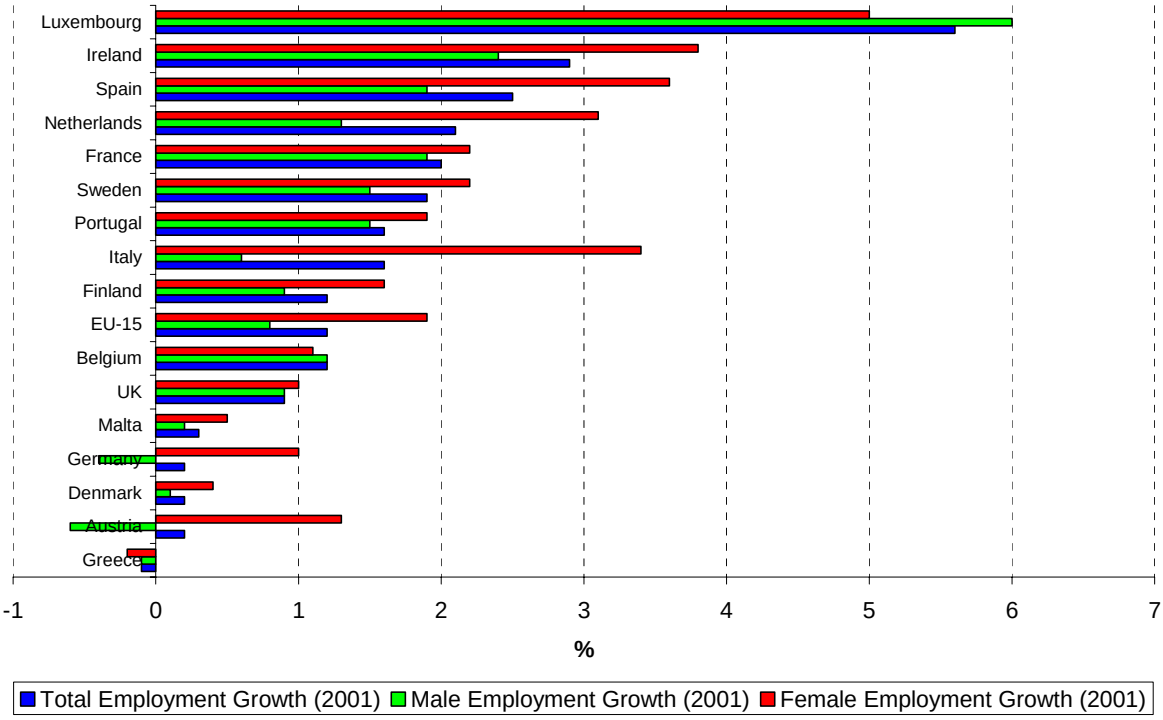

Chart I1: Employment Growth[85]

The employment rate, which stood at 54.1 in 2001, is lower than that of any EU Member State and around 10% lower than the EU-15 average. While the employment rate of males compares well with that of the EU-15, the female employment rate is extremely low. The figure reported for 2001 was of 32%. This may have increased slightly over the last couple of years, but female participation in the labour force will take a number of years to approach European levels. The employment rate for older workers averaged 31% in 2001; that for males stood at a healthy 52.5% whereas that for females stood at a mere 11.3%. Clearly, female participation is much higher among the younger generations and this augurs well for Malta's future productive capacity.

[85] Source: NSO, 2003e

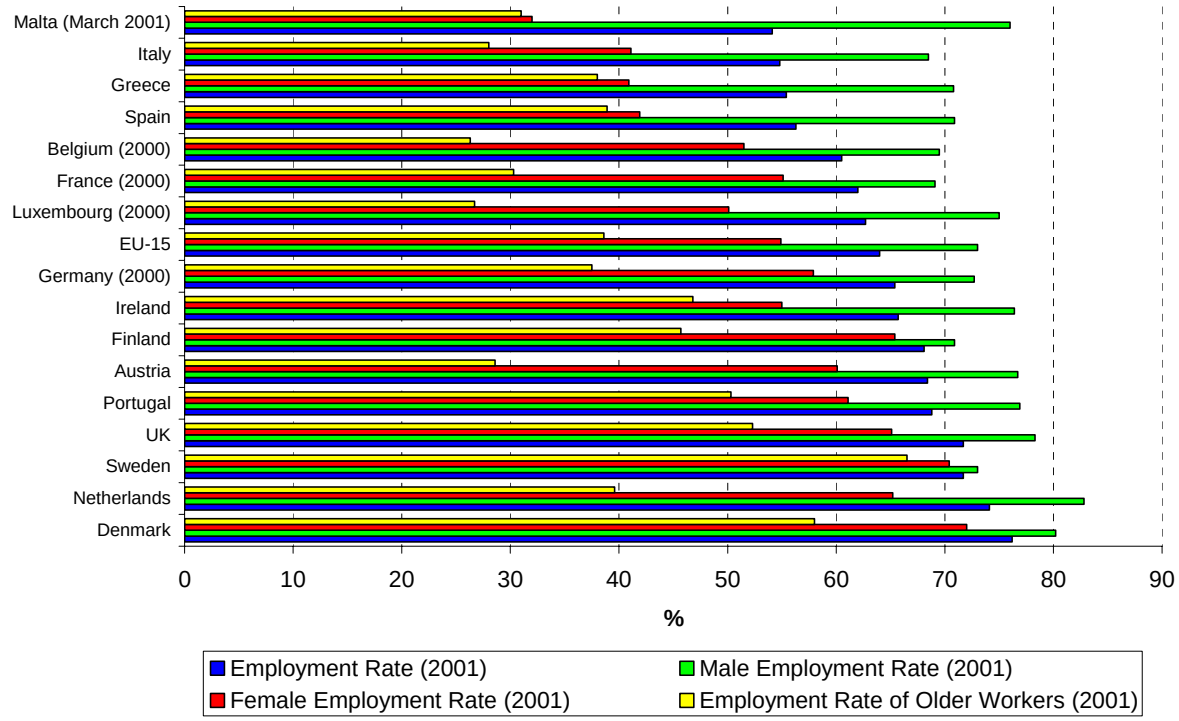

Chart I2: Employment Rate[86]

There are some notable contrasts in workers' participation in training and further education. The distribution of and access to training opportunities does not appear to be even within the different sectors of the economy. The December 2002 Labour Force Survey (LFS), which found only 6.1% of employed persons were engaged in a training or education programme, indicates that employees in the public sector are almost twice as likely to participate in training courses than their counterparts in the private sector. Younger workers are also more likely to be pursuing training opportunities than older workers. In fact, 7.6% of those under 40 years of age were found to be undertaking training in December 2002, whereas only 4.1% of those over 40 years of age were engaged in training. Interestingly, relatively more female employees, 6.5%, were found to be undertaking training and further education than their male counterparts, of whom 5.9% were in training. It is also evident from the available data that those workers with primary and secondary education backgrounds are less likely to be found engaging themselves in training and further education opportunities when compared to employees with a post-secondary or higher education background. In fact, only 3.1% of those having primary or secondary education were engaged in training in December 2002, compared to 11.6% and 15.1% of those having post-secondary and tertiary education respectively. Somewhat ironically, it is actually those employees who already have a higher level of education who are benefiting most from training and further education opportunities, possibly because they show a better disposition towards learning and are more trainable. Most of the training and education programmes undertaken by persons in employment seem to be to be taking place in the working environment itself, although 27.7% of respondents of the LFS reported that their education courses were being held in classrooms, a setting which may further facilitate those who have spent more years in formal education.[87]

[86] Source: NSO, 2003e
[87] NSO News Release No. 120/2003

The suspicion that early school-leavers may in fact lack the required basic skills to pursue further education or training is lent some support by the data reproduced in Table I1 below. The percentage of early school-leavers that were not in further education or training (defined as the percentage of persons aged 18-24 years who have secondary level education or less and are not attending education or training) stood at a staggering 54.9% in 2001. This is well above the EU-15 average for the same year, which was 19.3%, and higher than the rate recorded in any EU Member State. Another possible explanation for the poor performance by Malta in this regard may be the lack of opportunities for further education or training for those lacking academic qualifications. The recent establishment of Malta College of Arts, Science and Technology (MCAST) may offer these youths greater opportunity for further education and training.

Country	Early school-leavers not in further education or training (2001)
Sweden	7.7
Austria	10.2
Finland	10.3
Germany	12.5
France	13.5
Belgium	13.6
Netherlands	15.3
Greece	16.5
Denmark	16.8
Luxembourg	18.1
EU-15	19.3
Italy	26.4
Spain	28.3
Portugal	45.2
Malta	**54.9**

Table I1: Early school-leavers not in further education or training[88]

I2 Migration

Malta, like most Mediterranean countries, has a long tradition of international migration. In fact, migration has been regarded as a necessary safety valve to ease population pressures for many years. During the 1950s and 1960s, thousands of Maltese left to settle in Australia, Canada, the USA and the UK. Since the mid-1970s Malta has received back thousands of former emigrants.

Table I2 gives an overview of three decades of emigration flows while Table I3 gives an overview of immigration flows during the same years. Australia and the UK feature prominently in the migratory trends of the Maltese. The year 1954 saw 11,447 Maltese, the largest number ever recorded, leaving their homeland, with Australia receiving over 8,000 of these emigrants and United Kingdom nearly 1,700. With regards to returning migrants, Australia and the United Kingdom played a major role in the years 1975 – 1977. In 1975, 1,572 former Maltese returned from the UK, whereas 1,344 returned from Australia in 1976.

[88] Source: NSO, 2003e

Year	Australia	Canada	UK	USA	Other	Total
1951	4,006	1,607	1,234	831	14	7,692
1952	2,161	680	1,200	1,293	11	5,345
1953	1,378	770	1,702	683	1	4,534
1954	8,470	963	1,690	299	25	11,447
1955	6,442	425	1,872	266	2	9,007
1956	2,724	383	1,611	27	7	4,752
1957	1,284	739	960	292	8	3,283
1958	1,643	505	805	196	3	3,152
1959	1,875	472	744	174	0	3,265
1960	2,304	509	878	142	8	3,841
1971	1,762	308	527	178	23	2,798
1972	1,853	467	597	213	33	3,163
1973	2,416	768	603	253	19	4,059
1974	2,595	755	581	252	6	4,189
1975	691	441	254	226	12	1,624
1976	619	202	113	162	11	1,107
1977	796	213	97	126	5	1,237
1978	959	269	100	246	3	1,577
1979	765	248	82	205	3	1,303
1980	981	213	48	129	3	1,374
1992	83	24	12	23	11	153
1993	31	8	10	12	5	66
1994	54	3	9	35	3	104
1995	55	3	10	36	3	107
1996	51	n/a	43	n/a	n/a	94
1997	10	n/a	63	n/a	n/a	73
1998	34	n/a	87	n/a	n/a	121
1999	13	n/a	54	n/a	n/a	67
2000	n/a	n/a	67	n/a	n/a	67
2001	n/a	n/a	73	n/a	n/a	73

Table I2: Emigration from Malta to other countries

Year	Australia	Canada	UK	USA	Other	Total
1951	232	135	40	63	0	470
1952	606	144	193	63	3	1,009
1953	439	117	261	132	0	949
1954	240	157	377	176	0	950
1955	267	169	315	110	0	861
1956	133	64	164	27	0	388
1957	1,097	119	408	47	0	1,671
1958	583	93	193	30	0	899
1959	361	39	58	8	0	466
1960	336	12	11	3	0	362
1971	11	6	123	3	0	143
1972	25	14	148	13	2	202
1973	21	39	154	12	4	230
1974	63	57	393	21	1	535
1975	558	517	1,572	269	41	2,957
1976	1,344	318	721	76	13	2,472
1977	1,283	238	615	113	9	2,258
1978	935	279	394	63	7	1,678
1979	1,177	347	598	158	9	2,289
1980	886	178	622	61	6	1,753
1992	396	97	188	85	54	820
1993	346	106	249	66	70	837
1994	262	108	233	78	80	761
1995	191	81	204	61	84	621
1996	127	52	124	44	52	399
1997	144	46	140	53	70	453
1998	96	33	100	73	47	349
1999	78	20	118	63	60	339
2000	89	19	147	61	134	450
2001	83	29	162	51	147	472

Table I3: Immigration back to Malta from other countries[89]

According to the National Statistics Office (NSO), migration statistics have always posed some problems. During the post-war era up to the beginning of the 1980s, outflows were readily quantifiable since emigrants could apply for a subsidised passage and the vast majority did so. Inflows in the form of returnees posed problems. In the last Census of Population, which was carried out in 1995, a migration module was included in the questionnaire. The findings of the Census of 1995 were considered to provide a good database for annual retrospective adjustments to figures concerning stocks and flows of migrants. In the early 1980s, the NSO introduced a new methodology for the estimation of returning migrants in collaboration with the customs authorities. At that time – and up to the present – outflows were in fact low. Inflows, in the form of returned migrants and foreigners settling in the Maltese Islands, have been – and still are – analysed from forms filled in with the details required by the NSO. Prospective settlers, both foreign and returning Maltese, are easily identifiable at Customs since they have to declare their personal effects. This system has proved to be very efficient.

[89] Source: National Statistics Office (Malta)

Outgoing migration data has become largely unavailable since the Labour Department dismantled its Emigration Section in January 1995. The only potential sources of information regarding emigration activity are foreign Embassies and High Commissions. The NSO claims that since the year 2000 only the British High Commission has been complying with its requests for such data.[90] It is believed that emigration to other countries is minimal.[91]

I2.1 The Immigration Act

The Immigration Act (Chapter 217 of the Laws of Malta) is the legal instrument regulating the inward movement of foreigners into the country. The Act provides for:

- The exemption from periodical permission from the Immigration Authorities, in respect of the foreign spouses of citizens of Malta and their dependents under 21 years of age, to enable them to reside and to work in Malta
- The authorisation of temporary periods of stays by foreigners on the Islands
- The issue of residence permits for indefinite stays in Malta
- The issue of employment licenses to foreigners enabling them to work in Malta

I2.2 Permanent Residence Permits

The settlement of foreigners in Malta goes back to the early 1960s, and records show that the foreign currency brought into the Islands by foreigners did generate income in the economy. Permanent Residence Schemes have long been used to attract the desired type of foreigners to the Islands. Such schemes lay down the essentially economic conditions that one has to satisfy to be granted a residence permit, together with his or her spouse and dependents, that would enable them to remain indefinitely on the Islands, provided that they do not engage themselves in any kind of employment activity in Malta.

I2.3 Work Permits

The employment of overseas nationals often bequeaths important benefits to the receiving country. It helps attract investment, creates new jobs and enables employers to access and recruit the best people from around the world. The Work Permit Scheme, which is part of immigration control, is intended to allow for employment of overseas nationals whilst protecting the long-term interest of the resident workforce.

Employment licenses, issued by the Department for Citizenship and Expatriates Affairs in respect of expatriates, are only granted in exceptional cases. Such licenses are issued for a predetermined period, generally one year, and for a specific purpose. It must also be ascertained that efforts to recruit a suitable Maltese citizen for the job in question were fruitless. There are cases where a foreign investor in manufacturing or financial sectors, holding substantial shareholding, may be granted a Work Permit on an indefinite basis.

[90] NSO News Release No. 107/2002
[91] NSO, 2003g

The number of work permit holders has fluctuated over the 1990s, but has remained fairly constant in recent years at between 2,500 and 3,000 persons. Table I4 shows the wide variety of nationalities of permit holders. Out of a total of 2,913 at the end of June 2002, 387 were British, followed by 306 Yugoslavs, 232 Chinese, 166 Indians, 151 Russians, 146 Bulgarians, 143 Italians, 141 Germans and 141 Libyans. The age groups with the largest number of permit holders are the 30-34 and 35-39 age groups, with 512 and 427 persons respectively.

Nationality	Male	Female	Total
Afghan	1	0	1
Albanian	5	11	16
Algerian	9	3	12
Angolan	1	0	1
Armenian	3	1	4
Australian	25	18	43
Austrian	25	5	30
Bangladeshi	4	0	4
Belarusian	1	0	1
Belgian	17	11	28
Bosnian	67	8	75
Brazilian	2	1	3
British	254	133	387
Bulgarian	101	45	146
Cameroon	2	0	2
Canadian	8	5	13
Chinese	127	105	232
Columbian	1	0	1
Congolese	1	0	1
Croatian	8	5	13
Cuban	1	0	1
Cypriot	0	1	1
Czech	8	7	15
Danish	12	10	22
Dutch	32	19	51
Egyptian	27	4	31
Estonian	0	2	2
Finnish	2	7	9
French	34	23	57
Georgian	5	2	7
German	72	69	141
Ghanaian	5	0	5
Greek	6	3	9
Hungarian	3	4	7
Icelandic	3	0	3
Indian	152	14	166
Iranian	1	1	2
Iraqi	17	3	20
Irish	9	6	15
Israeli	1	0	1
Italian	131	12	143
Japanese	0	4	4
Jordanian	4	1	5

Nationality	Male	Female	Total
Kazakhstan	0	1	1
Kenyan	1	0	1
Korean	1	1	2
Latvian	42	2	44
Lebanese	9	2	11
Libyan	133	8	141
Lithuanian	1	2	3
Luxembourg	0	1	1
Macedonian	3	1	4
Malaysian	4	0	4
Moldavian	0	1	1
Moroccan	6	8	14
New Zealander	5	1	6
Nigerian	17	7	24
Norwegian	11	2	13
Pakistani	19	4	23
Palestinian	7	0	7
Peruvian	1	1	2
Philippine	25	20	45
Polish	8	10	18
Portuguese	3	0	3
Rumanian	19	10	29
Russian	75	76	151
Seychelles	1	0	1
Sierra Leone	10	0	10
Slovak	4	10	14
Slovenian	1	0	1
Somalia	4	0	4
South African	3	1	4
Spanish	5	6	11
Sri Lanka	7	0	7
Stateless	1	0	1
Sudanese	5	0	5
Swedish	77	13	90
Swiss	10	2	12
Syrian	18	0	18
Taiwanese	0	1	1
Thai	9	6	15
Tunisian	17	5	22
Turkish	38	15	53
Ukrainian	15	16	31
United States	17	10	27
Uzbekistani	0	1	1
Venezuelan	1	0	1
Yugoslav	263	43	306
Total	**2,083**	**830**	**2,913**

Table I4: Work permit holders by nationality at end of June 2002[92]

[92] Source: National Statistics Office (Malta)

I2.4 Migration Prospects within the EU

Given that Malta has very limited land area and no exploitable natural resources, Government has justifiably adopted a protective stance with respect to immigration. This was reflected in the country's negotiating position during pre-accession talks and specifically in its request for a derogation on the right of foreigners to purchase property in Malta – a request that was conceded to by the Commission. Malta has in fact been granted a permanent derogation that provides that an EU citizen can only purchase residential property in Malta if and when he has lived in the country for a continuous period of at least five years. It is interesting to note that migratory movements across current EU members states is modest and the progressive integration of the Central and Eastern European countries, with their varying social realities, did not lead to large migratory movements as envisaged by some, suggesting that the post-accession EU may not in fact feature migration as prominently as the discrepancies in living standards across regions may lead to anticipate.

With regards to the emigration prospects of the Maltese within the EU, recent trends indicate that there is bound to be some movement of Maltese workers out of the country into western EU Member States, notably Brussels where Malta is gradually building up the administrate capacity required to sustain its membership. Up to now, there does not seem to be any acute threat of brain drain with respect to any particular sector, including the ICT sector, at least in the short term. The medium to long-term impact of EU membership on the emigration patterns of the Maltese can be better predicted once Europe actually opens its doors to the new Member States in May 2004. There is a risk that, as job prospects for Maltese IT professionals within Europe widen as a direct consequence of EU accession, many of these fresh graduates who leave the country to further their studies may eventually end up working in other European countries, particularly since Malta has a fairly recent history of emigration that predisposes the Maltese for searching for better job opportunities abroad and integrating into other societies with relative ease. This could eventually lead to a brain drain in the ICT sector. Admittedly, there may be a positive side to such a movement, especially judging by the outcome of Malta's emigration history. Malta suffered a brain drain in the medical field in the mid-1970s, yet most of the doctors who left the island back then returned ten to fifteen years later with extensive experience in leading hospitals abroad and renowned specialists in their field. As a direct consequence of the medical brain drain of the 1970s, Malta today boasts top quality healthcare, particularly in specialised fields. It is hoped that should Malta actually suffer an ICT brain drain, it would eventually have the same kind of positive impact as returned migrants bring back both knowledge and experience with them. In the meantime, Malta would have to import foreign expertise and labour to satisfy demand for ICT human resources and more importantly to develop the supply-side of the sector. It is pertinent to note that a large proportion of returning migrants over the past few years were people who had spent less than 4 years abroad, indicating a trend of temporary migration.

I2.5 Irregular Migration

The phenomenon of irregular migration, which has increased dramatically over the past decade, has constituted a substantial burden on Maltese authorities in recent years. Mediterranean countries are exposed to the problem of illegal immigration both as destination countries and as transit countries. Malta had to cope with an influx of 1,600 irregular immigrants that came into the Islands by boat during 2002.

I3 Other Social Considerations

The ongoing process of economic restructuring has social implications that cannot be overlooked. In the face of increasing unemployment of the unskilled and talk of a redefinition of the social contract, it is also pertinent to consider the distribution of income, poverty and the social safety net.

The Gini coefficient figures given in Table I5 indicate that the distribution of income in Malta is broadly similar to that in the EU-15. Southern central and eastern European countries appear to have a more equitable distribution of income than Malta. Their northern counterparts, on the other hand, seem to have a less equitable distribution of income.

Country	Gini Coefficient
Slovakia (1999)	16.3
Slovenia (1999)	22.4
Hungary (1999)	23.1
Bulgaria (2001)	26.3
Cyprus (1997)	28.7
Rumania (1999)	28.7
Poland (2000)	29.8
Malta (2000)	**30.4**
EU-15	31.0
Lithuania (1999)	31.1
Latvia (1999)	31.2
Estonia (2000)	36.2
Turkey (1994)	49.0

Table I5: Income Distribution[93]

Country	At-risk-of-poverty rate
Hungary (1999)	9.0
Slovenia (1999)	11.0
Malta (2000)	**14.9**
Bulgaria (2001)	15.0
Cyprus (1997)	16.0
Latvia (1999)	16.0
Poland (2000)	16.0
Romania (1999)	16.0
Lithuania (1999)	17.0
Estonia (2000)	18.0
EU-15	18.0
Turkey (1994)	23.0

Table I6: Poverty Indicators[94]

[93] Source: NSO, 2003e
[94] Source: NSO, 2003e

The percentage of the population at risk of poverty in Malta stood at 14.9% in 2000. This rate is lower than that of most accession and candidate countries (ACCs) and substantially lower than the EU-15 average. 10.8% of the persons aged 0-65 lived in jobless households in 2001; the EU-15 average for the same year was 13.9%.[95]

It is evident that Government plays an important role in redistributing income. The tax rate of low-wage earners was 17.4% in 2001 when the EU-15 average stood at 37.8%. The at-risk-of-poverty rate before social transfers (including pensions) stood at 30.2% in 2000 compared to the EU-15 average of 26%. Social benefits curbed Malta's at-risk-of poverty rate to 14.9% while the EU-15 average was only reduced to 18% by social transfers.

Key Points

On a positive note:

- Female participation in the labour market in increasing, albeit rather slowly
- Emigration has traditionally contributed positively to Malta's socio-economic development, as most Maltese who leave the country in search of better career prospects abroad eventually tend to return and bring with them a wealth of knowledge and experiences
- Poverty and social exclusion is contained, largely because Government plays a key role in redistributing income

One of the major weaknesses of Malta's socio-cultural make up is that:

- The employment rate that is lower than that of any EU-15 country, due to the fact that the female participation rate is one of the lowest in Europe

By definition, EU membership implies full freedom of movement of people, and particularly people in search of opportunity. Hence:

- Malta may be able to attract skilled resources from Central and Eastern Europe in specialised areas where its labour force falls short
- Malta may also benefit by tapping into the skills of the female human resources that are currently out of the labour market, by devising incentive-compatible schemes that would entice these women to join the labour force

The present socio-cultural threats are that:

- Malta may also loose some of its better qualified human resources to other European countries
- EU membership has made it a more attractive destination for illegal immigrants coming from Africa and the Middle East, and it is likely that the country will require assistance from its European counterparts to be able to find a long-term, acceptable solution to the problem of illegal immigration

[95] Source: NSO, 2003e

DIAGNOS-IS

A contextualised, multicausal, multifactorial picture of the country: IST-related dynamics and their potential

Malta has a positive growth track record and good prospects for economic growth within the EU. It has been able to attract considerable FDI over the years, notably in the ICT manufacturing industry. Labour productivity is high, particularly in the export-oriented sectors of the economy. These factors can facilitate the assimilation of ICT and the development of the information society in Malta. Investment in ICT and particularly in the ICT manufacturing sector, where Malta enjoys a comparative advantage, and also in the ICT services sector of the economy, can reinforce these strengths.

On the other hand, the Maltese economy is still burdened with an over-proportionately large public sector. The dominant role that Government has traditionally played in the economy has bred a culture of state-dependence that stifles competitiveness and innovation. The ongoing privatisation programme is bound to contribute significantly to the rationalisation of the public sector. Malta also suffers from lower levels of literacy than the EU-15 and most of the other acceding countries. Effective, target-specific national policies with respect to education, particularly in the fields of science and technology (S&T), in parallel with privatisation and business promotion initiatives, are critical to overcoming human resource limitations in the shortest time possible. Unarguably, 100% literacy is a prerequisite to the successful development of an information society.

Malta within the EU may exploit a number of opportunities since EU accession implies full access to the large EU market to which Maltese businesses, that have previously restricted themselves to the local market, now have the potential to export. Moreover, the process of economic restructuring, including privatisation, is bound to increase efficiency across all sectors of the economy and promote private investment, including more FDI. There may also be significant increases in labour supply since the participation rate is relatively low, particularly in the case of females. The integration of ICT into the restructuring process can contribute to a more efficient economy that can effectively benefit from higher rates of participation in the labour force. Moreover, intelligent use of ICT can facilitate the attainment of higher participation rates by facilitating more flexible work arrangements in the information society.

The Maltese economy faces a number of impending threats that can hinder its sustainable development. Unfortunately, Malta is still struggling to curb its fiscal deficit to sustainable levels. The fiscal issue is undoubtedly one of the greatest challenges for the Maltese Government, together with the emerging threats of the pension and health systems. Another major concern is that the unemployment rate is highest in the under 25 age-bracket. This calls for political commitment to address the existing shortfalls of the education system. Moreover, the Maltese economy is excessively dependent on the ICT manufacturing exports generated by a single company. It is hoped that some new investment projects will reduce the economy's vulnerability to sector-specific and firm-specific shocks in future.

At the micro level, the Maltese economy is characterised by a relatively large number of small enterprises that were traditionally oriented towards a protected domestic market and hence need to re-invent themselves so as to be able to rise up to the challenges of international

competition. Because Malta is a small economy, most firms are unable to reap economies of scale to their full extent and competitive forces are relatively weak in the limited domestic market. These considerations have important implications for the extent to which Maltese businesses undertake investment initiatives. In this context, it is important to note the dichotomous nature of Maltese enterprises. The typical exporting business has significant foreign participation in its ownership and management, faces international competition and has the ability to adapt and innovate in response to and in anticipation of market dynamics. The typical provider for the domestic market is locally-owned and managed, possibly a family-run business, and either an importer or a producer sheltered to varying degrees from international competition with limited ability for innovation and for facing competitive pressures. There are weak connections, if any at all, between these two spheres of business. Malta's imminent EU membership has necessitated a restructuring programme to introduce more market-oriented policies in domestic markets and to assist domestic producers to become effective competitors within a more open economic environment. Measures undertaken towards this end include privatisation projects aimed at providing finance and expertise for business restructuring, as well as business promotion measures for targeted sectors mainly in the form of tax concessions.

Economic activity in Malta is fairly diversified, with one-fourth of output being generated by the manufacturing sector and around one-third by the services sector in which tourism is the major contributor. The contribution of financial services and information technology (IT) services is expanding rapidly but still accounts for a relatively small share of GDP. Primary activities, consisting of agriculture and fishing, and construction and quarrying, contribute less than 10% of GDP. The main area of industrial production is the single-company semi-conductor industry, which produces 40% of manufactured output and accounts for over 50% of manufactured Malta's exports. Apart from ST Microelectronics, there are a number of smaller high value-added industries. The presence of multinationals has contributed significantly towards IST-related developments in Malta. For example, the CEO of ST International sits on the UN Committee for bridging the digital divide. Malta is the first location in which ST has started implementing a programme to contribute effectively towards bridging the digital divide. Among other initiatives, ST in Malta is providing free Internet courses for 1,000 Maltese citizens by the end of 2003.

Although services account for a substantial and increasing share of output, foreign investment in the services sector is lower. This is mainly because Government policy has promoted industry rather than services for a number of years, even as wages in Malta steadily hitchhiked to well above cheap labour levels and a revision of policy was called for. Tax concessions, which were one of the major attractions for foreign investment, were mainly attached to exporting manufacturing industries and it is only with the introduction of the Business Promotion Act (BPA) in 2001 that policy has effectively shifted away from focusing exclusively on promoting the manufacturing industry towards promoting services and R&D as well. The BPA has also introduced tax incentives attached to investment expenditure, including investment in ICT. It has, however, cut down on incentives in the form of training grants that featured strongly under the former legislation. Yet, investment in R&D levels remain low, as does the propensity to innovate, particularly in local businesses. Some foreign companies do carry out some R&D activity in their plants in Malta, but most simply transfer the technology from their mother companies abroad.

Proponents of industry agree that Malta's future in the ICT industry, as well as in other industries, lies in identifying and exploiting market niches in which it can enjoy a

comparative advantage. Competitiveness is indeed a key issue for Malta. The country enjoys a per capita income, in purchasing power standards, that is just over 55% of the EU average, making it one of the most affluent economies among EU accession countries, while its price level is already around 90% of the EU average, making it the most expensive economy within the group. An exercise carried out recently by the Central Bank of Malta (Bonello, 2002) compares the performance of Malta with that of the EU-15 and of seven[96] of the larger accession and candidate countries (CC-7), using the methodology of the World Competitiveness Yearbook published by the International Institute for Management Development. The resulting comparative indicators of Malta's competitiveness are tabulated below.

	Malta	CC-7	EU-15
Economic Performance	**83**	**70**	**100**
Domestic Economy	79	68	100
International Trade	110	90	100
International Investment	56	45	100
Employment	76	75	100
Prices	93	74	100
Government Efficiency	**82**	**81**	**100**
Public Finance	89	99	100
Fiscal Policy	98	97	100
Institutional Framework	90	61	100
Business Legislation	73	65	100
Education	61	80	100
Business Efficiency	**61**	**72**	**100**
Management Productivity	71	52	100
Labour Market	75	96	100
Finance	58	56	100
Management Practices	46	63	100
Impact of Globalisation	53	90	100
Infrastructure	**67**	**68**	**100**
Basic	56	82	100
Technological	77	65	100
Scientific	44	60	100
Health and Environment	86	56	100
Value System	70	77	100
Overall Score	**73**	**73**	**100**

Table I: Comparative Indicators of Malta's Competitiveness

On the basis of this analysis, it emerges that Malta's relative competitive strengths have been identified to be:

- Its past economic performance
- Its exposure to international trade
- Its monetary stability
- Its fiscal reform efforts and its telecommunications infrastructure
- A flexible and generally well-educated labour force

[96] Czech Republic, Estonia, Hungary, Poland, Rumania, Slovak Republic, Slovenia

- A legal infrastructure compatible with the EU
- The adoption of environmental and quality standards compatible with the EU
- Its relative proximity to the European market
- Natural endowments with regard to tourism
- Its proximity to and knowledge of North African market
- Cultural attitudes compatible with those of advanced countries
- A stable political environment

The main areas of competitive weaknesses are the following:

- Malta's insufficient attractiveness to FDI
- Lacunae in its education system
- Labour market rigidities
- Shortcomings in the entrepreneurial culture
- Excessive government intervention in the economy
- Inadequacies in basic infrastructural services
- Insufficient R&D activity
- Small size
- High transport costs
- Limited natural resources endowments
- High dependence on imported industrial supplies
- A fragile ecosystem leading to environmental constraints

A recently-appointed task force assigned with the task of drafting of a competitiveness strategy for Malta has identified the following ten golden rules for achieving competitiveness (Briguglio & Cordina, 2003):

- Maintaining a stable and resilient macroeconomic environment
- Creating adequate and predictable legislative environment
- Putting in place adequate infrastructural services
- Promoting of education and investment in human capital
- Fostering of innovation and research and development
- Providing public administration services efficiently and transparently
- Balancing wage levels, productivity and taxation
- Preserving the social fabric and fostering of social cohesion
- Exploiting market opportunities
- Attracting investment from local and foreign sources

A stable and resilient macroeconomic environment, coupled with a sound legislative environment and adequate infrastructural services, are prerequisites to attracting IST-related investment that would also facilitate the assimilation of ICTs. The promotion of education and investment in human capital, together with the fostering of innovation and R&D, are also an imperative for the sustainable development of the information society and economy (IS&E).

ICTs can, in turn, effectively contribute towards providing public administration services efficiently and transparently, particularly via the e-government and m-government projects in which Malta is well advanced. IST can also be a kingpin in attracting investment from local and foreign sources and in creating and exploiting market opportunities. The preservation of the social fabric and fostering of social cohesion in an IS&E context cannot be achieved without preventing the promulgation of the digital divide by ensuring that IST is accessible to everyone.

With respect to the development and implementation of national IS policies, Malta has achieved quite a lot in a relatively short span of time in this respect. Importantly, the Government of Malta is committed to making the country a model for e-government and an ICT centre of excellence. Although Malta started late in information management, it has caught up remarkably well over the past two years, registering progress on all fronts, including the legislative framework. Both local businesses and the Maltese public have responded positively to the initiatives led by Government and the e-Malta Commission to promote the development of the IS&E across all sectors of the Maltese economy and society. These factors militate in favour of further development of the IS&E in Malta and suggest that the ambitious IS goals that Government has set for this country may be well within reach.

Unfortunately, policy implementation has not been effective in the wider S&T context. Notably, the national S&T policy, which could have served as a backdrop for the comprehensive development and assimilation of ICTs, was never implemented. MCST, the entity responsible for overseeing the implementation of the national S&T policy, has not been given adequate resources to fulfil its mandate. EU membership is expected to give rise to several opportunities for funding for MCST, but Government needs to take immediate action to realign the national S&T policy and to empower its long overdue implementation such that Malta may be able to take advantage of these opportunities to the full.

Indeed, the prospects for Malta as an IS&E within the EU look favourable and effective policymaking can greatly contribute towards enhancing these prospects. More specifically, Government's successful outsourcing policy offers ample scope for further development of the local ICT industry, particularly the ICT services sector, and could stimulate private sector investment and innovation. The wide-ranging long-term partnership agreement that the Maltese Government has secured with software giant Microsoft promises a wealth of opportunities for technology acquisition that would substantially upgrade the country's technical human resource base. Moreover, the IS&E public consultation process that is currently underway could promote the formation of new partnerships that would provide an opportunity for relatively small organisations to pool in resources into extensive projects and be competitive even internationally. Malta really has the potential to become an ICT centre of excellence. Its exploitable strategic location at the southern periphery of the European Continent with easy access to Northern Africa and the Middle East could contribute significantly to this.

On the other hand, Malta faces some constraints that can hinder the sustainable development of the IS&E. Undeniably, the country carries a legacy of lack of innovation and limited R&D capacity. While Malta has invested in capacity building over the last couple of years, the institutional capacities remain somewhat limited and it may still fall short of an adequate supply of specialised resources to be able to keep up the pace in the highly dynamic ICT world. Both Government and the private sector can help bridge critical gaps by entering into partnerships with leading international firms in the ICT industry.

IST penetration rates are satisfactory in telecommunications where the technical background is quite strong, major manufacturing sectors which are mainly export-oriented and in which FDI plays a key role, educational services in which Government has been investing significantly for a number of years, and households. IST in financial services is picking up steadily, as is the case in other major service sectors and in public services and public administration in which substantial progress has been made in a relatively short span of time. The areas that are lagging behind in terms of IST penetration are transport (except for air transport), postal services and health services.

While Government is pursuing a fairly rigorous privatisation programme, which is running in parallel with the long-overdue restructuring of the Maltese economy, a number of key industries are bound to remain regulated. Apart from key infrastructural sectors such as energy and transport, the telecommunications sector is also regulated. The telecommunications regulator is not fully autonomous from Government. Private telecommunication service providers are in favour of an autonomous regulator, particularly because Government is also the majority shareholder in Maltacom, which enjoys a monopoly in landline telephony and has a number of subsidiaries providing mobile telephony and Internet services among others.

Malta's essentially British education system has a long tradition since it is a legacy of two hundred years of British colonisation that last till 1964. Government spending on education is high, providing for free education for all from the age of 4 to the age of 16, which is the minimum school-leaving age, and free higher education for all those who satisfy the prerequisite qualifications, all the way up to University degrees. Enrolment levels in higher education have been increasing steadily year after year since the early 1990s. Yet, science and technology (S&T) courses, including IT courses, which the University of Malta started offering in 1996, do not enjoy the same popularity as the more traditional professions such as law, medicine and accounting, particularly among female students which are highly underrepresented in these areas of study. S&T subjects are often perceived to be more difficult by students and most parents, short-sightedly and unwittingly, tend to encourage their children to take up traditional professions rather than IT careers. Moreover, IT is merely regarded as yet another subject area as opposed to a necessary tool for the successful pursuit of any career in the IS&E. In an attempt to counter this trend and to maximise IT literacy among school-leavers, Government is promoting the European Computer Driving Licence (ECDL) in secondary schools. While this initiative has been met by a satisfactory response with respect to student participation, private IT higher education institutions, which contribute significantly to the proliferation of IT education in Malta, argue that Government's strategy promoting the attainment of the ECDL in secondary schools over the teaching of compute science as a technical subject is contributing to the relatively low enrolment levels in IT-related higher education courses. It appears that IT in education has evolved in such a way that the focus is more on increasing IT literacy levels at the secondary level and creating awareness at the primary level as well as among adults, at the expense of breeding future ICT professionals.

The Ministry of Education claims that, while it has invested substantially in hardware in schools, IT human resources are limited in supply and since government salaries are according to pay-scales that are fixed across the board and it is not possible to IT teachers to negotiate a higher salary than teachers of other subjects, it cannot compete with the private sector in attracting the required resources. Thus, with one personal computer (PC) for every seven students, Maltese government schools boast the highest PC per student ratio in Europe

and all students have Internet access, their own e-mail address and their own personal web-space, but apparently there are not enough IT teachers available. This is partly because, due to lack of foresight and proactive planning, the University did not offer IT to undergraduates pursuing teaching careers before it was actually introduced in schools. Government is trying to bridge the gap by sponsoring undergraduate teachers who have an aptitude for IT for a part-time diploma in the subject and IT training for teachers after-hours. The trends are gradually moving towards online resources and e-learning but funds to finance such projects are limited. Meanwhile, the Ministry of Education admits that it has partly abdicated the role of preparing students to pursue higher education in IT-related areas to the private sector and that, in future, the leading providers of such education will probably be private institutions. This position raises some concern because ultimately private tuition may not be financially accessible to everybody, and unless Government offers some form of assistance to promising students who may not have the financial means, such students may not be able to pursue careers in IT.

IT Professors at the University argue that the unsatisfactory quality of maths education in most secondary schools is also to blame for low enrolment levels in both IT and S&T courses in general. They also feel that while the role of the University, as an academic institution, is to ensure that graduates are equipped with the necessary tools to pursue careers in industry, the academia should not interfere with industry or with investment policy. On the other hand, one of the main concerns of students is that the University's relationship with industry is not strong enough and closer association would improve their skills base, and consequently, their employability. Private higher education institutions often claim that academics tend to be cut-off from the realities of industry and, as a result, University graduates generally lack a hands-on approach and the entrepreneurial culture that is necessary to complement technical knowledge for the promotion of R&D and innovation. It is a fact that Government spends most of its modest research and development (R&D) budget on small innovation projects being carried out at the University of Malta. Yet, University Professors claim that the University is well-equipped for traditional research requiring less technologically-advanced resources such as libraries, but severely limited insofar as scientific research requiring ICT and other equipment is concerned. Moreover, it has been very difficult to obtain financing because there is no coherent long-term research policy, even though the issue has been subject to discussion for some time. In the meantime, EU funding possibilities are being considered and could effectively improve the situation. Leading exponents in industry claim that, while the standard of courses in science, engineering and business is high, the methodologies applied in problem solving in fields such as engineering are restrictive and do stifle innovation. The opportunities for advanced R&D in ICT and other S&T fields are restricted by the fact that there are no corporation-size companies to fund such research.

Undoubtedly, there are lacunae in the education system, particularly in technical areas where skilled human resources are badly needed, even to service other industries, but are in extremely short supply. Government has recently set up the Malta College of Arts, Science and Technology (MCAST) to provide higher education in technical and vocational areas in particular. MCAST is intended to eventually offer degree courses at the same level as those offered by the University but with greater emphasis on technical skills and practical application.

IT graduates are unarguably in demand in Malta and, being in short supply, they enjoy a high level of job mobility within the country. Many undergraduates and fresh graduates aspire to further their studies in IT at post-graduate level. Since the University of Malta does not offer post-graduate IT-related degree programmes, these graduates would have to leave the island

to further their studies. There is a risk that, as job prospects for Maltese IT professionals within Europe widen as a direct consequence of EU accession, many of these fresh graduates who leave the country to further their studies may eventually end up working in other European countries, particularly since Malta has a fairly recent history of emigration that predisposes the Maltese for searching for better job opportunities abroad and integrating into other societies with relative ease. This could effectively amount to a brain drain in the ICT sector. There may be a positive side to such a movement, especially judging by the outcome of Malta's emigration history. Malta suffered a brain drain in the medical field in the mid-1970s, yet most of the doctors who left the island back then returned ten to fifteen years later with extensive experience in leading hospitals abroad and renowned specialists in their field. As a direct consequence of the medical brain drain of the 1970s, Malta today boasts top quality healthcare, particularly in specialised fields. It is hoped that should the potential ICT brain drain materialise, it would eventually have the same kind of positive impact as returned migrants bring back both knowledge and experience with them. In the meantime, Malta would have to import foreign expertise and labour to satisfy demand for ICT human resources and more importantly to develop the supply-side of the sector.

Demographically, Malta shares the problem facing most European countries. It has an ageing population that is bound to intensify social and economic pressures as the generation of post-war baby-boomers reaches pensionable age. Apart from necessitating an immediate reform in the pensions system to guarantee a sustainable welfare system in future, this has several other more direct implications on the IS&E. Essentially, it implies that in a few years time, a substantial part of the population may be at the risk of social exclusion because access to ICTs would be a necessary prerequisite to full integration in society when the same generation would have grown up in a world without ICTs. Government is trying to mitigate the extent of such a potential digital divide by offering free ICT education for adults and free Internet access, both through local councils. Moreover, it has offered a free e-mail address to every Maltese citizen, in parallel with its extensive campaign to promote its e-government and m-government services. These initiatives have proved to be very successful, possibly because of the cultural fabric of Maltese families. Children tend to live with their parents until they get married and parents hence have the possibility to follow the progress of their children through their years of formal schooling. Since most mothers do not work, they generally spend a lot of time with their children while they study or play with their computer, and hence they have both the opportunity to be exposed to ICT and the incentive to familiarise themselves with the technology.

It may be of interest to compare this diagnosis of Malta's IST-related dynamics and their potential with the findings of the World Economic Forum's *Global Information Technology Report 2003-2004* which features the Networked Readiness Index (NRI) for a total of 102 economies including Malta. The NRI measures how prepared economies are to participate in and benefit from ICT developments and provides a legitimate framework against which to evaluate this diagnosis, precisely because it is based on wide-angled premises which mirror with the contextualised, multicausal, multifactorial approach of this study. It acknowledges that there are three important stakeholders to consider in the development and use of ICT, namely individuals, businesses, and governments; that there is a general macroeconomic and regulatory *environment* for ICT in which the stakeholders play out their respective roles; and that the degree of *usage* of ICT by (and hence the impact of ICT on) the three stakeholders is linked to their degrees of *readiness* (or capability) to use and benefit from ICT. Table II reproduces Malta's overall NRI ranking (out of 102 countries) as well as its ranking in all the

sub-indices constituting the NRI, and assesses each element as being a relative strength, major strength, weakness or major weakness, on the basis of Malta's ranking.

MALTA	**Rank/102**	**Assessment[1]**
NETWORKED READINESS INDEX RANK 2003–2004 (102 countries)	**27**	
ENVIRONMENT COMPONENT INDEX	**29**	
Market Environment	**41**	**W**
Political and Regulatory Environment	**20**	**S**
Infrastructure Environment	**29**	
State of cluster development, 2003	79	**WW**
Venture capital availability, 2003	56	**WW**
Subsidies for firm-level R&D, 2003	38	
Quality of scientific research institutions, 2003	71	**WW**
Availability of scientists and engineers, 2003	58	**WW**
Brain drain, 2003	29	
Utility patents granted (per 1,000,000 inhabitants), 2002	33	
ICT manufactured exports (per capita), 2001	4	**SS**
ICT service exports (per capita), 2001	19	**S**
Overall administrative burden, 2003	39	
Quality of the legal system, 2003	21	
Laws relating to ICT, 2003	29	
Competition in the ISP sector, 2003	34	
Foreign ownership restrictions, 2003	37	
Efficiency of the tax system, 2003	8	**SS**
Freedom of the press, 2003	35	
Overall infrastructure quality, 2003	42	**W**
Waiting time for telephone lines (years), 2000	30	
Telephone mainlines (per 1,000 inhabitants), 2001	30	
Public pay phones (per 1,000 inhabitants), 2001	20	**S**
Internet servers (per 1,000,000 inhabitants), 2001	24	
READINESS COMPONENT INDEX	**31**	
Individual Readiness	**35**	
Business Readiness	**40**	
Government Readiness	**23**	
Public expenditure on education (per capita), 2000	29	
Adult illiteracy (%), 2001	53	**WW**
Tertiary enrollment (gross %), 2001 or most recent available	58	**WW**
Radios (per 1,000 inhabitants), 2001 or most recent available	26	
Television sets (per 1,000 inhabitants), 2001	17	**S**
Households online (as % of households with computers), 2002	36	
Quality of math and science education, 2003	30	
Affordability of local fixed line calls (as % of per capita GDP), 2001	38	
Affordability of Internet telephone access (as % of per capita GDP), 2001	8	**SS**
Affordability of Internet service provider fees (as % of per capita GDP), 2001	33	
Ease of obtaining telephone mainlines and telephone lines, 2003	32	
Cost of business telephone monthly subscription (as % of per capita GDP), 2002	30	
Extent of staff training, 2003	38	
Quality of business schools, 2003	58	**WW**
Scientists and engineers in R&D (per 1,000 inhabitants), 2000	47	**W**
Government prioritization of ICT, 2003	6	**SS**
Government online presence, 2003	40	
Government procurement of ICT, 2003	54	**WW**

[1] KEY: "S" = Relative Strength; "SS" = Major Relative Strength
"W" = Relative Weakness; "WW" = Major Relative Weakness

MALTA	Rank/102	Assessment[1]
NETWORKED READINESS INDEX RANK 2003–2004 (102 countries)	**27**	
USAGE COMPONENT INDEX	**24**	
Individual Usage	**20**	**S**
Business Usage	**29**	
Government Usage	**17**	**S**
Personal computers (per 1,000 inhabitants), 2001	30	
ISDN subscribers (per 1,000 inhabitants), 2001	40	
Cable TV subscribers (per 1,000 inhabitants), 2001	8	**SS**
Internet users (per 1,000 inhabitants), 2001	12	**S**
Computers installed in businesses (per 1,000 inhabitants), 2002	24	
Firm-level technology absorption, 2003	45	**W**
Prevalence of foreign technology licensing, 2003	45	**W**
Government success in ICT promotion, 2003	7	**SS**
Government online services, 2003	27	

[1] KEY: "S" = Relative Strength; "SS" = Major Relative Strength
"W" = Relative Weakness; "WW" = Major Relative Weakness

Table II: Malta's Networked Readiness Index (NRI) Ranking[97]

According to this assessment, based on Malta's NRI ranking in each sub-index, the political and regulatory environment of the country is a relative strength whereas the market environment is a weakness, mainly due to the underdevelopment of industry clusters and the limited availability of venture capital, the quality of scientific research institutions and the limited availability of scientists and engineers, as highlighted in this study. The activity of ST Microelectronics shows up in Malta's ranking for ICT manufactured exports per capita, and interestingly, Malta ranks quite well with respect to ICT services export per capita as well, according to this study. There are in fact some rather small yet successful software companies that do export their services, but ICT services exports are still not of ICT-hub magnitude. While the efficiency of the tax system is perceived to be a major strength, the quality of the overall infrastructure is a weakness.

When it comes to the readiness and usage components, the NRI sub-indices confirm the findings of this study, namely that Government seems to be leading in the drive towards the attainment of the IS&E, followed by individuals, followed by businesses which include the more advanced foreign businesses and the less advanced local businesses. Not surprisingly, this pattern is reflected in both readiness and usage rankings, but Malta's usage rankings are better than its readiness levels across the board. The NRI sub-indices rankings are in congruence with the findings of this study: adult illiteracy, tertiary enrolment and government procurement of ICT are among the major weaknesses, while government prioritisation of ICT and its success in ICT promotion are among the major strengths. <> Malta has a relatively high number of Internet users but not enough scientists and engineers, weak firm-level technology absorption and a low prevalence of foreign technology licensing. These rankings point to the same factors and lend support to the same policy-directed recommendations.

In summary, Malta is a country that stands to benefit from IS-related developments in a special way due to its small size, human resource development potential and strategic

[97] Adapted from World Economic Forum (2003), with special thanks for having made Malta's full NRI ranking profile available to the author readily upon request.

geographical location. Encouragingly, Government seems to have made this crucial realisation and has committed itself to national IS policies that are geared towards ambitious IS objectives such as that of making Malta an ICT hub. The country may, however, lack the resources that are required to implement these policies and sustain further development of the IS&E in the medium to long run, particularly in view of the critical fiscal situation which is weighing heavily on the economy and which is bound to constrain public spending. Government must work towards attracting foreign investment, encouraging alliances between local companies and foreign industry leaders, forging private-public partnerships and tapping any EU funding possibilities that may arise to be able to attain its objectives. Moreover, it is imperative to enhance competitiveness by strengthen the supply-side of the economy and to improve IST penetration rates, particularly in those sectors that are lagging behind, thereby stimulating higher demand for IST-related services. ISTs could also be employed to support an infrastructure that would, in conjunction with policies and facilities that promote more flexible work patterns, encourage an increasing number of women to join the labour force in productive employment. Lastly, but probably most importantly, Government must effectively address the existing gaps in the education system with immediate urgency. Malta cannot but rely on a skilled and flexible labour force to be able to maximise its economic growth potential, while preserving social cohesion within the context of an IS&E.

IS-CENARIOS

A dynamic, policy-subjective and policy-directed analysis of the development prospects for the information economy and society in Malta

The ensuing prospective analysis is built on a framework of a total of twenty factors which have been identified to be key contributors to the direction and pace of development of the IS&E in Malta. These factors have been grouped under six headings, namely (1) the macroeconomic factors, (2) internationalisation, (3) investment, (4) the IST environment, (5) human resources capabilities and (6) sociological factors.

Malta today has a given macroeconomic climate, level of competitiveness and investment, IST environment, human resources base and social fabric, determined by the current status of the identified contributing factors, all of which have been extensively reviewed and discussed throughout this monograph. Changes in these factors, whether in the positive direction or otherwise, and the pace of these changes, will determine the short-term scenario of the IS&E in Malta as well as the medium-to-long term scenario. Most of the desired changes will either not happen or happen too slowly unless there are appropriate policies that provide the required stimulus and support. The ultimate purpose of this analysis is hence to inspire policy-making to be a catalyst for change in the right direction and at the right pace in those areas where this is deemed to be necessary. Unarguably, there are many actors that have key roles to play in the successful development of the IS&E, and these include several protagonists from the private sector. But policy-makers are the ones that have to set the scene for all actors to be able to play their part well. Essentially, the successful development of the IS&E needs to be policy-driven.

The set of twenty key factors are presented in the tables below and for each of these factors, three possible standings are given, namely the status quo, the negative outlook which implies loss of pace for Malta's IS&E, and the positive outlook which sees Malta becoming the ICT hub which it aspires to be. The yellow cells in the table indicate where Malta is expected to get to if there is no major shift of policy in any direction. For most factors, this corresponds to where Malta is now, that is to the status quo or baseline. For a few others, some improvement is expected even with the existing policies. The position that Malta is starting from in these cases is highlighted by the green cells. At the other end, the blue cells indicate what Malta can be expected to achieve if appropriate policies are put into place.

With respect to the macroeconomic framework and the factors associated with it which are listed in Table I, the major issue is the Malta's fiscal position which is weighing heavily on the economy and hampers growth prospects. As things stand at the moment, the country is expected to register economic growth rates in the region of 2% to 4%, which though higher than the marginal growth rates that have marred Malta's positive economic growth record over the last couple of years, are still modest for a country that is in the process of restructuring its economy and gaining full access to the vast EU market. Rigorous policies that effectively address the current fiscal situation with immediate urgency to attain fiscal consolidation within the next couple of years are the key to higher economic growth in future. Fiscal consolidation is a prerequisite to EMU membership and, unless immediate policy action is taken on this front, Malta risks having to delay EMU membership, which is bound to serve the country's economy well, due to lack of convergence.

MACROECONOMIC FACTORS	Negative (loss of pace)	Baseline (status quo)	Positive (ICT hub)
Real GDP Growth	0 – 2% annually	2 – 4% annually	4 – 6% annually
Prices: Inflation	3 – 4% annually	2 – 3% annually	1 – 2% annually
Fiscal Policy: **Fiscal Deficit** **Public Debt**	5 – 7% of GDP Over 60% of GDP	3 – 5% of GDP 60% of GDP	Below 3% of GDP Below 60% of GDP
EMU Convergence	Not achieved	Achieved with some difficulty	Achieved comfortably

Key: Where Malta is starting from
Where Malta is heading given current policies
What Malta could achieve if appropriate policies are pursued

Table I: Macroeconomic Factors

For a small country like Malta, the degree of internationalisation sets the pace of development. A number of factors have been identified to contribute to internationalisation. One important factor is competitiveness, which is related to several factors including the economy, the legislative environment, the infrastructure, human capital, wage levels and productivity, innovation and R&D, the quality of public administration services, taxation, and the social fabric. Policies directed at addressing the weaknesses in each of these areas could contribute to an overall improvement in competitiveness across all sectors of the Maltese economy. The proposals put forward by the recently-appointed task force assigned with the task of drafting of a competitiveness strategy for Malta are a good starting point for policy-formulation, but more energy has to be put into sustaining a constant drive for maximising Malta's competitive potential. This could also attract more FDI to Malta in a number of sectors, which would diversify the economic risk associated with the present industrial structure in which one company in the electronics sub-sector accounts for a large share of manufacturing output and exports. On the other hand, erosion of competitiveness in the existing pockets of excellence of the Maltese economy could fuel loss of FDI to the upcoming CEEs. It is expected that while the EU market opportunities that lie ahead will not be exploited by many Maltese industries within the first few years of EU membership, the existing few weak links between local and foreign businesses will become stronger and could eventually lead Maltese businesses to venture into EU markets with greater confidence.

INTERNATIONALISATION FACTORS	Negative (loss of pace)	Baseline (status quo)	Positive (ICT hub)
Competitiveness	Erosion of pockets of excellence	Improves marginally in specific sectors	Improves across most sectors
FDI	Lost to CEE countries	At current levels	Increases in a number of areas
Links between Local and Foreign Businesses	None	Few and limited	Several and strong
EU Market Opportunities	Not exploited	Exploited by few industries	Exploited by most industries

Key: Where Malta is starting from, Where Malta is heading given current policies
What Malta could achieve if appropriate policies are pursued

Table II: Macroeconomic Factors

As echoed several times throughout this monograph, investment expenditure, including expenditure on R&D and innovation, is limited. Moreover, Maltese entrepreneurs are generally not predisposed to innovation and it is only recently that some initiatives have been undertaken to stimulate the diffusion of an innovation culture. Given the current state of public finances, the country cannot rely entirely on the Government to generate the amount of investment that is required to sustain a fully-fledged IS&E. EU funding opportunities, together with public-private partnerships, could contribute significantly to increasing the country's productive capacity. If Malta manages to exploit these opportunities to the full, then it is expected that R&D expenditure as well as investment in the supporting infrastructure will increase. For Malta to become an ICT hub, its infrastructure must not only be gradually developed further but must be constantly maintained at benchmark levels.

INVESTMENT-RELATED FACTORS	Negative (loss of pace)	Baseline (status quo)	Positive (ICT hub)
EU Funding Opportunities	Largely lost due to lack of resources and initiative	Some taken, some lost	Exploited to the full
R&D Expenditure	Shrinks further	Remains at modest levels	Increases gradually
Innovation Culture	No diffusion	Diffuses slowly	Diffuses rapidly

Key: Where Malta is heading given current policies
What Malta could achieve if appropriate policies are pursued

Table III: Investment-Related Factors

Policy-making with respect to the IST environment is generally on the right track. It is expected that IST penetration rates will continue to increase and there will be faster take-up and roll-out of new products in the local IST markets. The telecoms regulator is expected to gain more autonomy in the near future. These developments are expected to create more space for competition and for private initiatives that would contribute to the upgrading of the local ICT infrastructure. Meanwhile, the on-going privatisation process is expected to proceed at a modest pace, in line with the restructuring process.

IST ENVIRONMENT FACTORS	Negative (loss of pace)	Baseline (status quo)	Positive (ICT hub)
IST Penetration	Dwindles – loss of interest	Stabilises gradually	Faster take-up (and roll-out)
Telecoms Regulation	Government remains dominant	Regulator gradually gains autonomy	Autonomous, market-oriented regulator
Privatisation	Limited achievements	Gradual, contributing to restructuring	Rapid and very successful
Infrastructure	Minimal development	Gradually developed further	Maintained at benchmark levels

Key: Where Malta is heading given current policies,
What Malta could achieve if appropriate policies are pursued

Table IV: IST Environment Factors

With respect to human resource capabilities and related factors policy-makers have a lot to do. Malta's education system needs to be reformed systematically. Piecemeal reform initiatives are gradually leading to some improvement in certain areas, but several lacunae still subsist and will continue to do so unless and until there is one concerted reform program that is carefully studied, well-funded, effectively implemented and closely monitored. In parallel with this, a comprehensive set of policy efforts have to be directed at increasing the female participation rate. These range all the way from the provision of childcare facilities to the promotion of ICT-aided flexible work practices, such as work-from-home arrangements, to the enactment of labour laws that encourage employers to offer and women to take up part-time jobs with flexible hours. Some brain drain is expected to occur as Maltese workers gain open access to the EU labour market, but eventually some emigrants are bound to return and bring back valuable knowledge and experience with them.

HUMAN RESOURCES FACTORS	Negative (loss of pace)	Baseline (status quo)	Positive (ICT hub)
Education	No effective reforms	Reformed slowly, some lacunae subsist	Reformed systematically
Brain drain	Most leave, few come back	Some leave, some come back	Few leave, all come back
Participation (esp. female)	No change	Increases slowly	Increases significantly

Key: Where Malta is starting from
Where Malta is heading given current policies
What Malta could achieve if appropriate policies are pursued

Table V: Human Resources Factors

Development has to be assessed in its wider sociological context as well as from the economic point of view. Two sociological factors have been identified as being key determinants in the direction and pace of development of the IS&E in Malta. The first of these is the welfare system and its implications. The existing welfare system is clearly not sustainable in the long run. Government has appointed a commission to propose reforms that would lead to a sustainable system that preserves the social safety-net. Judging by the progress registered so far, it appears that the reform is going to be rather slow and it will in the process weigh heavily on public funds, which are limited and for which there are competing claims. If the welfare reform gathers momentum and Government is successful both in its implementation and in stimulating related developments in the financial sector, then a substantial part of the recurrent burden on public finances would be relieved. The other key sociological factor is the digital divide. Policies aimed at minimising the digital divide would preserve the social fabric and foster social cohesion, thereby engendering the development of the IS&E in Malta.

HUMAN RESOURCES FACTORS	Negative (loss of pace)	Baseline (status quo)	Positive (ICT hub)
Welfare System	Not successfully reformed, exerting both fiscal and social pressures	Reformed slowly, weighing on public funds	Reformed successfully, stimulating developments in the financial sector
Digital Divide	Intensified	Contained	Minimised

Key: Where Malta is heading given current policies
What Malta could achieve if appropriate policies are pursued

Table VI: Sociological Factors

The ICT hub scenario that has inspired IS policies during the past couple of years should also inspire policy-making in other areas, ranging from public finance to investment promotion to education. A wide array of factors contribute to the development of the IS&E and this development can in turn have an impact on several socio-economic factors which is not easy to quantify. Importantly, development in the 21st century requires investment in ICT and the creation of a socio-economic environment that is conducive to such investment and that can benefit fully from it. Economic growth prospects in the IS&E are not subject to natural resource limitations but depend almost entirely on human resource capabilities. This may be good news for Malta, a small open economy that has relied on its human resources to reach its present level of development. Malta's aspirations to become an ICT hub may be within reach if policy gears up to exploit the country's human resource potential to the full. Indeed, the key to economic success lies in attaining and maintaining international competitiveness, which requires efficient allocation of resources coupled with skills, knowledge and innovation.

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	ECONOMIC GROWTH																
01	Real GDP	A11	NSO(M)	EUR million at constant prices & exchange rates (1995 = 100)	2170,6	2329,3	2370,9	2279,4	2404,2	2482,2	2603,0	2862,8	2965,6	3154,8	3537,7	3505,6	3490,6
02	Real GDP Growth	A11	NSO(M)	% change on previous year at constant prices & exchange rates	6,30	6,26	4,69	4,49	5,72	6,23	3,99	4,85	3,43	4,06	6,38	-1,20	0,98
03	Nominal GDP	A11	NSO(M)	EUR million at current market prices & exchange rates	1817,1	2015,6	2124,6	2100,6	2293,1	2482,2	2625,1	2952,7	3127,4	3417,5	3864,8	4044,6	4121,9
04	PPS GDP	A11	Eurostat	PPS billion at current prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	4,1	4,3	4,5	4,9	5,0	n/a
05	PPS GDP per Capita	A11	Eurostat	PPS	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	10600	11100	11700	12600	12700	n/a
06	PPS Index	A11	Eurostat	EU-15 = 100	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	55,0	55,0	55,0	56,0	55,0	n/a
	CONTRIBUTION: SUPPLY-SIDE																
	Sectoral Contribution																
07	Agriculture & Fishing	A21	NSO(M)	EUR million	55,7	58,5	57,1	56,1	57,2	61,4	67,1	74,6	74,9	73,4	77,5	88,8	96,2
08	Construction & Quarrying	A21	NSO(M)	EUR million	56,6	66,2	61,4	58,6	75,2	76,5	78,1	85,0	82,8	77,2	91,8	104,3	114,9
09	Manufacturing including Ship Repairing & Shipbuilding	A21	NSO(M)	EUR million	434,4	469,9	465,7	449,1	497,3	522,1	542,2	575,2	622,9	681,2	849,1	794,5	802,7
10	Transport & Telecommunication	A21	NSO(M)	EUR million	91,8	104,5	126,8	132,8	146,7	142,2	148,0	164,3	174,1	203,2	215,3	225,2	211,6
11	Wholesale & Retail Trade	A21	NSO(M)	EUR million	231,9	253,2	267,1	258,6	268,4	285,7	290,5	309,4	312,4	328,8	366,0	379,8	387,2

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REF	DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
12	Insurance, Banking & Real Estate	A21	NSO(M)	EUR million	104,7	124,1	138,8	133,3	136,0	158,0	193,5	219,1	222,5	234,6	296,1	318,7	323,9
13	Government Enterprises	A21	NSO(M)	EUR million	132,1	145,5	150,0	141,8	157,5	131,5	129,0	180,3	215,0	234,3	201,1	213,8	226,2
14	Public Administration	A21	NSO(M)	EUR million	229,2	260,2	284,1	301,8	330,0	356,4	398,6	416,3	427,5	447,7	492,0	562,7	570,9
15	Property Income	A21	NSO(M)	EUR million	126,2	128,3	139,7	143,8	180,7	194,7	221,2	269,2	309,6	333,2	347,2	356,6	353,9
16	Private Services	A21	NSO(M)	EUR million	143,9	162,7	178,5	188,2	200,7	214,3	232,7	267,9	308,3	343,3	382,1	400,3	409,0
17	GDP at factor cost	A21	NSO(M)	EUR million	1606,6	1773,1	1869,2	1864,0	2049,8	2142,9	2300,8	2561,3	2750,1	2957,0	3318,2	3444,6	3496,5
	Sectoral Percentage Contribution																
18	Agriculture & Fishing	A21	NSO(M)	% of GDP at factor cost	3,5	3,3	3,1	3,0	2,8	2,9	2,9	2,9	2,7	2,5	2,3	2,6	2,8
19	Construction & Quarrying	A21	NSO(M)	% of GDP at factor cost	3,5	3,7	3,3	3,1	3,7	3,6	3,4	3,3	3,0	2,6	2,8	3,0	3,3
20	Manufacturing including Ship Repairing & Shipbuilding	A21	NSO(M)	% of GDP at factor cost	27,0	26,5	24,9	24,1	24,3	24,4	23,6	22,5	22,7	23,0	25,6	23,1	23,0
21	Transport & Telecommunication	A21	NSO(M)	% of GDP at factor cost	5,7	5,9	6,8	7,1	7,2	6,6	6,4	6,4	6,3	6,9	6,5	6,5	6,1
22	Wholesale & Retail Trade	A21	NSO(M)	% of GDP at factor cost	14,4	14,3	14,3	13,9	13,1	13,3	12,6	12,1	11,4	11,1	11,0	11,0	11,1
23	Insurance, Banking & Real Estate	A21	NSO(M)	% of GDP at factor cost	6,5	7,0	7,4	7,2	6,6	7,4	8,4	8,6	8,1	7,9	8,9	9,3	9,3
24	Government Enterprises	A21	NSO(M)	% of GDP at factor cost	8,2	8,2	8,0	7,6	7,7	6,1	5,6	7,0	7,8	7,9	6,1	6,2	6,5

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25	Public Administration	A21	NSO(M)	% of GDP at factor cost	14,3	14,7	15,2	16,2	16,1	16,6	17,3	16,3	15,5	15,1	14,8	16,3	16,3
26	Property Income	A21	NSO(M)	% of GDP at factor cost	7,9	7,2	7,5	7,7	8,8	9,1	9,6	10,5	11,3	11,3	10,5	10,4	10,1
27	Private Services	A21	NSO(M)	% of GDP at factor cost	9,0	9,2	9,6	10,1	9,8	10,0	10,1	10,5	11,2	11,6	11,5	11,6	11,7
	CONTRIBUTION: DEMAND-SIDE																
	GDP Expenditure Aggregates																
28	Consumers' Expenditure	A22	NSO(M)	EUR millions	1139,7	1235,2	1290,6	1254,8	1356,3	1517,7	1671,5	1841,7	1942,2	2147,5	2465,9	2592,2	2665,3
29	General Government Current Expenditure on Goods & Services	A22	NSO(M)	EUR millions	319,6	367,4	399,0	422,1	467,1	509,7	567,7	605,3	617,5	639,8	720,5	815,4	835,3
30	Gross Fixed Capital Formation	A22	NSO(M)	EUR millions	575,3	597,2	585,1	618,6	680,9	791,4	754,5	748,1	765,8	798,0	1013,1	940,2	951,6
31	Inventory Changes[1]	A22	NSO(M)	Lm millions	31,4	39,0	0,2	8,3	22,3	2,6	-3,1	6,9	-24,6	22,1	81,9	-121,8	-166,4
32	Exports	A22	NSO(M)	EUR millions	1549,3	1753,3	1952,9	2003,0	2217,1	2328,8	2284,8	2511,7	2742,7	3101,1	3969,2	3542,3	3502,6
33	Imports	A22	NSO(M)	EUR millions	1797,8	1976,3	2103,3	2206,1	2450,3	2667,9	2650,2	2761,1	2916,2	3291,0	4385,6	3723,5	3666,3
34	External Trade Balance	A22	NSO(M)	EUR millions	-248,6	-223,1	-150,3	-203,1	-233,2	-339,1	-365,4	-249,4	-173,6	-189,9	-416,4	-181,1	-163,7
35	GDP at current market prices	A22	NSO(M)	EUR millions	1817,4	2015,8	2124,6	2100,6	2293,4	2482,2	2625,3	2952,7	3127,4	3417,5	3865,0	4044,8	4122,1
	GDP Expenditure Aggregates Percentage of GDP																

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36	Consumers' Expenditure	A22	NSO(M)	% of GDP at current market prices	62,7	61,3	60,7	59,7	59,1	61,1	63,7	62,4	62,1	62,8	63,8	64,1	64,7
37	General Government Current Expenditure on Goods & Services	A22	NSO(M)	% of GDP at current market prices	17,6	18,2	18,8	20,1	20,4	20,5	21,6	20,5	19,7	18,7	18,6	20,2	20,3
38	Gross Fixed Capital Formation	A22	NSO(M)	% of GDP at current market prices	31,7	29,6	27,5	29,4	29,7	31,9	28,7	25,3	24,5	23,4	26,2	23,2	23,1
39	Inventory Changes[1]	A22	NSO(M)	% of GDP at current market prices	1,7	1,9	0,0	0,4	1,0	0,1	-0,1	0,2	-0,8	0,6	2,1	-3,0	-4,0
40	Exports	A22	NSO(M)	% of GDP at current market prices	85,2	87,0	91,9	95,4	96,7	93,8	87,0	85,1	87,7	90,7	102,7	87,6	85,0
41	Imports	A22	NSO(M)	% of GDP at current market prices	98,9	98,0	99,0	105,0	106,8	107,5	100,9	93,5	93,2	96,3	113,5	92,1	88,9
42	External Trade Balance	A22	NSO(M)	% of GDP at current market prices	-13,7	-11,1	-7,1	-9,7	-10,2	-13,7	-13,9	-8,4	-5,5	-5,6	-10,8	-4,5	-4,0
	Changes in GDP Expenditure Aggregates																
43	Consumers' Expenditure	A22	NSO(M)	% change on previous year	tbc	8,4	4,5	-2,8	8,1	11,9	10,1	10,2	5,5	10,6	14,8	5,1	2,8
44	General Government Current Expenditure on Goods & Services	A22	NSO(M)	% change on previous year	tbc	15,0	8,6	5,8	10,7	9,1	11,4	6,6	2,0	3,6	12,6	13,2	2,4
45	Gross Fixed Capital Formation	A22	NSO(M)	% change on previous year	tbc	3,8	-2,0	5,7	10,1	16,2	-4,7	-0,8	2,4	4,2	27,0	-7,2	1,2
46	Exports	A22	NSO(M)	% change on previous year	tbc	13,2	11,4	2,6	10,7	5,0	-1,9	9,9	9,2	13,1	28,0	-10,8	-1,1
47	Imports	A22	NSO(M)	% change on previous year	tbc	9,9	6,4	4,9	11,1	8,9	-0,7	4,2	5,6	12,9	33,3	-15,1	-1,5
48	External Trade Balance	A22	NSO(M)	% change on previous year	tbc	10,3	32,6	-35,1	-14,8	-45,4	-7,7	31,7	30,4	-9,4	-119,3	56,5	9,6

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	UNEMPLOYMENT																
49	Unemployment Rate	A31	NSO(M)	%	4,3	4,1	4,5	5,2	4,8	4,2	5,0	5,5	5,6	5,8	5,0	5,1	5,4
	Unemployed Persons[1] by Age Group																
50	Under 20	A31	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	1146	1064	1104	943	1027	900
51	20 - 24	A31	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	1019	1068	1094	867	943	1015
52	25 - 29	A31	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	732	766	815	740	747	825
53	30 - 44	A31	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	2561	2754	2740	2280	2268	2264
54	45+	A31	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	1691	1785	1942	1753	1768	1770
55	Total Unemployed Persons	A31	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	7149	7437	7695	6583	6753	6774
	Age Distribution of Unemployed Persons[2]																
56	Under 20	A31	NSO(M)	% of total unemployed persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	16,0	14,3	14,3	14,3	15,2	13,3
57	20 - 24	A31	NSO(M)	% of total unemployed persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	14,3	14,4	14,2	13,2	14,0	15,0
58	25 - 29	A31	NSO(M)	% of total unemployed persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	10,2	10,3	10,6	11,2	11,1	12,2
59	30 - 44	A31	NSO(M)	% of total unemployed persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	35,8	37,0	35,6	34,6	33,6	33,4

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60	45+	A31	NSO(M)	% of total unemployed persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	23,7	24,0	25,2	26,6	26,2	26,1
	LABOUR SUPPLY																
61	Labour Supply	A32	NSO(M)	fulltime gainfully occupied + registered unemployed	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	140834	141186	142608	144016	144885	144379
62	Labour Supply Growth	A32	NSO(M)	% change on previous year	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	0,25	1,01	0,99	0,60	-0,35
63	Population of Working Age	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	tbc	tbc	tbc	tbc	tbc	tbc
64	Paticipation Ratio	A32	NSO(M)	% of population of working age	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	tbc	tbc	tbc	tbc	tbc	tbc
	EMPLOYMENT																
	Sectoral Employement																
65	Agriculture and Fisheries	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	2181	2180	2175	2203	2150	2215
66	Quarrying, Construction & Oil Drilling	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	6053	5835	5888	6398	6708	6803
67	Manufacturing	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	28861	29088	28707	28970	29116	28687
68	Wholesale & Retail	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	15095	15217	15592	15683	15358	15596
69	Banking, Insurance and Real Estate	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	3213	3291	5077	5028	4949	4865
70	Transport, Storage & Communication	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	6111	6184	6436	6171	6082	6085

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71	Hotels & Catering Establishments	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	8988	8814	9132	9260	9033	8969
72	Other Private Market Services	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	11530	11956	12805	13917	14398	15013
73	Public Sector	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	50263	49730	47422	47992	48482	47556
74	Temporary Employement	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	846	981	1068	1206	1176	1074
75	Total Employment	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	133141	133276	134302	136828	137452	136863
	Sectoral Distribution of Employment																
76	Agriculture and Fisheries	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	1,6	1,6	1,6	1,6	1,6	1,6
77	Quarrying, Construction & Oil Drilling	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	4,5	4,4	4,4	4,7	4,9	5,0
78	Manufacturing	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	21,7	21,8	21,4	21,2	21,2	21,0
79	Wholesale & Retail	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	11,3	11,4	11,6	11,5	11,2	11,4
80	Banking, Insurance and Real Estate	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	2,4	2,5	3,8	3,7	3,6	3,6
81	Transport, Storage & Communication	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	4,6	4,6	4,8	4,5	4,4	4,4
82	Hotels & Catering Establishments	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	6,8	6,6	6,8	6,8	6,6	6,6
83	Other Private Market Services	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	8,7	9,0	9,5	10,2	10,5	11,0

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84	Public Sector	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	37,8	37,3	35,3	35,1	35,3	34,7
85	Temporary Employement	A32	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	ncfa	0,6	0,7	0,8	0,9	0,9	0,8
	LABOUR PRODUCTIVITY																
86	Labour Productivity Index	A33	NSO(M)	1995 = 100	79	81	83	86	91	100	105	109	116	122	144	130	136
87	Changes in Labour Productivity	A33	NSO(M)	% change on previous year	8,22	2,53	2,47	3,61	5,81	9,89	5,00	3,81	6,42	5,17	18,03	-9,72	4,62
	CROSS-BORDER CAPITAL FLOWS																
88	Financial Account Balance	A51	NSO(M)	EUR million	ncfa	ncfa	ncfa	ncfa	ncfa	259,2	229,1	86,2	87,9	152,6	409,1	12,1	60,2
	TRADE FLOWS IN ICT																
	Imports																
89	tba	A53	NSO(M)	EUR million	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc
	Exports of High-Tech Products																
90	Office Machinery	A53	NSO(M)	EUR million	0,8	ncfa	ncfa	ncfa	ncfa	22,8	15,3	25,2	18,8	22,4	29,4	ncfa	ncfa
91	Of which: Computers & Parts	A53	NSO(M)	EUR million	0,7	ncfa	ncfa	ncfa	ncfa	21,9	14,5	25,1	18,6	22,4	26,4	ncfa	ncfa
92	Electrical Machinery	A53	NSO(M)	EUR million	402,4	ncfa	ncfa	ncfa	ncfa	858,7	744,3	730,2	944,0	1062,4	1756,2	ncfa	ncfa

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93	Of which: Electronic Components	A53	NSO(M)	EUR million	344,6	ncfa	ncfa	ncfa	ncfa	771,5	668,7	647,1	853,3	953,8	1649,3	ncfa	ncfa
94	Scientific Instruments & Apparatus	A53	NSO(M)	EUR million	38,2	ncfa	ncfa	ncfa	ncfa	61,1	58,1	59,7	57,3	66,2	66,7	ncfa	ncfa
95	Medicinal & Pharmaceutical Products	A53	NSO(M)	EUR million	5,7	ncfa	ncfa	ncfa	ncfa	17,4	18,4	22,4	23,6	25,7	22,1	ncfa	ncfa
96	Total Exports of High-Tech Products	A53	NSO(M)	EUR million	447,1	ncfa	ncfa	ncfa	ncfa	960,0	836,1	837,5	1043,8	1176,7	1874,5	ncfa	ncfa
	High-Tech Products as a Percentage of Visible Exports																
97	Office Machinery	A53	NSO(M)	% of visible exports	0,1	ncfa	ncfa	ncfa	ncfa	1,6	1,1	1,7	1,2	1,2	1,1	ncfa	ncfa
98	Of which: Computers & Parts	A53	NSO(M)	% of visible exports	0,1	ncfa	ncfa	ncfa	ncfa	1,5	1,1	1,7	1,1	1,2	1,0	ncfa	ncfa
99	Electrical Machinery	A53	NSO(M)	% of visible exports	45,5	ncfa	ncfa	ncfa	ncfa	58,7	54,6	50,7	57,8	57,2	66,1	ncfa	ncfa
100	Of which: Electronic Components	A53	NSO(M)	% of visible exports	38,9	ncfa	ncfa	ncfa	ncfa	52,7	49,0	44,9	52,2	51,4	62,1	ncfa	ncfa
101	Scientific Instruments & Apparatus	A53	NSO(M)	% of visible exports	4,3	ncfa	ncfa	ncfa	ncfa	4,2	4,3	4,1	3,5	3,6	2,5	ncfa	ncfa
102	Medicinal & Pharmaceutical Products	A53	NSO(M)	% of visible exports	0,6	ncfa	ncfa	ncfa	ncfa	1,2	1,3	1,6	1,4	1,4	0,8	ncfa	ncfa
103	Total Exports of High-Tech Products	A53	NSO(M)	% of visible exports	50,5	ncfa	ncfa	ncfa	ncfa	65,6	61,3	58,1	63,9	63,4	70,6	ncfa	ncfa
	EXCHANGE RATES																
104	EUR/Lm Exchange Rate		CBM	Spot Annual Average (EUR : Lm 1)	2,4733	2,4979	2,4287	2,2347	2,2296	2,1669	2,1852	2,2921	2,2957	2,3470	2,4741	2,4815	2,4468

(1) Includes statistical discrepency
(2) Registering for employment under Part I of the Unemployment Register
n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed
All figures in blue are provisional

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
INDUSTRIAL PRODUCTION																		
NACE		**Gross Output**																
01	15	Manufacture of food products and beverages	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	227,5	240,7	268,3	279,1	n/a	n/a	n/a	n/a
02	16	Manufacture of tabacco products	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	34,9	38,8	50,1	54,0	n/a	n/a	n/a	n/a
03	17	Manufacture of textiles	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	10,2	11,0	10,4	10,4	n/a	n/a	n/a	n/a
04	18	Manufacture of wearing apparel; dressing and dyeing of fur	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	138,2	138,6	137,2	149,7	n/a	n/a	n/a	n/a
05	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	38,6	39,5	36,1	38,4	n/a	n/a	n/a	n/a
06	20	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	3,1	3,3	4,4	5,2	n/a	n/a	n/a	n/a
07	21	Manufacture of pulp, paper and paper products	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	15,8	17,2	19,2	18,9	n/a	n/a	n/a	n/a
08	22	Publishing, printing and reproduction of recorded media	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	73,2	73,1	70,3	82,8	n/a	n/a	n/a	n/a
09	23	Manufacture of coke, refined petroleum products and nuclear fuel	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
10	24	Manufacture of chemicals and chemical products	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	69,5	77,9	88,4	91,2	n/a	n/a	n/a	n/a
11	25	Manufacture of rubber and plastic products	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	51,1	52,0	60,9	69,6	n/a	n/a	n/a	n/a
12	26	Manufacture of other non-metallic mineral products	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	53,3	56,0	52,0	44,2	n/a	n/a	n/a	n/a
13	27	Manufacture of basic metals	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	1,7	n/a	n/a	n/a	n/a
14	28	Manufacture of fabricated metal products, except machinery and equipment	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	60,1	52,8	57,1	55,8	n/a	n/a	n/a	n/a
15	29	Manufacture of machinery and equipment n.e.c.	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	11,8	12,0	50,6	37,5	n/a	n/a	n/a	n/a
16	30	Manufacture of office machinery and computers n.e.c.	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	2,3	3,2	3,0	2,8	n/a	n/a	n/a	n/a
17	31	Manufacture of electrical machinery and apparatus	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	49,7	50,7	65,0	80,3	n/a	n/a	n/a	n/a
18	32	Manufacture of radio, television and communication equipment and apparatus	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	829,4	715,4	670,6	875,6	n/a	n/a	n/a	n/a
19	33	Manufacture of medical, precision and optical instruments, watches and clocks	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	63,5	53,6	54,4	58,5	n/a	n/a	n/a	n/a
20	34	Manufacture of motor vehicles, trailers and semi-trailers	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	3,1	5,3	5,7	2,9	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
21	35	Manufacture of other transport equipment	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	55,1	22,2	33,8	50,2	n/a	n/a	n/a	n/a
22	36	Manufacture of furniture; manufacturing n.e.c.	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	127,8	122,6	131,1	132,8	n/a	n/a	n/a	n/a
23	37	Recycling	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	2,1	1,7	1,9	1,4	n/a	n/a	n/a	n/a
24		TOTAL MANUFACTURING	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	1920,2	1787,6	1870,5	2143,0	n/a	n/a	n/a	n/a
25	14	Total Other Mining & Quarrying	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	13,7	14,9	15,3	12,6	n/a	n/a	n/a	n/a
26	45	Total Construction	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	181,3	207,2	204,2	185,0	n/a	n/a	n/a	n/a
27		TOTAL GROSS OUTPUT	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	2115,2	2009,8	2090,0	2340,6	n/a	n/a	n/a	n/a
	NACE	**Gross Output Volume Indices**																
28	15	Manufacture of food products and beverages	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	10,8	12,0	12,8	11,9	n/a	n/a	n/a	n/a
29	16	Manufacture of tabacco products	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	1,7	1,9	2,4	2,3	n/a	n/a	n/a	n/a
30	17	Manufacture of textiles	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,5	0,5	0,5	0,4	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
31	18	Manufacture of wearing apparel; dressing and dyeing of fur	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	6,5	6,9	6,6	6,4	n/a	n/a	n/a	n/a
32	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	1,8	2,0	1,7	1,6	n/a	n/a	n/a	n/a
33	20	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,1	0,2	0,2	0,2	n/a	n/a	n/a	n/a
34	21	Manufacture of pulp, paper and paper products	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,7	0,9	0,9	0,8	n/a	n/a	n/a	n/a
35	22	Publishing, printing and reproduction of recorded media	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	3,5	3,6	3,4	3,5	n/a	n/a	n/a	n/a
36	23	Manufacture of coke, refined petroleum products and nuclear fuel	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a
37	24	Manufacture of chemicals and chemical products	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	3,3	3,9	4,2	3,9	n/a	n/a	n/a	n/a
38	25	Manufacture of rubber and plastic products	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	2,4	2,6	2,9	3,0	n/a	n/a	n/a	n/a
39	26	Manufacture of other non-metallic mineral products	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	2,5	2,8	2,5	1,9	n/a	n/a	n/a	n/a
40	27	Manufacture of basic metals	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,1	n/a	n/a	n/a	n/a
41	28	Manufacture of fabricated metal products, except machinery and equipment	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	2,8	2,6	2,7	2,4	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
42	29	Manufacture of machinery and equipment n.e.c.	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,6	0,6	2,4	1,6	n/a	n/a	n/a	n/a
43	30	Manufacture of office machinery and computers n.e.c.	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,1	0,2	0,1	0,1	n/a	n/a	n/a	n/a
44	31	Manufacture of electrical machinery and apparatus	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	2,3	2,5	3,1	3,4	n/a	n/a	n/a	n/a
45	32	Manufacture of radio, television and communication equipment and apparatus	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	39,2	35,6	32,1	37,4	n/a	n/a	n/a	n/a
46	33	Manufacture of medical, precision and optical instruments, watches and clocks	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	3,0	2,7	2,6	2,5	n/a	n/a	n/a	n/a
47	34	Manufacture of motor vehicles, trailers and semi-trailers	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,1	0,3	0,3	0,1	n/a	n/a	n/a	n/a
48	35	Manufacture of other transport equipment	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	2,6	1,1	1,6	2,1	n/a	n/a	n/a	n/a
48	36	Manufacture of furniture; manufacturing n.e.c.	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	6,0	6,1	6,3	5,7	n/a	n/a	n/a	n/a
50	37	Recycling	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,1	0,1	0,1	0,1	n/a	n/a	n/a	n/a
51		TOTAL MANUFACTURING	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	90,8	88,9	89,5	91,6	n/a	n/a	n/a	n/a
52	14	Total Other Mining & Quarrying	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,6	0,7	0,7	0,5	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
53	45	Total Construction	C11	NSO(M)	% of total gross output	ncfa	ncfa	ncfa	ncfa	ncfa	8,6	10,3	9,8	7,9	n/a	n/a	n/a	n/a
	NACE	**Employment**																
54	15	Manufacture of food products and beverages	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	3930	3881	3926	3883	n/a	n/a	n/a	n/a
55	16	Manufacture of tabacco products	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	160	158	159	156	n/a	n/a	n/a	n/a
56	17	Manufacture of textiles	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	311	305	267	256	n/a	n/a	n/a	n/a
57	18	Manufacture of wearing apparel; dressing and dyeing of fur	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	3995	3507	3349	3125	n/a	n/a	n/a	n/a
58	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	1159	1089	937	889	n/a	n/a	n/a	n/a
59	20	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	106	95	110	120	n/a	n/a	n/a	n/a
60	21	Manufacture of pulp, paper and paper products	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	374	369	362	386	n/a	n/a	n/a	n/a
61	22	Publishing, printing and reproduction of recorded media	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	1546	1482	1477	1536	n/a	n/a	n/a	n/a
62	23	Manufacture of coke, refined petroleum products and nuclear fuel	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	0	0	0	0	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
63	24	Manufacture of chemicals and chemical products	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	978	1079	1085	1112	n/a	n/a	n/a	n/a
64	25	Manufacture of rubber and plastic products	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	1668	1661	1891	1863	n/a	n/a	n/a	n/a
65	26	Manufacture of other non-metallic mineral products	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	1432	1416	1281	1085	n/a	n/a	n/a	n/a
66	27	Manufacture of basic metals	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	0	0	0	0	n/a	n/a	n/a	n/a
67	28	Manufacture of fabricated metal products, except machinery and equipment	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	1417	1297	1167	1118	n/a	n/a	n/a	n/a
68	29	Manufacture of machinery and equipment n.e.c.	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	178	243	442	490	n/a	n/a	n/a	n/a
69	30	Manufacture of office machinery and computers n.e.c.	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	45	43	38	26	n/a	n/a	n/a	n/a
70	31	Manufacture of electrical machinery and apparatus	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	822	885	989	1170	n/a	n/a	n/a	n/a
71	32	Manufacture of radio, television and communication equipment and apparatus	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	2128	2358	2366	2466	n/a	n/a	n/a	n/a
72	33	Manufacture of medical, precision and optical instruments, watches and clocks	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	1575	1386	1271	1274	n/a	n/a	n/a	n/a
73	34	Manufacture of motor vehicles, trailers and semi-trailers	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	111	232	233	86	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
74	35	Manufacture of other transport equipment	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	1546	1175	1186	1208	n/a	n/a	n/a	n/a
75	36	Manufacture of furniture; manufacturing n.e.c.	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	3182	2867	2905	2904	n/a	n/a	n/a	n/a
76	37	Recycling	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	20	23	26	20	n/a	n/a	n/a	n/a
77		TOTAL MANUFACTURING	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	26683	25551	25467	25173	n/a	n/a	n/a	n/a
78	14	Total Other Mining & Quarrying	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	243	245	238	238	n/a	n/a	n/a	n/a
79	45	Total Construction	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	4592	4622	4494	3949	n/a	n/a	n/a	n/a
80		TOTAL EMPLOYMENT	C11	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	31518	30418	30199	29360	n/a	n/a	n/a	n/a
	NACE	**Value-Added**																
81	15	Manufacture of food products and beverages	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	83,9	85,7	102,8	111,0	n/a	n/a	n/a	n/a
82	16	Manufacture of tabacco products	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	5,5	7,5	10,4	7,8	n/a	n/a	n/a	n/a
83	17	Manufacture of textiles	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	4,4	4,1	3,4	3,6	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
84	18	Manufacture of wearing apparel; dressing and dyeing of fur	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	52,4	60,2	52,9	55,8	n/a	n/a	n/a	n/a
85	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	14,0	14,8	12,8	13,0	n/a	n/a	n/a	n/a
86	20	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	1,6	1,5	2,1	2,7	n/a	n/a	n/a	n/a
87	21	Manufacture of pulp, paper and paper products	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	6,0	7,1	9,0	8,9	n/a	n/a	n/a	n/a
88	22	Publishing, printing and reproduction of recorded media	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	39,1	37,3	38,3	45,9	n/a	n/a	n/a	n/a
89	23	Manufacture of coke, refined petroleum products and nuclear fuel	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a
90	24	Manufacture of chemicals and chemical products	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	25,8	29,0	30,7	32,4	n/a	n/a	n/a	n/a
91	25	Manufacture of rubber and plastic products	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	31,3	29,0	33,9	39,4	n/a	n/a	n/a	n/a
92	26	Manufacture of other non-metallic mineral products	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	21,9	21,7	22,1	16,8	n/a	n/a	n/a	n/a
93	27	Manufacture of basic metals	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,8	n/a	n/a	n/a	n/a
94	28	Manufacture of fabricated metal products, except machinery and equipment	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	26,1	20,0	19,8	22,6	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
95	29	Manufacture of machinery and equipment n.e.c.	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	3,7	1,2	17,0	12,9	n/a	n/a	n/a	n/a
96	30	Manufacture of office machinery and computers n.e.c.	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	-0,2	0,6	1,9	1,1	n/a	n/a	n/a	n/a
97	31	Manufacture of electrical machinery and apparatus	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	18,1	22,1	30,8	39,8	n/a	n/a	n/a	n/a
98	32	Manufacture of radio, television and communication equipment and apparatus	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	107,1	128,5	118,2	132,4	n/a	n/a	n/a	n/a
99	33	Manufacture of medical, precision and optical instruments, watches and clocks	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	27,7	22,1	24,5	27,6	n/a	n/a	n/a	n/a
10	34	Manufacture of motor vehicles, trailers and semi-trailers	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	1,3	3,5	3,7	1,5	n/a	n/a	n/a	n/a
21	35	Manufacture of other transport equipment	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	15,4	5,0	11,4	18,5	n/a	n/a	n/a	n/a
101	36	Manufacture of furniture; manufacturing n.e.c.	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	56,1	53,7	64,3	64,7	n/a	n/a	n/a	n/a
102	37	Recycling	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,9	0,8	0,9	0,9	n/a	n/a	n/a	n/a
103		TOTAL MANUFACTURING	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	542,1	555,6	611,3	659,9	n/a	n/a	n/a	n/a
104	14	Total Other Mining & Quarrying	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	7,5	8,3	8,5	7,1	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
105	45	Total Construction	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	74,7	87,0	80,7	87,0	n/a	n/a	n/a	n/a
106		TOTAL VALUE-ADDED	C11	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	624,4	650,9	700,5	754,1	n/a	n/a	n/a	n/a
	NACE	**Value-Added per Employee**																
107	15	Manufacture of food products and beverages	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	21349	22091	26192	28574	n/a	n/a	n/a	n/a
108	16	Manufacture of tabacco products	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	34549	47286	65678	50005	n/a	n/a	n/a	n/a
109	17	Manufacture of textiles	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	14116	13491	12834	13891	n/a	n/a	n/a	n/a
110	18	Manufacture of wearing apparel; dressing and dyeing of fur	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	13108	17171	15806	17843	n/a	n/a	n/a	n/a
111	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	12083	13623	13699	14657	n/a	n/a	n/a	n/a
112	20	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	15332	16216	19358	22249	n/a	n/a	n/a	n/a
113	21	Manufacture of pulp, paper and paper products	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	15985	19365	24979	23106	n/a	n/a	n/a	n/a
114	22	Publishing, printing and reproduction of recorded media	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	25292	25186	25938	29865	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
115	23	Manufacture of coke, refined petroleum products and nuclear fuel	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
116	24	Manufacture of chemicals and chemical products	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	26340	26897	28333	29130	n/a	n/a	n/a	n/a
117	25	Manufacture of rubber and plastic products	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	18777	17438	17914	21158	n/a	n/a	n/a	n/a
118	26	Manufacture of other non-metallic mineral products	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	15277	15307	17242	15484	n/a	n/a	n/a	n/a
119	27	Manufacture of basic metals	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
120	28	Manufacture of fabricated metal products, except machinery and equipment	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	18395	15436	16974	20201	n/a	n/a	n/a	n/a
121	29	Manufacture of machinery and equipment n.e.c.	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	20914	4991	38504	26410	n/a	n/a	n/a	n/a
122	30	Manufacture of office machinery and computers n.e.c.	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	-4767	12959	50909	42206	n/a	n/a	n/a	n/a
123	31	Manufacture of electrical machinery and apparatus	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	22059	24958	31132	33986	n/a	n/a	n/a	n/a
124	32	Manufacture of radio, television and communication equipment and apparatus	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	50349	54510	49958	53700	n/a	n/a	n/a	n/a
125	33	Manufacture of medical, precision and optical instruments, watches and clocks	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	17595	15930	19282	21643	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF		DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
126	34	Manufacture of motor vehicles, trailers and semi-trailers	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	11752	14938	15818	17138	n/a	n/a	n/a	n/a
127	35	Manufacture of other transport equipment	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	9953	4283	9646	15334	n/a	n/a	n/a	n/a
128	36	Manufacture of furniture; manufacturing n.e.c.	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	17645	18738	22138	22282	n/a	n/a	n/a	n/a
129	37	Recycling	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	43771	36578	36145	44077	n/a	n/a	n/a	n/a
130		AVERAGE MANUFACTURING	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	20317	21745	24003	26215	n/a	n/a	n/a	n/a
131	14	Other Mining & Quarrying	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	31050	33777	35595	29834	n/a	n/a	n/a	n/a
132	45	Construction	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	16273	18824	17968	22041	n/a	n/a	n/a	n/a
133		AVERAGE VALUE-ADDED	C11	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	19811	21398	23196	25683	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tbc: To be confirmed

NSO(M): National Statistics Office (Malta)

REF	DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	INNOVATION																
01	Applications for Registration of Trademarks	D21	IPO(M)	number of applications	791	947	919	845	974	1284	1415	1443	1604	1469	1615	2840	tbc
02	Applications for Registration of Patents	D21	IPO(M)	number of applications	28	27	25	24	42	24	28	47	34	84	116	132	tbc
03	Applications for Registration of Designs	D21	IPO(M)	number of applications	40	9	32	30	52	9	30	59	14	24	34	10	tbc
04	Revenue from Registration of Trademarks, Patents & Designs	D21	IPO(M)	EUR	122334	143737	120133	117279	156895	150034	168201	195544	231239	235014	256861	422714	tbc
	Trends in Innovation																
05	Applications for Registration of Trademarks	D21	IPO(M)	% change on previous year	tbc	20	-3	-8	15	32	10	2	11	-8	10	76	tbc
06	Applications for Registration of Patents	D21	IPO(M)	% change on previous year	tbc	-4	-7	-4	75	-43	17	68	-28	147	38	14	tbc
07	Applications for Registration of Designs	D21	IPO(M)	% change on previous year	tbc	-78	256	-6	73	-83	233	97	-76	71	42	-71	tbc
08	Revenue from Registration of Trademarks, Patents & Designs	D21	IPO(M)	% change on previous year	tbc	17	-16	-2	34	-4	12	16	18	2	9	65	tbc
	ICT MANUFACTURING INDUSTRY																

n/a: Not available
ncfa: No comparable figure available
tba: To be advised
tbc: To be confirmed

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	NACE	Number of Enterprises																
09	30,01	Manufacture of office machinery	D24	NSO(M)	number of firms	ncfa	ncfa	ncfa	ncfa	ncfa	0	0	0	0	n/a	n/a	n/a	n/a
10	30,02	Manufacture of computers and other information processing equipment	D24	NSO(M)	number of firms	ncfa	ncfa	ncfa	ncfa	ncfa	5	4	3	4	n/a	n/a	n/a	n/a
11	31.30 31.40	Manufacture of insulated wire and cable; manufacure of accumulators, primary cells and primary batteries	D24	NSO(M)	number of firms	ncfa	ncfa	ncfa	ncfa	ncfa	4	5	6	5	n/a	n/a	n/a	n/a
12	32,10	Manufacture of electronic values and tubes and other electronic components	D24	NSO(M)	number of firms	ncfa	ncfa	ncfa	ncfa	ncfa	12	12	10	8	n/a	n/a	n/a	n/a
13	32.20 32.30	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	D24	NSO(M)	number of firms	ncfa	ncfa	ncfa	ncfa	ncfa	9	7	6	5	n/a	n/a	n/a	n/a
14	33,20	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process	D24	NSO(M)	number of firms	ncfa	ncfa	ncfa	ncfa	ncfa	6	6	6	5	n/a	n/a	n/a	n/a
15	33,30	Manufacture of industrial process control equipment	D24	NSO(M)	number of firms	ncfa	ncfa	ncfa	ncfa	ncfa	0	0	0	0	n/a	n/a	n/a	n/a
16		TOTAL ICT MANUFACTURING INDUSTRY	D24	NSO(M)	number of firms	ncfa	ncfa	ncfa	ncfa	ncfa	36	34	31	27	n/a	n/a	n/a	n/a
17		TOTAL MANUFACTURING INDUSTRY	D24	NSO(M)	number of firms	ncfa	ncfa	ncfa	ncfa	ncfa	2921	2759	2605	2512	n/a	n/a	n/a	n/a
	NACE	Gross Output																
18	30,01	Manufacture of office machinery	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
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19	30,02	Manufacture of computers and other information processing equipment	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	2,3	3,2	3,0	2,8	n/a	n/a	n/a	n/a
20	31.30 31.40	Manufacture of insulated wire and cable; manufacure of accumulators, primary cells and primary batteries	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	2,3	2,3	3,3	4,7	n/a	n/a	n/a	n/a
21	32,10	Manufacture of electronic values and tubes and other electronic components	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	804,2	703,0	650,3	858,3	n/a	n/a	n/a	n/a
22	32.20 32.30	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	25,2	12,3	20,3	17,3	n/a	n/a	n/a	n/a
23	33,20	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	9,9	8,4	9,6	12,2	n/a	n/a	n/a	n/a
24	33,30	Manufacture of industrial process control equipment	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a
25		TOTAL ICT MANUFACTURING INDUSTRY	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	843,9	729,3	686,5	895,2	n/a	n/a	n/a	n/a
26		TOTAL MANUFACTURING INDUSTRY	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	1920,2	1787,6	1870,5	2143,0	n/a	n/a	n/a	n/a
	NACE	**Gross Output Volume Indices**																
27	30,01	Manufacture of office machinery	D24	NSO(M)	% of total manufacturing industry gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a
28	30,02	Manufacture of computers and other information processing equipment	D24	NSO(M)	% of total manufacturing industry gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,1	0,2	0,2	0,1	n/a	n/a	n/a	n/a
29	31.30 31.40	Manufacture of insulated wire and cable; manufacture of accumulators, primary cells and primary batteries	D24	NSO(M)	% of total manufacturing industry gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,1	0,1	0,2	0,2	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tba: To be advised
tbc: To be confirmed

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30	32,10	Manufacture of electronic values and tubes and other electronic components	D24	NSO(M)	% of total manufacturing industry gross output	ncfa	ncfa	ncfa	ncfa	ncfa	41,9	39,3	34,8	40,1	n/a	n/a	n/a	n/a
31	32.20 32.30	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	D24	NSO(M)	% of total manufacturing industry gross output	ncfa	ncfa	ncfa	ncfa	ncfa	1,3	0,7	1,1	0,8	n/a	n/a	n/a	n/a
32	33,20	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process	D24	NSO(M)	% of total manufacturing industry gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,5	0,5	0,5	0,6	n/a	n/a	n/a	n/a
33	33,30	Manufacture of industrial process control equipment	D24	NSO(M)	% of total manufacturing industry gross output	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a
34		TOTAL ICT MANUFACTURING INDUSTRY	D24	NSO(M)	% of total manufacturing industry gross output	ncfa	ncfa	ncfa	ncfa	ncfa	43,9	40,8	36,7	41,8	n/a	n/a	n/a	n/a
	NACE	**Gainfully Occupied**																
35	30,01	Manufacture of office machinery	D24	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	0	0	0	0	n/a	n/a	n/a	n/a
36	30,02	Manufacture of computers and other information processing equipment	D24	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	45	43	38	26	n/a	n/a	n/a	n/a
37	31.30 31.40	Manufacture of insulated wire and cable; manufacture of accumulators, primary cells and primary batteries	D24	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	59	64	102	107	n/a	n/a	n/a	n/a
38	32,10	Manufacture of electronic values and tubes and other electronic components	D24	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	1874	2151	2213	2315	n/a	n/a	n/a	n/a
39	32.20 32.30	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	D24	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	255	209	156	151	n/a	n/a	n/a	n/a
40	33,20	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process	D24	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	140	137	140	117	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tba: To be advised
tbc: To be confirmed

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41	33,30	Manufacture of industrial process control equipment	D24	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	0	0	0	0	n/a	n/a	n/a	n/a
42		TOTAL ICT MANUFACTURING INDUSTRY	D24	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	2373	2604	2649	2716	n/a	n/a	n/a	n/a
43		TOTAL MANUFACTURING INDUSTRY	D24	NSO(M)	number of persons	ncfa	ncfa	ncfa	ncfa	ncfa	29197	27871	27649	27261	n/a	n/a	n/a	n/a
	NACE	**Value Added**																
44	30,01	Manufacture of office machinery	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a
45	30,02	Manufacture of computers and other information processing equipment	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	-0,2	0,6	1,9	1,1	n/a	n/a	n/a	n/a
46	31.30 31.40	Manufacture of insulated wire and cable; manufacture of accumulators, primary cells and primary batteries	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,9	0,9	1,4	2,0	n/a	n/a	n/a	n/a
47	32,10	Manufacture of electronic values and tubes and other electronic components	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	101,8	119,7	107,3	125,3	n/a	n/a	n/a	n/a
48	32.20 32.30	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	6,2	8,9	10,9	7,1	n/a	n/a	n/a	n/a
49	33,20	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	3,1	2,5	3,4	3,7	n/a	n/a	n/a	n/a
50	33,30	Manufacture of industrial process control equipment	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a
51		TOTAL ICT MANUFACTURING INDUSTRY	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	111,7	132,5	125,0	139,2	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
tba: To be advised
tbc: To be confirmed

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52		TOTAL MANUFACTURING INDUSTRY	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	542,1	555,6	611,3	659,9	n/a	n/a	n/a	n/a
	NACE	**Value Added per Gainfully Occupied Person**																
53	30,01	Manufacture of office machinery	D24	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54	30,02	Manufacture of computers and other information processing equipment	D24	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	-4767	12959	50909	42206	n/a	n/a	n/a	n/a
55	31.30 31.40	Manufacture of insulated wire and cable; manufacture of accumulators, primary cells and primary batteries	D24	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	15242	14204	13977	18623	n/a	n/a	n/a	n/a
56	32,10	Manufacture of electronic values and tubes and other electronic components	D24	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	54299	55631	48497	54123	n/a	n/a	n/a	n/a
57	32.20 32.30	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	D24	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	24218	42460	69733	47221	n/a	n/a	n/a	n/a
58	33,20	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process	D24	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	22366	18550	24493	31885	n/a	n/a	n/a	n/a
59	33,30	Manufacture of industrial process control equipment	D24	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60		AVERAGE ICT MANUFACTURING INDUSTRY	D24	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	47091	50900	47184	51269	n/a	n/a	n/a	n/a
61		AVERAGE MANUFACTURING INDUSTRY	D24	NSO(M)	EUR at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	18568	19935	22109	24207	n/a	n/a	n/a	n/a
	NACE	**Investment**																

n/a: Not available
ncfa: No comparable figure available
tba: To be advised
tbc: To be confirmed

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62	30,01	Manufacture of office machinery	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a
63	30,02	Manufacture of computers and other information processing equipment	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,2	0,2	0,1	0,0	n/a	n/a	n/a	n/a
64	31.30 31.40	Manufacture of insulated wire and cable; manufacture of accumulators, primary cells and primary batteries	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,1	0,0	0,1	0,2	n/a	n/a	n/a	n/a
65	32,10	Manufacture of electronic values and tubes and other electronic components	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	50,4	54,9	33,9	26,2	n/a	n/a	n/a	n/a
66	32.20 32.30	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	1,0	0,3	0,5	0,3	n/a	n/a	n/a	n/a
67	33,20	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,2	0,1	0,0	0,0	n/a	n/a	n/a	n/a
68	33,30	Manufacture of industrial process control equipment	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	0,0	0,0	0,0	0,0	n/a	n/a	n/a	n/a
69		TOTAL ICT MANUFACTURING INDUSTRY	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	51,8	55,5	34,6	26,7	n/a	n/a	n/a	n/a
70		TOTAL MANUFACTURING INDUSTRY	D24	NSO(M)	EUR million at current market prices & exchange rates	ncfa	ncfa	ncfa	ncfa	ncfa	132,1	112,9	80,9	93,2	n/a	n/a	n/a	n/a

n/a: Not available
ncfa: No comparable figure available
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REF	DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	SECONDARY & POST-SECONDARY EDUCATION																
	Student Population																
	SECONDARY SCHOOLS																
	Government Schools																
01	Opportunity Centres	G11	NSO(M)	number of students	0	0	1198	1212	1077	0	0	0	0	0	0	n/a	n/a
02	Boys' Schools	G11	NSO(M)	number of students	0	0	0	0	0	1002	1027	966	932	510	954	n/a	n/a
03	Girls' Schools	G11	NSO(M)	number of students	0	0	0	0	0	456	438	476	231	401	367	n/a	n/a
04	Boys' Secondary Schools	G11	NSO(M)	number of students	4097	2988	3034	3172	3408	4272	4284	4119	3978	4360	3984	n/a	n/a
05	Girls' Secondary Schools	G11	NSO(M)	number of students	3500	3971	3832	4880	4555	4709	4665	4510	4458	4003	3961	n/a	n/a
06	Junior Lyceum	G11	NSO(M)	number of students	7259	8632	9059	7950	8455	8684	8771	9030	9237	9347	9178	n/a	n/a
07	**Private Schools**	G11	NSO(M)	number of students	6982	7190	7339	7526	7521	7877	7886	8289	8342	8585	8810	n/a	n/a
08	TOTAL	G11	NSO(M)	number of students	21838	22781	24462	24740	25016	27000	27071	27390	27178	27206	27254	n/a	n/a
	POST-SECONDARY SCHOOLS																
	General																
09	Junior College	G11	NSO(M)	number of students	0	0	0	0	0	0	916	1892	2222	2033	2431	n/a	n/a
10	Upper Lyceums	G11	NSO(M)	number of students	1683	1689	1646	1953	2135	2139	1163	663	679	854	688	n/a	n/a
11	Higher Secondary	G11	NSO(M)	number of students	844	780	944	835	701	754	752	911	1264	1075	1295	n/a	n/a
12	Private Schools	G11	NSO(M)	number of students	426	399	452	610	657	700	673	708	776	732	777	n/a	n/a
13	SUB-TOTAL	G11	NSO(M)	number of students	2953	2868	3042	3398	3493	3593	3504	4174	4941	4694	5191	n/a	n/a
	Vocational																
14	Upper Lyceums	G11	NSO(M)	number of students	0	0	0	0	0	0	0	0	0	0	126	n/a	n/a
15	Secretarial School	G11	NSO(M)	number of students	68	102	141	116	98	127	113	137	123	147	221	n/a	n/a
16	Pre-Vocational, Msida	G11	NSO(M)	number of students	141	140	152	150	117	146	91	110	98	162	170	n/a	n/a

n/a: Not available

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17	Pre-Vocational, Gozo	G11	NSO(M)	number of students	0	0	0	15	15	6	13	17	23	30	37	n/a	n/a
18	SUB-TOTAL	G11	NSO(M)	number of students	209	242	293	281	230	279	217	264	244	339	554	n/a	n/a
	Other																	
19	Institute of Tourism Studies: Full-Time	G11	NSO(M)	number of students	44	108	142	182	202	198	194	262	441	539	476	n/a	n/a
20	Institute of Tourism Studies: Part-Time & In-Service Courses	G11	NSO(M)	number of students	0	0	0	154	143	122	156	267	320	191	102	n/a	n/a
21	Institute for Pre-Education Training	G11	NSO(M)	number of students	0	0	0	0	0	0	59	53	55	57	55	n/a	n/a
22	Other	G11	NSO(M)	number of students	238	180	97	105	80	65	0	0	0	0	0	n/a	n/a
23	SUB-TOTAL	G11	NSO(M)	number of students	282	288	239	441	425	385	409	582	816	787	633	n/a	n/a
24	TOTAL	G11	NSO(M)	number of students	3444	3398	3574	4120	4148	4257	4130	5020	6001	5820	6378	n/a	n/a
	TECHNICAL SCHOOLS																	
25	Technical Institutes	G11	NSO(M)	number of students	1097	1103	1340	1282	1282	914	942	875	938	1046	1079	n/a	n/a
26	Trade Schools	G11	NSO(M)	number of students	1152	2049	1256	1015	1556	2343	2052	1684	1637	1679	1515	n/a	n/a
	TERTIARY EDUCATION																	
	Student Population																	
	UNIVERSITY OF MALTA																	
27	Board of Studies for Information Technology	G11	NSO(M) UOM	number of students	0	0	0	0	0	50	98	0	166	151	174	157	192
28	Centre for Communication Technology	G11	NSO(M) UOM	number of students	0	0	0	0	0	0	0	1	2	233	243	283	345
29	European Documentation Research Centre	G11	NSO(M) UOM	number of students	0	0	0	0	0	6	22	33	46	31	60	65	71
30	Faculty of Architecture & Civil Engineering	G11	NSO(M) UOM	number of students	97	68	95	61	141	154	172	210	219	160	187	170	214
31	Faculty of Arts	G11	NSO(M) UOM	number of students	511	682	765	776	906	914	766	813	668	494	704	665	715
32	Faculty of Dental Surgery	G11	NSO(M) UOM	number of students	23	22	24	22	36	24	38	24	30	35	36	42	32
33	Faculty of Economics, Management & Accountancy	G11	NSO(M) UOM	number of students	472	512	712	830	897	1027	913	1109	1210	1373	1480	1538	1774
34	Faculty of Education	G11	NSO(M) UOM	number of students	575	525	861	962	1095	1418	1484	2062	1914	1513	1594	1635	1456
35	Faculty of Engineering	G11	NSO(M) UOM	number of students	293	320	283	302	340	336	291	261	244	251	271	298	314

n/a: Not available

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36	Faculty of Law	G11	NSO(M) UOM	number of students	184	323	303	378	311	427	488	575	651	575	639	767	724	
37	Faculty of Medicine & Surgery	G11	NSO(M) UOM	number of students	388	321	346	288	356	325	362	385	380	413	439	517	490	
38	Faculty of Science	G11	NSO(M) UOM	number of students	196	209	224	230	247	215	190	334	176	157	205	207	213	
39	Faculty of Theology	G11	NSO(M) UOM	number of students	104	99	182	203	207	219	229	203	189	148	185	183	211	
40	Foundation for International Studies	G11	NSO(M) UOM	number of students	0	0	0	52	32	41	11	47	18	0	0	0	0	
41	Foundation Studies	G11	NSO(M) UOM	number of students	0	0	0	0	0	0	35	26	44	54	73	74	85	
42	Institute for Masonry & Construction	G11	NSO(M) UOM	number of students	0	0	0	1	4	4	10	4	11	0	10	10	15	
43	Institute for Restoration & Conservation	G11	NSO(M) UOM	number of students	0	0	0	0	0	0	0	0	0	0	0	0	34	
44	Institute of Agriculture	G11	NSO(M) UOM	number of students	0	0	0	22	28	30	33	39	37	16	44	40	33	
45	Institute of Baroque Studies	G11	NSO(M) UOM	number of students	0	0	0	0	0	0	12	10	9	2	2	8	10	
46	Institute of Energy Technology	G11	NSO(M) UOM	number of students	0	0	0	1	2	2	0	2	1	0	0	0	0	
47	Institute of Forensic Studies	G11	NSO(M) UOM	number of students	0	0	0	5	103	91	42	30	27	4	8	21	29	
48	Institute of Gerontology	G11	NSO(M) UOM	number of students	12	12	15	23	39	39	27	42	27	0	0	0	0	
49	Institute of Health Care	G11	NSO(M) UOM	number of students	90	214	474	629	587	637	772	669	641	659	775	821	849	
50	Institute of Islands & Small States	G11	NSO(M) UOM	number of students	0	0	0	0	13	8	8	13	8	7	9	13	10	
51	Institute of Linguistics	G11	NSO(M) UOM	number of students	0	0	0	0	0	0	0	0	11	0	6	1	0	
52	Institute of Public Administartion & Management	G11	NSO(M) UOM	number of students	0	0	0	0	0	0	0	0	0	0	0	23	23	
53	Institute of Social Welfare	G11	NSO(M) UOM	number of students	54	0	64	56	51	106	139	147	124	0	0	0	0	
54	Institute of Water Studies	G11	NSO(M) UOM	number of students	0	0	0	0	8	4	0	0	0	0	0	0	0	
55	Institute of Youth Studies	G11	NSO(M) UOM	number of students	0	0	0	49	79	105	126	0	0	0	0	0	0	
56	International Environment Institute	G11	NSO(M) UOM	number of students	0	0	0	0	0	0	0	0	10	16	31	17	10	
57	Mediterranean Academy of Diplomatic Studies	G11	NSO(M) UOM	number of students	27	25	35	45	62	43	71	47	55	42	57	38	71	
58	Mediterranean Institute	G11	NSO(M) UOM	number of students	0	0	1	17	13	19	16	24	9	2	9	9	8	
59	Workers Participation Development Centre	G11	NSO(M) UOM	number of students	0	0	0	0	0	19	13	78	59	26	104	67	113	

n/a: Not available

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60	Interdisciplinary	G11	NSO(M) UOM	number of students	151	270	278	225	248	0	0	0	0	0	0	0	0
61	TOTAL	G11	NSO(M) UOM	number of students	3177	3602	4662	5177	5805	6263	6368	7188	6986	6362	7345	7669	8041
62	Of which: Evening Courses	G11	NSO(M) UOM	number of students	n/a	214	527	449	639	626	895	963	895	808	n/a	n/a	n/a
	Number of Graduates																
	UNIVERSITY OF MALTA																
63	Board of Studies for Information Technology	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	0	0	0	0	1	42	30	39
64	Centre for Communication Technology	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	0	0	0	0	0	1	58	61
65	European Documentation Research Centre	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	0	0	0	6	5	8	19	24
66	Faculty of Architecture & Civil Engineering	G11	NSO(M) UOM	number of graduates	0	11	11	27	0	23	23	1	32	0	64	28	26
67	Faculty of Arts	G11	NSO(M) UOM	number of graduates	89	120	120	143	139	172	182	175	187	208	131	119	193
68	Faculty of Dental Surgery	G11	NSO(M) UOM	number of graduates	10	0	0	0	0	10	0	0	11	0	10	16	0
69	Faculty of Economics, Management & Accountancy	G11	NSO(M) UOM	number of graduates	61	139	139	227	265	260	249	299	341	388	320	401	444
70	Faculty of Education	G11	NSO(M) UOM	number of graduates	61	169	169	171	163	309	322	320	427	494	629	494	401
71	Faculty of Engineering	G11	NSO(M) UOM	number of graduates	38	58	58	42	69	52	49	62	81	68	55	52	72
72	Faculty of Law	G11	NSO(M) UOM	number of graduates	29	76	0	0	27	178	178	109	191	128	290	348	284
73	Faculty of Medicine & Surgery	G11	NSO(M) UOM	number of graduates	48	72	72	54	78	54	54	84	66	77	63	95	86
74	Faculty of Science	G11	NSO(M) UOM	number of graduates	36	78	78	43	44	55	55	60	62	13	39	47	45
75	Faculty of Theology	G11	NSO(M) UOM	number of graduates	33	24	24	45	34	51	51	26	65	58	39	38	37
76	Foundation for International Studies	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	0	0	0	0	0	0	0	0
77	Foundation Studies	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	0	0	0	0	0	0	0	0
78	Institute for Masonry & Construction	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	0	0	0	4	0	3	3	0
79	Institute of Agriculture	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	8	8	7	15	10	13	24	3
80	Institute of Baroque Studies	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	0	0	0	0	0	8	0	8
81	Institute of Energy Technology	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	1	1	0	0	0	1	0	0

n/a: Not available

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82	Institute of Forensic Studies	G11	NSO(M) UOM	number of graduates	0	0	0	0	4	3	3	6	6	8	21	0	5
83	Institute of Gerontology	G11	NSO(M) UOM	number of graduates	0	11	11	10	10	25	25	13	22	0	0	0	0
84	Institute of Health Care	G11	NSO(M) UOM	number of graduates	0	0	0	11	66	60	60	116	143	143	129	114	141
85	Institute of Islands & Small States	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	13	0	7	6	6	1	0	4
86	Institute of Linguistics	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	0	0	0	0	0	0	1	0
87	Institute of Public Administartion & Management	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	0	0	0	0	0	0	0	23
88	Institute of Social Welfare	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	7	7	12	15	33	0	0	0
89	Institute of Water Studies	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	8	8	0	0	0	0	0	0
90	Institute of Youth Studies	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	6	6	12	0	6	0	0	0
91	International Environment Institute	G11	NSO(M) UOM	number of graduates	0	0	0	0	25	0	0	17	0	0	25	5	0
92	Mediterranean Academy of Diplomatic Studies	G11	NSO(M) UOM	number of graduates	0	36	36	32	17	37	18	28	28	41	23	24	47
93	Mediterranean Institute	G11	NSO(M) UOM	number of graduates	0	0	0	0	1	0	0	7	1	3	8	0	2
94	Workers Participation Development Centre	G11	NSO(M) UOM	number of graduates	0	0	0	0	0	0	0	0	11	1	55	56	3
95	TOTAL	G11	NSO(M) UOM	number of graduates	405	794	718	805	942	1332	1299	1361	1720	1691	1978	1972	1948
	LIFE-LONG LEARNING																	
	Student Population																	
96	Government Evening Classes	G11	NSO(M)	number of students	2513	2761	4128	4285	4036	3950	2906	3726	2748	3862	3500	n/a	n/a
97	Private Evening Classes	G11	NSO(M)	number of students	1919	2275	1905	2265	3603	2592	3201	3451	3381	3568	3609	n/a	n/a
98	Adult Education	G11	NSO(M)	number of students	0	0	0	0	0	0	707	743	723	987	1580	n/a	n/a
99	TOTAL	G11	NSO(M)	number of students	4432	5036	6033	6550	7639	6542	6814	7920	6852	8417	8689	n/a	n/a

n/a: Not available

NSO(M): National Statistics Office (Malta)
UOM: University of Malta

REF	DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	POPULATION																
	Total Population																
01	Males	H	NSO(M)	number of persons					183471	185079	186970	188452	189968	191120	192428	193689	195363
02	Females	H	NSO(M)	number of persons					189690	191354	191434	192953	194208	195277	196331	197726	199278
03	Total	H	NSO(M)	number of persons	0	0	0	0	373161	376433	378404	381405	384176	386397	388759	391415	394641
	Age Distribution																
04	0 - 4	H1	NSO(M)	% of total population													
05	5 - 9	H1	NSO(M)	% of total population													
06	10 - 14	H1	NSO(M)	% of total population													
07	15 - 19	H1	NSO(M)	% of total population													
08	20 - 24	H1	NSO(M)	% of total population													
09	25 - 29	H1	NSO(M)	% of total population													
10	30 - 34	H1	NSO(M)	% of total population													
11	35 - 39	H1	NSO(M)	% of total population													
12	40 - 44	H1	NSO(M)	% of total population													
13	45 - 49	H1	NSO(M)	% of total population													
14	50 - 54	H1	NSO(M)	% of total population													
15	55 - 59	H1	NSO(M)	% of total population													
16	60 - 64	H1	NSO(M)	% of total population													
17	65 - 69	H1	NSO(M)	% of total population													
18	70 - 74	H1	NSO(M)	% of total population													
19	75 - 79	H1	NSO(M)	% of total population													
20	80 - 84	H1	NSO(M)	% of total population													

REF	DATA	CODE	SOURCE	UNIT OF MEASUREMENT	2002
	POPULATION				
	Total Population				
01	Males	H	NSO(M)	number of persons	196836
02	Females	H	NSO(M)	number of persons	200460
03	Total	H	NSO(M)	number of persons	397296
	Age Distribution				
04	0 - 4	H1	NSO(M)	% of total population	5,4
05	5 - 9	H1	NSO(M)	% of total population	6,4
06	10 - 14	H1	NSO(M)	% of total population	7,2
07	15 - 19	H1	NSO(M)	% of total population	7,3
08	20 - 24	H1	NSO(M)	% of total population	7,6
09	25 - 29	H1	NSO(M)	% of total population	7,3
10	30 - 34	H1	NSO(M)	% of total population	6,2
11	35 - 39	H1	NSO(M)	% of total population	6,3
12	40 - 44	H1	NSO(M)	% of total population	7,5
13	45 - 49	H1	NSO(M)	% of total population	7,4
14	50 - 54	H1	NSO(M)	% of total population	7,5
15	55 - 59	H1	NSO(M)	% of total population	7,1
16	60 - 64	H1	NSO(M)	% of total population	4,1
17	65 - 69	H1	NSO(M)	% of total population	4,2
18	70 - 74	H1	NSO(M)	% of total population	3,4
19	75 - 79	H1	NSO(M)	% of total population	2,6
20	80 - 84	H1	NSO(M)	% of total population	1,6

REF	DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
21	85+	H1	NSO(M)	% of total population													
	Population Growth																
22	Population Growth Rate	H21	NSO(M)	% change on previous year			#DIV/0!	#DIV/0!	#DIV/0!	0,9	0,5	0,8	0,7	0,6	0,6	0,7	0,8

n/a: Not available

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REF	DATA	CODE	SOURCE	UNIT OF MEASUREMENT	2002
21	85+	H1	NSO(M)	% of total population	0,9
	Population Growth				
22	Population Growth Rate	H21	NSO(M)	% change on previous year	0,7

REF	DATA	CODE	SOURCE	UNIT OF MEASUREMENT	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	SOCIO-CULTURE																
	Migration																
04	Immigration	I21	NSO(M)	number of persons				820	837	761	621	399	453	349	339	450	472
05	Emigration	I21	NSO(M)	number of persons				153	66	104	107	94	73	121	67	67	73
06	Migration Balance	I21	NSO(M)	number of persons	0	0	0	667	771	657	514	305	380	228	272	383	399

n/a: Not available

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REF	DATA	CODE	SOURCE	UNIT OF MEASUREMENT	2002
	SOCIO-CULTURE				
	Migration				
04	Immigration	I21	NSO(M)	number of persons	382
05	Emigration	I21	NSO(M)	number of persons	96
06	Migration Balance	I21	NSO(M)	number of persons	286