United Nations Conference on Trade and Development

E-COMMERCE AND DEVELOPMENT REPORT 2004

CHAPTER 7.

UNITED NATIONS
New York and Geneva, 2004

Chapter 7

ASSESSING COMPETITIVENESS IN THE ICT SECTOR: THE CASE OF TUNISIA

A. Introduction

Tunisia occupies a leading position among developing countries with respect to its development of information and communication technologies (ICTs) and competitiveness. According to recently published economic indicators, Tunisia ranks 34th in the Networked Readiness Index (NRI), which covers 82 countries (World Economic Forum, 2003a). The country has the highest ranking in Africa and in the Arab world, and is ahead of several European countries. Furthermore, according to the technology achievement index (TAI), in 1999 Tunisia was the leading Arab exporter of "recent innovations in high and medium technology" (UNDP, 2001).

The Tunisian Government is making an effort to foster a supportive environment for ICTs via its national e-strategy. National ICT policies cover a broad set of development targets concerned with infrastructure, institutions, legislation and education. As host to the second phase of the World Summit on the Information Society (WSIS),[1] the Government is committed to making Tunisia a knowledge-based society.

Most dependent on the ICT environment and related policies is the ICT sector itself. In Tunisia, that sector has been one of the fastest-growing in the past few years, with an increase in turnover of 260 per cent in software and IT services between 1997 and 2001. At the same time, the firms that produce the technologies are one of the main driving forces behind the country's technological development. In recognition of this important role, one of the Government's priorities is to develop a strong and competitive ICT sector. Its national ICT policies are therefore designed to give particular support to the domestic software and IT industry. For example, its current development plan (covering the years 2002 –2006) provides for greater promotion of the knowledge-based society, and in particular the information economy, including software production and IT services (République Tunisienne, 2001a).

This chapter provides an analysis of the Tunisian ICT sector and identifies links between ICT policy measures, the national and international business environment, corporate strategies and enterprise performance. It also examines the extent to which national ICT policies enable ICT companies to enhance their competitiveness, in particular in foreign markets.

In order to evaluate how ICT policies and competitiveness relate to each other, how they have been leveraged in the country and which challenges have to be faced to take full advantage of ICT, an analysis is required that goes beyond available macro indicators and country rankings. This chapter will therefore provide an analysis at the sector and firm levels to identify the impact of ICT policies on business activities and performance, and hence the competitiveness of companies. The firm-level analysis will provide insights into the capacity of companies to gain and sustain competitive advantages within the given environment.

For this purpose, a survey was carried out with a sample of 49 software and IT service companies in Tunisia (representing about 18 per cent of the total sector), which provides the data needed for the assessment of the sector's competitiveness. The analysis will be complemented by an overall evaluation of how the national ICT environment and corporate strategies complement each other and what their impact on the sector's competitiveness is.

On the basis of the results of the survey, the chapter identifies the companies' needs for an improved policy environment. This will be useful to business leaders defining their strategies for

building competitive advantages in the software and IT industry. The chapter also provides suggestions for policy makers on how to assess and redefine their national ICT strategy so that it impacts on the competitiveness of the sector, including policies related to the ICT infrastructure, education, and public financial and non-financial business development support (BDS). This could be useful to policy makers from other developing countries aiming at fostering a competitive national ICT sector.

The following section will provide an overview of the Tunisian ICT sector and its business environment. Section C will present the Tunisian national ICT strategy and policies relevant to the creation of an enabling environment for the development of the ICT sector. Section D presents the results of the survey carried out with ICT companies. Section E draws conclusions and provides concrete suggestions related to both business and policy strategies, aimed at enhancing the competitiveness of the sector.

B. Overview of the ICT sector and its business environment

1. Definition of the ICT sector

There are various initiatives at the international level, mainly driven by the UN and the OECD, to define the ICT sector and the type of activities it comprises, and hence improve data comparability at the international level. This is a challenging task. First, given the lack of an internationally accepted classification, it is difficult to collect comparable statistical data for trade in certain products and services, such as software and IT services, but these activities are essential to the ICT sector. Second, there is inadequate implementation of international standards for statistical measurements in many countries and hence a lack of comparability of data. The definition agreed by OECD member states in 1998 will serve as a basis for the analysis in this chapter (OECD, 2002).

The OECD definition is based on the International Standard Industrial Classification ISIC Rev. 3.[2] But there are limitations to ISIC Rev. 3 regarding the coverage of software and IT services. Therefore, a firm-level analysis requires, with regard to the kind of activities considered to be software and IT services, further classification into two main categories: first, software development and software manipulating services, such as software customization and integration, IT consulting, web development, translation and arabization (in the case of Tunisia); and second, IT-based services, such as database management, data mining, data conversion, and data extraction (World Bank, 2002).

2. Performance of Tunisia's ICT sector at a glance

The overall turnover of the ICT sector[3] increased continuously between 1997 and 1999 owing to substantial investments in ICTs, and declined in 2000 (chart 7.1). In 2001, this effect was compensated to some extent by earnings from businesses initiated during the boom years up to 1999 (Ministère des Technologies, de la Communication et du Transport, 2003).

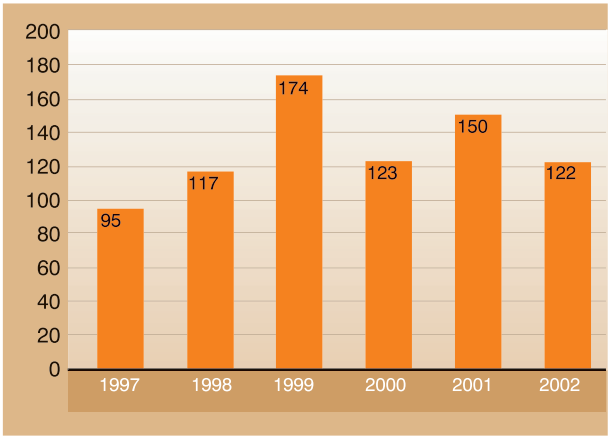
Although the turnover of the ICT sector declined in 2000, it is important to note that, driven by the prospering world market, exports of software and IT services doubled at the same time. With an increase in turnover of 260 per cent between 1997 to 2001, software and services were a major growth area in the field of ICTs.

In 2001, a process of consolidation took place and many of the ICT companies disappeared from the market (chart 7.2), but employment for the whole sector was still increasing (chart 7.3).

Chart 7.1

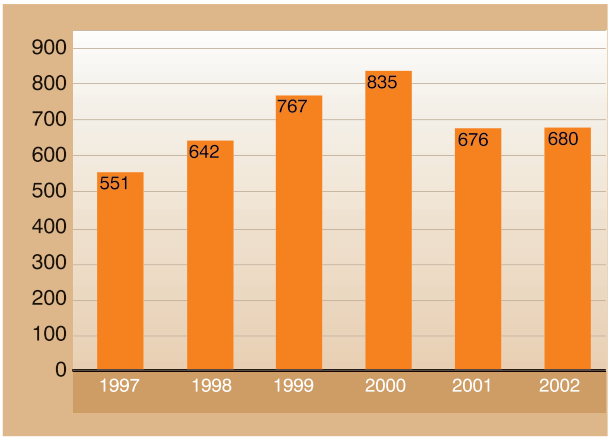
Turnover of ICT companies (hardware and software)

(millions of dollars)



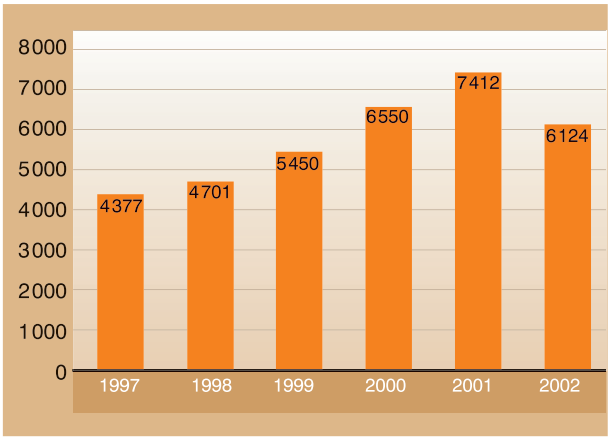
Source: Ministère des Finances (2003).

Chart 7.2
Number of private ICT companies



Source: Caisse Nationale de la Sécurité Sociale (2003).

Chart 7.3
Employment in private ICT companies



Source: Caisse Nationale de la Sécurité sociale (2003).

Strong growth in local demand helped ICT companies increase turnover again, before a decline in 2002. While firms reduced employment, the structural realignment within the sector was over and the existing companies remained. This can be explained by two factors. First, there were lay-offs due to the concentration of the market, for example through mergers and acquisitions. Second, a number of companies re-allocated employees and activities to foreign countries in order to be closer to export customers, for example in Europe.

In 2002, the sector comprised 680 companies with 6,124 employees (accounting for 2.1 per cent of total employment). There were 350 private enterprises specialized in the field of IT services and software development, which employed about 50 per cent of the 6,124 employees. The rest of the workforce was distributed among IT departments of major corporations, public enterprises and public administration, hardware production and national IT centres.

In the current five-year plan the Government estimates for software and IT service companies an average annual growth in turnover of 42.5 per cent, from 80 million Tunisian dinar (US$ 58.3 million) in 2002 to 655 million Tunisian dinar (US$ 477.2 million) in 2006. The average growth of other industrial sectors in Tunisia is put at 5.7 per cent. As a result, the share of software and IT services in the gross domestic product (GDP) is projected to increase significantly, from 0.27 per cent in 2002 to 1.5 per cent in 2006 (ITC, 2004). Despite the investments and growth planned by the Government, many software and IT service companies have disappeared from the market. At the beginning of 2004, there were 274 IT software and service firms (CNS SSII, 2004).

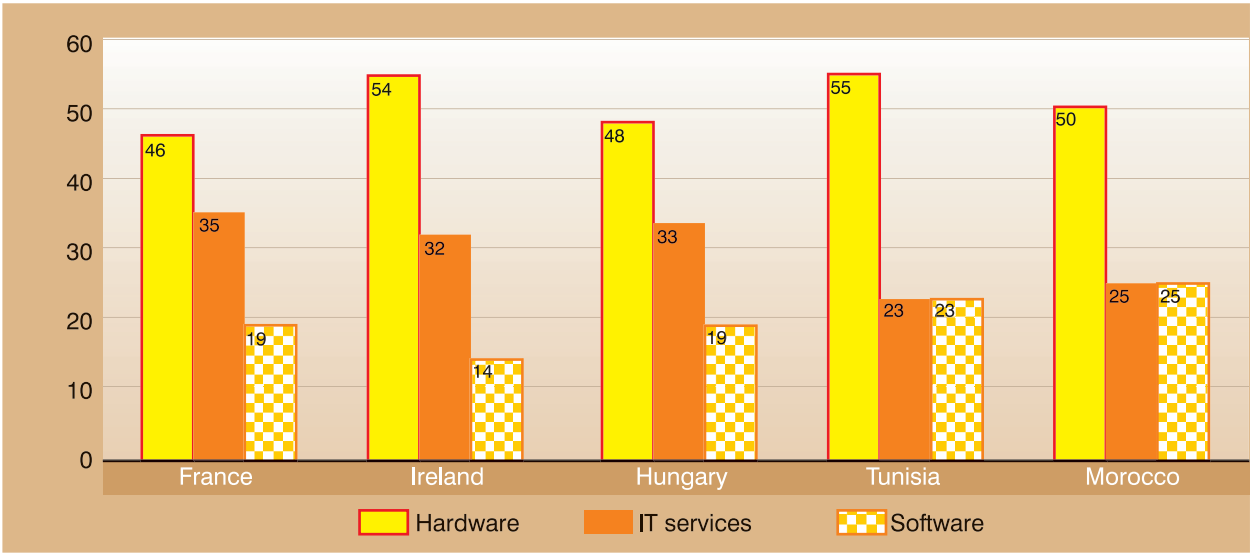
3. National ICT business environment

Competitiveness is determined by the productivity of companies, or more precisely – in a dynamic approach – by the capacity of firms to increase productivity. Firms that are able to maintain an increase in their productivity are more likely to maintain their competitive position in the future than those that achieve a higher level of productivity but are unable to increase it further (Porter, 2003). Therefore, from a policy maker's point of view, the main concern is how to create optimal conditions for rapid and sustainable productivity growth. This section will look at these conditions by addressing two interrelated areas. First, it will look at the quality of the overall business environment. Second, it will examine the level of sophistication with which firms compete in their domestic and export markets. The link has to be made because, as companies move to more sophisticated ways of competing, they require changes in the business environment, for instance more highly skilled human resources, an improved infrastructure, or advanced research institutions (World Economic Forum, 2003a).

The following sections will look at the specific business environment for software and IT service companies in Tunisia. The discussion follows Michael Porter's methodological work on the requirements for a nation or industry to be internationally competitive (Porter 1990, see annex I).

Chart 7.4

Structure of ICT spending *(percentages)*



Source: ITC (2004).

In his work, Porter used a diagnostic tool known as the "competitiveness diamond", which requires that the economic conditions within which an industry competes be tested against four dimensions that have been found to be strong predictors of competitiveness and success: demand conditions, factor conditions, the presence of related and supporting industries, and the firm structure and strategy. These dimensions are closely interrelated. Governments have an influence on all aspects of the diamond via legislation, policy and delivery activities.

Demand conditions

Domestic demand for ICTs

Domestic demand is more important in terms of its character than of its size. It plays a disproportionate role in influencing the capacity of firms to improve products and services over time. Therefore, a closer look has to be taken at the structure of the domestic market in Tunisia and its impact on software and IT service companies (Porter, 1991).

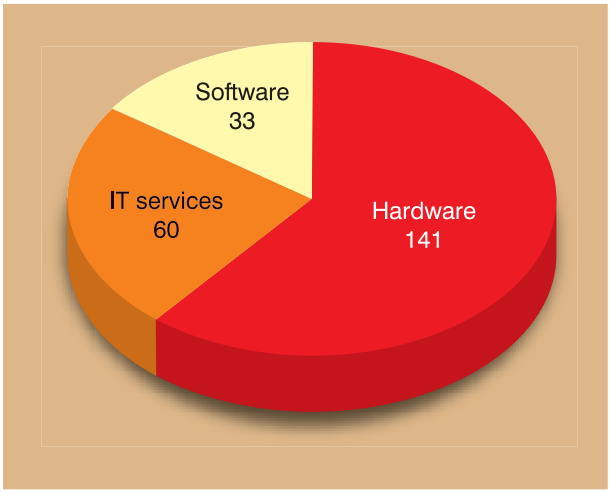
The structure of spending on ICTs, as far as hardware is concerned, is very similar to that in other countries; but there is a significant difference in the international comparison regarding the ratio of services to software spending. For instance, in European countries, 15 – 20 per cent of spending is on software and about 30 per cent on services. Whereas in Tunisia and other Maghreb countries, both are equally represented with about 25 per cent of spending (chart 7.4). This is primarily because of the disproportionately higher cost of software licences, for example for Windows or Oracle, compared with that of local IT services.

In particular, the revenues of ICT companies are significantly higher for services than for software.

Chart 7.5

Structure of revenues of the ICT sector in the domestic market

(millions of dollars)



Source: International Data Corporation (IDC) – Central and Eastern Europe and the Middle East and Africa (Cema) (2003).

This means that for the same budget spent on software, IT services are more profitable (chart 7.5).

Since public investment in ICTs accounts for an important share in the overall turnover of the ICT sector, it deserves special mention in the discussion of demand conditions in Tunisia. The overall public budget for hardware, software and IT services is projected to increase from 912.2 million Tunisian dinar (US$ 664.6 million) for the period from 1997 to 2001, to 1.779 billion Tunisian dinar (US$ 1.3 billion) for the period from 2002 to 2006. Since 2002, the Government has given a higher priority to software and IT services than during the previous years (République Tunisienne, 2001a). The budget's planned increase of 18.6 per cent annually (2002 – 2006) is significantly higher for services and software than for hardware (12.3 per cent). The most extensive financial resources are reserved for hardware and equipment (which are largely imported), but this corresponds to the structure of spending in other countries.

Demand conditions in export markets

Since 1999, Tunisia has been exporting software and IT services. The biggest customers for Tunisian IT firms are located in Europe, North America, Africa and the Middle East. Important countries include France, Germany, Spain, Italy, the United Kingdom, the United States, Canada, Algeria, Morocco, the Libyan Arab Jamahiriya, Mauritania, Mali, Rwanda, Cameroon, South Africa, the United Arab Emirates and Oman (Ministère des Technologies, de la Communication et du Transport, 2003).

Chart 7.6 shows that between 1999 and 2000 the volume of exports of software and IT services doubled, in line with a fast-growing global demand. In 2001, exports suffered from – among other reasons – the weak demand growth in the global market for information technology products and services. It is interesting to note that despite the crisis in the global market after 2001, exports of software and IT services increased significantly in 2002. In Tunisia, the downturn in the overall turnover was mainly caused by weak domestic demand.

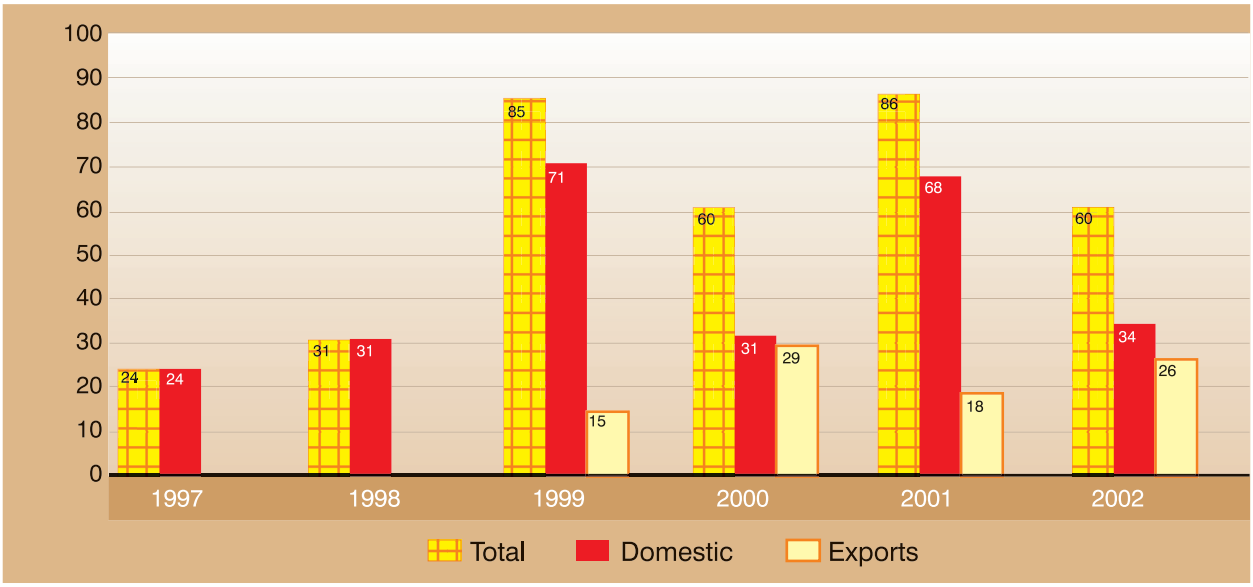
Factor conditions

Key inputs for the ICT sector are human resources, capital, ICT infrastructure, and science and research, in terms of efficiency, quality and specialization, and the extent to which they determine firms' competitiveness.

Chart 7.6

Structure of turnover of software and IT service companies

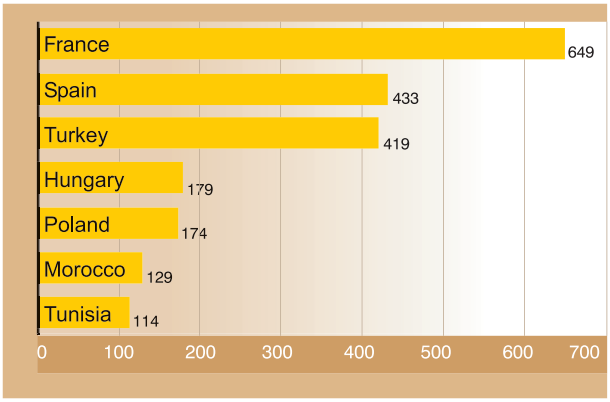
(millions of dollars)



Source: Ministère des Finances (2003).

Chart 7.7

Production costs of software per man-day
(in dollars)



Source: FIPA (2002).

Qualified human resources specialized in ICTs

The higher education system is a key provider of technological and managerial know-how for IT businesses. Tunisian graduates in ICT studies rank high in the international comparison as far as quality is concerned (see section C.4). In terms of quantity, the number of graduates specialized in IT will increase from 1,900 in 2002 to 5,000 in 2005 (Ministère des Technologies, de la Communication et du Transport 2003). Hence, the quantitative supply is guaranteed and does not affect negatively the ability of firms to increase productivity. A different question is whether software and IT service companies can generate sufficient demand for university graduates if the governmental estimates for 2002 – 2006 for sector growth cannot be met by the companies.

Promoting the international experience of students is another important aspect of the educational system. This way language skills other than in Arabic and French can be developed effectively. Tunisian exchange students still have a strong affinity for French-speaking countries. Seventy-three per cent of all student exchanges are with France, Canada, Belgium and Switzerland (Ministère de l'Enseignement Supérieur, de la Recherche Scientifique et de la Technologie, 2003).

Traditionally, the education system in Tunisia focuses on continuous training of employees, including in less qualified positions. Tunisian companies either pay for the training of their own employees or have to pay a fee to the public training system. As companies have an influence on the kind of training an employee receives, this process supports the continuous input of knowledge and know-how (Ministère des Technologies, de la Communication et du Transport, 2003).

Low labour costs

A key competitive advantage in the Tunisian ICT sector is the low cost of highly qualified employees (chart 7.7). With 60 – 80 per cent of costs per man-day per unit of software produced, labour is the most important cost driver for software companies. The low level of wages supports effectively competitive prices of IT solutions and services in the international market, for example in Western and Eastern Europe and North America (FIPA, 2002).

Capital supply for software and IT service companies

Efficient capital markets and flexible financing models are essential to investments in the ICT sector. In particular, software and IT service companies with a somewhat non-tangible asset base require very specific financing conditions, compared with traditional sectors with a more tangible asset base. In this regard, there is still a lack of expertise concerning adequate risk evaluation in banks and the vast majority of venture capital firms. In general, investments and financing projects of large enterprises are preferred. This is a serious obstacle for software and IT service companies in Tunisia in view of the fact that the availability of risk capital is an important precondition for innovation and business development (World Bank, 2002), and could put them at a disadvantage in relation to competitors in countries with capital markets more experienced in the field of ICT.

There are various governmental initiatives to support ICT firms by providing public venture capital. Through the Régime d'Incitation à l'Innovation dans les Technologies de l'Information (RITI) the Government offers ICT firms the possibility of participating in projects related to research and development (R&D). A maximum of 50 per cent of the project cost may be covered by a bank loan, and at least 50 per cent is venture capital shared by the entrepreneur (minimum 2 per cent), a private venture capital company and the Fonds d'Incitation à l'Innovation dans les Technologies de l'Information (FITI). Another public-private venture capital fund is the Tunis Information Technology Fund (TITF).

Through these funds, the Government supports not only ICT companies, but in the long term also banks and venture capital firms, in gaining experience in financing projects in the field of ICT. It remains to be seen to what extent these funds are used by Tunisian enterprises and whether the capital market will change its traditional patterns regarding risk capital provision for ICT firms. This will be further explored in section D.

Foreign direct investment in ICT

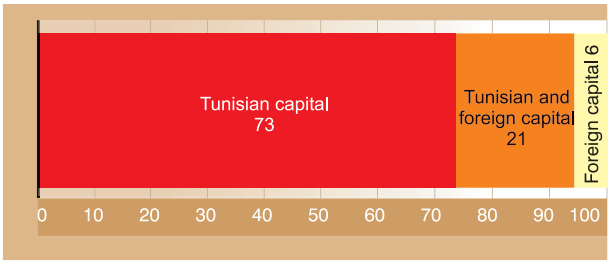
The potential of the domestic market to attract foreign direct investment (FDI) plays a key role in overcoming structural obstacles, such as lack of availability of local venture capital. The presence of foreign investors in the domestic market can help Tunisian software and IT service companies develop international partnerships and take part in international networks. Collaboration with subsidiaries of multinational enterprises (MNEs) in Tunisia or MNEs investing in Tunisian companies can support the transfer of know-how. Moreover, Tunisian firms are more integrated into foreign value chains and hence, closer to foreign markets (Raffa et al., 2002).

The beneficial effects of FDI do not automatically come with the presence of foreign firms or capital. Therefore, steps to promote FDI effectively were taken by the government with the establishment of the Foreign Investment Promotion Agency (FIPA). Accordingly, administrative procedures for foreign investors were optimized and the Tunisian market is more accessible to foreign capital (Mansour, 2003). Furthermore, an advanced legal framework for the protection of intellectual property rights was developed, which is essential for efficient know-how transfers.

Chart 7.8 shows that foreign capital is not widespread among Tunisian software and IT service companies and only few subsidiaries of MNEs exist. This reflects the fact that the majority of software and IT service companies are very small and therefore less attractive to foreign capital participation. On the other hand, the availability of cost efficient Internet-based communication technologies would support intensive communication with distant foreign partners, or between subsidiaries of MNEs and home markets (World Bank, 2002). That this is an important issue for businesses in Tunisia is explained in section D.

Chart 7.8

Tunisian software and IT service companies by origin of capital



Source: Ministère des Technologies de la Communication et du Transport (2003)

Related and supporting industries

The availability and the quality of local suppliers and other supporting industries are important for the competitiveness of firms. The terms "supplier" and "industries" should not be misunderstood, however. Combined they comprise all organizations, institutions and businesses in an up-stream or down-stream relationship with software and IT service companies (Porter, 1990). "Up-stream" refers to the supply side of the value chain of firms, such as research institutions providing technological innovations. "Down-stream" refers to activities along the value chain after the actual creation of software and service solutions. Up-stream and down-stream activities regarding cluster development will be presented in section C.2. The next subsection looks at financial business support available to companies.

Public financial business support

In addition to venture capital, public funds established by the Government are focusing on the active support of business processes, having either a direct or indirect impact on ICT businesses (see section C.2, table 7.3).

Various public funds have been created to help different economic sectors to technologically upgrade their production and business processes in general. The main objective is to increase productivity, competitiveness and export performance. As investments in ICTs increased among companies as a result of these funds, software and IT service companies benefited indirectly, for example by providing resource planning systems for industrial production. In the domestic market these funds have a positive impact on the performance of ICT firms. It is hard to estimate to what

extent this enhances the productivity and competitiveness of software and IT service companies. On the one hand, the subsidies help to sell software and IT service solutions in the local market, which would be too expensive without the subsidies. Hence, it is questionable whether the products and solutions would be competitive in export markets, without the subsidies. On the other hand, software and IT service companies might acquire the necessary size, financial strength and know-how in the domestic market to successfully move into export markets.

Some funds have a direct impact on software and IT service companies. They concentrate on the promotion of exports across all economic sectors. For example, FAMEX (Fonds d'Accès aux Marchés d'Exportation) was established in collaboration between the Tunisian Government and the World Bank. Companies have to present their business plan for their export business to the advisory committee of the fund. Once approved, 50 per cent of the costs of any action undertaken to enter the market are covered by FAMEX, such as marketing efforts and business travel. The collaboration with FAMEX includes intensive management consultancy for the company, which transfers the expertise of the fund to the new export business. The Fonds de Promotion et Développement d'Exportation (FOPRODEX) is also an export promotion fund, which covers 15–50 per cent of costs for certain activities undertaken by a company, such as participation in trade fairs and certain kinds of advertising material. Both FAMEX and FOPRODEX have a positive impact on the competitiveness of Tunisian software and IT service companies. Collaboration with the funds reduces market access barriers as it permits companies to go abroad and market products with less financial effort. Companies thus learn how to market their products effectively and, in the long term, they may be able to approach the market without the support of the funds.

4. Firms' strategies and rivalry

Strategies are determined by a variety of options that an enterprise has to develop, on the basis of its strengths and advantages compared with those of its competitors, and in order to maximize profitability. The presence of domestic competitors, for example, negates basic factor advantages and forces firms to enhance existing advantages or to develop new ones. This rivalry should be seen from two perspectives. Intense local rivalry among competitors may, on the one hand, keep profits low in the home market, but on the other hand, force companies to enhance advantages that might lead to higher profits in export markets. Therefore, the role of the public ICT sector as a competitor, and the extent to which it influences positively or negatively the business of software and IT service companies, are important (Porter, 1980).

In Tunisia, 80 per cent of software development for the public sector and public administration is carried out by the Centre National de l'Informatique (CNI). Section D.4 will illustrate in more detail that this is a significant share in an important segment of the domestic market. With the remaining 20 per cent, private businesses can scarcely participate in large national projects as these are primarily assigned to the CNI.

In the domestic and export markets, the Centre des Etudes et Recherche en Télélcommunication (CERT) is active in the field of IT services and software development. CERT mainly supplies the public administration and firms in the public sector in Tunisia. As an exporter, it has carried out IT consulting and IT management projects in various African countries and was involved in technical assistance projects in several Gulf States (UNDP and CEPEX, 2004).

Therefore, public ICT producers are the principal rivals of private software and IT service companies. A frequent argument against the dominance of CNI and CERT in these markets is that private software and IT service companies are hindered from achieving a certain critical size and financial strength, which would allow them to successfully tap export markets.

A call for liberalization to open the market for private software and IT service companies has to be seen as a trade-off against other national and sectoral development priorities of the Government. Therefore, the dominance of public ICT producers in certain market segments should not be regarded as a barrier to growth for private firms. An important question is whether all functions and responsibilities of public ICT providers should be transferred to private firms, or whether some functions should stay with public providers.

C. Tunisia's national e-strategy

The e-strategy of a country defines the overall framework for national ICT development.[4] In Tunisia, this framework is embedded in the Government's five-year plans for national economic and social development, which give high priority to ICTs (République Tunisienne, 2001a). As a result, the country achieved the fourth best Government ICT readiness scoring after Singapore, Taiwan Province of China and Finland in the NRI, in particular a high-valued ICT competence of public officials and a high ranking for governmental procurement of advanced technology products. Furthermore, in terms of ICT usage, the Government performed better than many other countries, including France, Portugal, Spain, Hungary and India (World Economic Forum, 2003b).

This section provides an overview of Tunisia's ICT policies, programmes and projects, including infrastructure, education and science, business development support, and selected supplementary ICT initiatives driven by various non-governmental stakeholders. It will also identify future challenges that the Government is facing as regards its ICT development agenda outlined in the current Tenth Plan, covering the period 2002–2006.

1. ICT infrastructure

During the period of the Ninth Plan (1997 – 2001), the Tunisian Government invested 1.4 billion Tunisian dinar (US$ 1 billion) in ICT infrastructure, including telephone networks, Internet backbone, and other digital communication networks. The Tenth Plan (2002–2006) provides for an investment of 2.8 billion Tunisian dinar (US$ 2.1 billion) (République Tunisienne, 2001a). Despite these investments, the country still ranks internationally below-average regarding the availability and quality of telecommunication and Internet access, particularly in rural areas (World Economic Forum 2003b). Improving rural access is addressed in the Tenth Plan, which aims at a total of 13 telephone subscribers per 100 inhabitants in 2006 (in rural areas). However, it is important to note that significant progress has been achieved over the last years, as budget allocation for national telephony has been a priority. As a result, the combined number of fixed line and mobile phone subscribers per 100 inhabitants increased from 6.5 in 1997 to 15 in 2001.

Another important aspect regarding the development of the telecommunications infrastructure concerns the deregulation of the national telecommunications market. Tunisia's telephone infrastructure is characterized by relatively low costs for telephone and mobile phone subscriptions. But prices for fixed line phone calls are still comparatively high, owing to the monopoly of Tunisie Telecom.

On the other hand, the progressive liberalization of the market for mobile communication is bearing fruit. The costs for mobile phone calls are

Table 7.1

Public Internet service providers in Tunisia

Public Internet service provider	Network	Institutions connected
ATI – Agence Tunisienne d'Internet	General national / international backbone	Public institutions
Tunisie Telecom	General national backbone	Ministry of Communication, Technology and Transport and its agencies
CCK – Centre de Calcul El–Khawarizmi	RNU – Réseau National Universitaire	Universities
INBMI – Institut National de Bureautique et de Micro-informatique	EDUNET	Primary and secondary schools
SOTETEL-IT / IRSIT – Institut Régional des Sciences Informatiques et des Télécommunications	RNRT – Réseau National de la Recherche et de la Technologie	Research institutions
CIMSP – Centre informatique du Ministère de la Santé Publique	RNS – Réseau National de Santé	Hospitals
IRESA – Institut de la Recherche et de l'Enseignement Supérieur Agricole	AGRINET	Ministry of Agriculture, agricultural institutions for research and education

Table 7.2
Telecommunication indicators

	Fixed-line subscribers per 100 inhabitants	Cost of fixed-line calls [a]	Mobile phone subscribers per 100 inhabitants	Cost of mobile calls[a]	Internet hosts per 10 000 inhabitants	nternet users per 10 000 inhabitants	Personal computers per 100 inhabitants
Algeria	6.10	0.02	1.28	0.13	0.26	159.78	0.77
Egypt	11.04	0.01	6.68	0.68	0.45	282.26	1.66
Hungary	36.12	0.09	67.60	0.68	191.59	1 576.04	10.84
India	3.98	0.02	1.22	0.12	0.75	159.14	0.72
Jordan	12.66	0.04	22.89	0.49	7.72	576.97	3.75
Lebanon	19.88	0.07	22.70	0.43	21.08	1 171.30	8.05
Morocco	3.80	0.14	20.91	0.64	0.90	236.14	2.36
Poland	29.51	0.08	36.26	-	170.30	2 299.98	10.56
Romania	19.44	0.11	23.57	0.54	18.90	1,014.71	8.30
Saudi Arabia	14.39	0.03	21.72	0.76	6.73	646.12	13.67
South Africa	10.66	0.07	30.39	0.56	43.75	682.01	7.26
Syrian Arab Rep.	12.32	0.01	2.35	0.26	0.01	129.11	1.94
Tunisia	11.74	0.02	5.15	0.52	0.35	516.81	3.07
United Arab Emirates	31.35	–	69.61	0.25	139.40	3 131.63	11.99

Source: ITU (2004), UNCTAD (2003a).
[a] in dollars per three minutes call.

significantly lower than in most other Arab countries since the second mobile phone provider – Tunisiana, a subsidiary of Orascom, Telecom Tunisie – received the licence from the Tunisian Government and the monopoly of Tunisie Telecom was weakened. This has led to an increase in the number of mobile phone subscribers over the past two years. While there were 503,900 mobile phone subscribers in 2002, estimates for 2006 are as high as 3,000,000.

As far as Internet access is concerned, there are currently 12 Internet service providers (ISPs) in Tunisia. The Government established a number of public ISPs to exclusively connect certain public institutions (table 7.1) and to make the Internet accessible to sectors of particular importance for the economy, even if the average access for the rest of the country remains very low. Specific needs, such as the Internet bandwidth of different institutions, were taken into account for the network configuration. For instance, the Réseau National de Santé (RNS), which connects hospitals, is supposed to enable tele-medicine and has specific requirements concerning live stream data for online diagnostics. This is very different from the Réseau National de Recherche et de Technologie (RNRT), which connects research institutions and has a heavy demand for transfers of very large files (World Bank, 2002).

Private Internet access has improved constantly over the past years and several large private ISPs have entered the market. Today, there are five major players: Planet Tunisie, 3S Global Net, HexaByte, Tunet and Topnet. In addition, there are so-called Publinets, publicly supported Internet access points across the country. Fifty per cent of the initial investment in these access points is met by the Government and the remainder can be financed by low-interest loans. There were 305 Publinets in 2004 (ATI, 2004). These developments increase competition and hence provide greater affordability and access to the Internet.

As a result, the number of Internet users increased from 110 in 1997 (ITU, 2004) to 631,000 in 2003 (ATI, 2004). However, with 0.35 (2002), the number of Internet hosts per 10,000 inhabitants is still low by international comparison (table 7.2).

Table 7.3

Targets of business development support programmes

Programme	Target	Impact on ICT sector
RITI – Régime d'Incitation à l'Innovation dans les Technologies de l'Information	Promotion of entrepreneurship and innovation in the ICT sector	Direct
FITI – Fonds d'Incitation à l'Innovation dans les Technologies de l'Information	Promotion of investments in ICT	Direct
Mise-à-Niveau	General competitiveness, technology absorption, quality certification	Direct / Indirect
FAMEX – Fonds d'Accès aux Marchés d'Exportation	Export promotion, management consultancy, financing of market access cost	Direct / Indirect
FOPRODEX – Fonds de Promotion et Développement d'Exportation	Export promotion, financing of market access cost	Direct / Indirect
FOPRODI – Fonds de Promotion et Développement d'Industrie	Large industrial projects, efficiency, productivity	Indirect

2. Business development support

Financial and non-financial business development support (BDS) plays a central role in the Tunisian e-strategy. Through various public promotion programmes, projects and funds, the Government aims at a wide dissemination of ICTs in the Tunisian economy. Some funds are directly designed for ICT companies, so as to support entrepreneurship and innovations (table 7.3). Others encourage companies from different sectors to invest in ICTs, for example in software solutions or hardware equipment.

Technology parks

Cluster formation is an important driver for productivity and competitiveness of software and IT service companies as it aims to create closely linked, efficient relationships up-stream, down-stream and among firms at the same stage of the value chain (Porter, 1991). An important feature of ICT development policy in Tunisia is ICT cluster development, by building technology parks, so-called technopoles. This concept follows the International Business Incubation Systems (IBIS) approach by UNIDO, which aims to promote technological and industrial development (UNIDO, 2004).

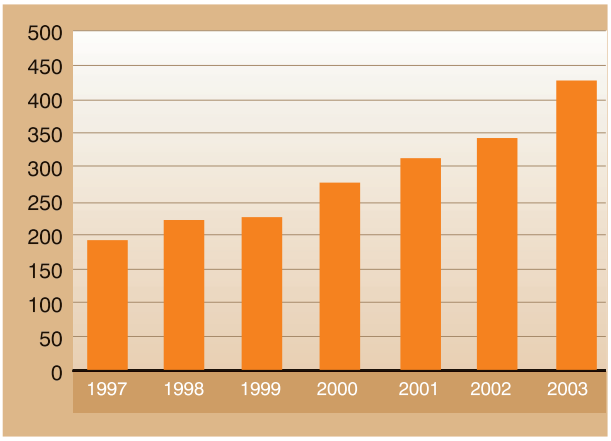
The parks make it easy for local businesses with similar products and services to locate around existing industrial structures (as opposed to somewhere else). In addition, the clusters are supported by institutions such as financial and research institutions and business consultancies, which help to maximize the companies' success and facilitate innovation (Porter, 1998). In Tunisia, public research institutions such as the Ecole Supérieure des Communications (Sup'Com) and the Institut Supérieur des Études Technologiques en Communications (ISET'Com), play a key role as drivers for innovation and as partners for companies (ITU, 2002b). Since 2001, ISET'Com has been establishing enterprise incubators in order to promote entrepreneurship in the ICT sector, by linking research, higher education and financial support.

One major project is the technopole Elgazala in Ariana, created in 1999. By 2003, the number of Tunisian and foreign firms located in the park had increased to 40, with about 520 engineers (www.elgazalacom.nat.tn 2004). Since 2000, Elgazala has been a member of the Association Internationale des Parcs Scientifiques (AIPS) and has established partnerships with technopoles in Bari (Italy) and Sophia Antipolis and Marseille (France). The motivation for this international collaboration among technopoles is transfer of know-how regarding the promotion of innovation and incubator development. Similar technopole projects are about to be launched, such as Sakiet Ezzit in Sfax and Hammam Maarouf in Sousse (Ambassade de France en Tunisie, 2003).

3. IT skills and education

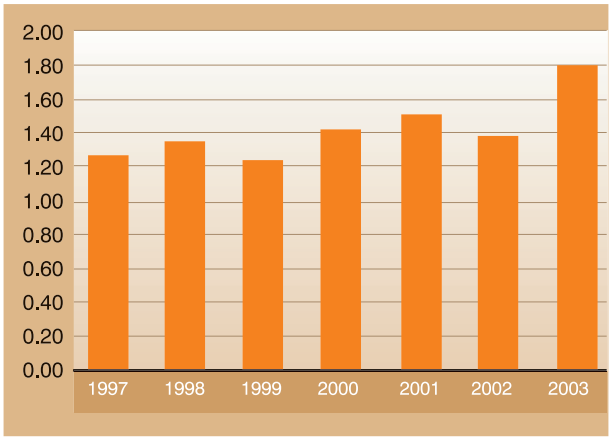
The Tunisian Government has always set as a priority the development of human resources. There-

Chart 7.9
Public spending on higher education
(millions of dollars)



Source: Ministère de l'Enseignement supérieur, de la Recherche Scientifique et de la Technologie (2003).

Chart 7.10
Public spending on higher education
(in percentage of GDP)

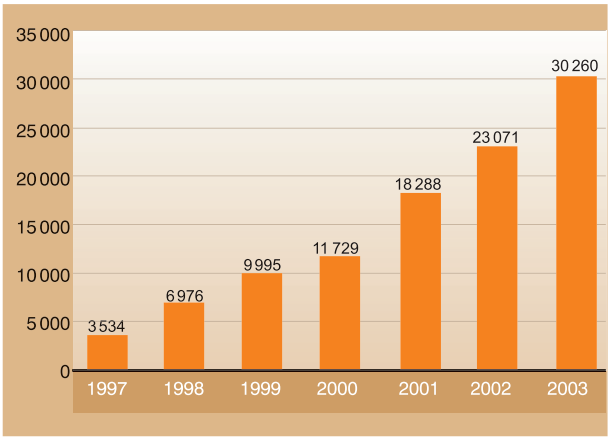


Source: Ministère de l'Enseignement supérieur, de la Recherche Scientifique et de la Technologie (2003).

fore, education plays a major role in the national development plan and accounts for a relatively large share of public spending (charts 7.9 and 7.10). This explains the good ranking at the international level for Tunisia's public spending on education.

The higher-education system continued to place great emphasis on technical studies, so as to enable and support the development of ICTs economically and socially (chart 7.11). The quality of mathematics and science education in particular is high and Tunisia is ranked as the sixth best country in the NRI.

Chart 7.11
Number of students in ICT-related technical studies



Source: Ministère de l'Enseignement Supérieur, de la Recherche Scientifique et de la Technologie (2003).
Includes computer science, engineering, mathematics, physics and media design.

Despite considerable efforts made in the area of education, adult literacy is still low. Out of 82 countries covered by the NRI, Tunisia is ranked 74th, with an average adult illiteracy rate of 29 per cent (World Economic Forum, 2003a). In addition, there is relatively poor technology awareness on a broad social scale. But these issues are critical to improving the overall e-literacy in Tunisia (ITU, 2002a). The Government has therefore initiated programmes to enhance technology awareness in the country and familiarize people with the opportunities provided by new technologies, such as the Internet Caravans, Internet Week and OscarWeb (ITU, 2002b).

4. Future ICT development challenges

A key challenge with regard to developing the Tunisian information society is the low individual usage and adoption of ICTs. Government initiatives, such as *Ordinateur Familial*,[5] were supposed to increase the number of people using computers at home and contribute to a broader dissemination of hardware. Crucial to greater penetration by the Internet is improved access (chart 7.12). Section C.2 outlined some of the improvements over the past years in the area of infrastructure, but much remains to be done.

Chart 7.12

Individual usage: A challenge for the knowledge-based society

Country	NRI Rank	NRI Score
Colombia	55	2.08
Peru	56	2.06
Philippines	57	1.98
Russian Fed.	58	1.97
Paraguay	59	1.96
Tunisia	60	1.96
China	61	1.95
Romania	62	1.95
Morocco	63	1.93
Thailand	64	1.92
Botswana	65	1.91

NRI subindex	Rank	Value	Mean	[Value - mean]
Use of online payment systems	29	3.98	3.64	+
Number of radios per 1,000 inhabitants	74	157.57	590.82	-
Number of television sets per 1,000 inhabitants	57	198.21	356.65	-
Number of cable television subscribers per 1,000 inhabitants	61	15.94	86.39	-
Number of mobile phones per 1,000 inhabitants	78	5.84	292.69	-
Number of Internet users per 100 inhabitants	54	12.83	38.44	-
Number of narrowband subscriber lines per 100 inhabitants	60	34.77	66.29	-
Number of broadband subscriber lines per 100 inhabitants	44	0.00	3.62	-
Household spending on ICT in dollars per month	58	19.60	27.05	-

Source: World Economic Forum (2003a).

Internet use might also be improved by increasingly offering administrative services online. Some services are already offered online, such as online registration for students at universities and tax declarations via Internet. But content and application development cannot be driven by the Government alone. Private initiatives are also necessary in order to take full advantage of the Internet and to make businesses and private persons use the Internet more actively.

The growth of the information economy is a priority for national development. On the business side, this encompasses mainly software production and IT services. These potential growth sectors are particularly interesting for two reasons. One is the role they play as regards greater integration of ICTs into the economy by supporting Tunisian manufacturing industries in upgrading their technological base (République Tunisienne, 2001b). For instance, the *Mise-à-Niveau*[6] programme is oriented in that direction and promotes investments in ICTs. The second is the role that software and IT services can play in exports. Currently, neither Tunisian software nor IT service firms have a significant presence in international markets. The first steps have been taken to respond to that challenge. The Government, in collaboration with the World Bank, has initiated the export promotion programme Fonds d'Accès aux Marchés d'Exportation (FAMEX). Other action that could be taken in this regard will be addressed in more detail in section D.

D. Firm strategies and competition: Survey results

The previous two sections outlined the business environment in which the Tunisian ICT companies operate, as well as the national policies that impact on the business environment.

The overall business environment, including demand and factor conditions, availability of related and supporting industries and how they relate to firm strategies and rivalry, can support or limit firm activity depending on the firm's capacity to take advantage of the existing conditions.

To analyse in more detail sector competitiveness and the key elements that determine a company's success, it is necessary to move from the general context of the business environment to the level of the firm. One important aspect to consider is the relative position of firms within the overall industrial structure. It has been widely argued that these firm-external structures, which could be determined by shared market strategies, or the product and service orientation of competitors, have an important influence on firm success (Porter, 1980).

Firm success based on competitive advantages also depends on the potential of firms to nurture competitive advantages (Grant, 1991; Wernerfelt, 1984). Therefore, a competitiveness analysis needs to look at firm-internal positions concerning strategic resources, which could be competitive advantages (Barney, 1991; Prahalad and Hamel, 1990). For example, if reputation and close business relationships are crucial to firm success, particular competencies in these areas can be of strategic importance.

In March – April 2004, UNCTAD carried out a survey of Tunisian businesses in the ICT sector, focusing on software and IT services. Its main objective was to gather information about the companies' strategies and performances that could explain their ability to gain sustained competitive advantages. The following sections present the research results, which are based on the information obtained from the survey. They provide a detailed analysis of Tunisian software and IT service companies, including their current strategic orientation with respect to internationalization, target markets, products and services, and future trends and business outlooks, as well as their link with national ICT policies.

1. Survey methodology

The study had three components:

(a) Field analysis: interviews were held with ICT experts from various Tunisian institutions, such as venture capital firms, public administration and business associations. Subsequently, a structured questionnaire was developed and distributed to all 274 Tunisian enterprises active in the field of software production and IT services. The survey response rate was 18 per cent (or 49 companies). In order to collect additional qualitative data, a sample of software and IT service companies were contacted for on-site meetings and interviews, and 21 Tunisian ICT experts were interviewed.

(b) Data analysis: on the basis of the data collected, the information obtained was analysed from a competitiveness point of view. Factors influencing the productivity of software and IT service companies and the resulting impact on competitive advantages and disadvantages were evaluated.

(c) Case studies: five software and IT service companies with outstanding characteristics as regards their strategy development were selected for a more detailed analysis based on personal interviews. The aim of the company case studies is to show which strategies have helped the companies gain competitive advantages and achieve improved performance. In this sense, the cases serve as best practice examples for Tunisian success stories in the field of software production and IT services. The case studies are presented in annex II.

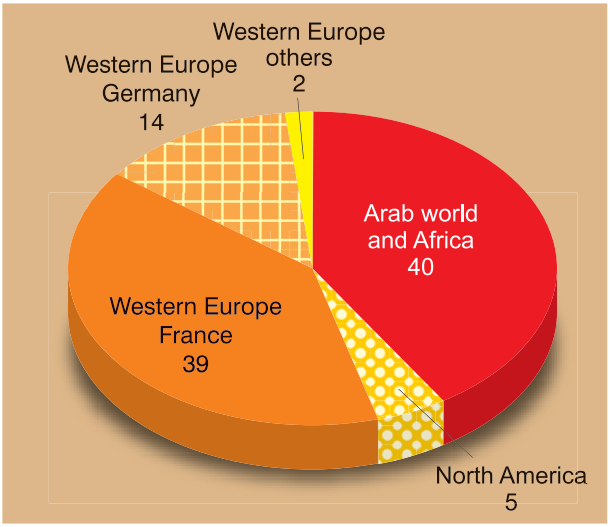
2. Sample characteristics

According to the Chambre Nationale Syndicale des Sociétés de Services et d'Ingénierie Informatique (CNS SSII) there are currently 274 software and IT service companies in Tunisia. Eighty-four per cent of the firms employ fewer than 10 people. Within the sample, 53 per cent of the companies employ fewer than 10 people. The sample is therefore slightly biased towards larger firms.

Twenty-two per cent of the companies surveyed have an annual turnover lower than 50,000 Tunisian dinar (US$ 36,430), 27 per cent between 50,000 and 200,000 Tunisian dinar (US$ 36,430 and 145,720), and 24 per cent above 200,000 Tunisian dinar (US$ 145,720), but under one million Tunisian dinar (US$ 728,600). The remaining 27 per cent have an annual turnover of more than 1 million Tunisian dinar (US$ 728,600), including 6 per cent with a turnover of more than 2 million Tunisian dinar (US$ 1.5 million).

Chart 7.13

Export markets of software and IT service companies



Note: Percentages relate to the export turnover generated by all software and IT service companies.

3. Internationalization

The results of the survey reveal that most of the businesses focus on the domestic market. Twenty-three per cent of the overall turnover generated by the companies relate to exports, and 77 per cent to the domestic market. Nevertheless, the internationalization of business plays an important role for the firms.

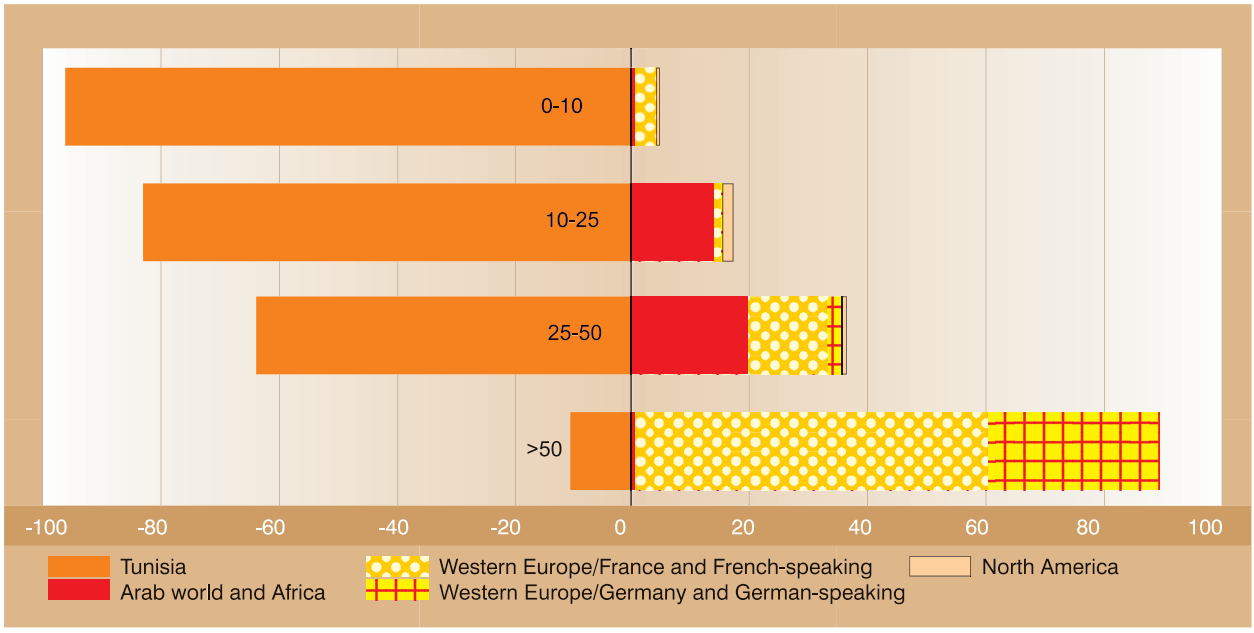
At the time of the survey, 29 per cent of software and IT service companies in Tunisia did not export at all. They were only active in the domestic market. According to business leaders' plans, this share will decrease to 6 per cent, as firms are increasingly trying to extend their business in export markets. Seventy-one per cent of the companies in the survey are exporters, including 6 per cent pure exporters exclusively serving foreign markets. Firms that do not sell any products or services domestically are, for example, off-shore outsourcing specialists. In the future, 94 per cent of all software and IT service companies will partly or exclusively serve foreign markets.

Chart 7.13 shows the main target markets. Customers in Africa and the Arab world are mainly located in North African countries, such as Morocco, Algeria and Egypt. The Gulf States contribute little (0.18 per cent) to regional export businesses. The highest share of export turnover is generated in Western Europe. Within the European market, companies in France contribute the major part, followed by Germany. Software and IT service companies are not present in the Italian market, despite the fact that Italy is the second

Chart 7.14

Structure of turnover of software and IT service companies per region by degree of export orientation

(percentages)



Note: Percentages relate to the export and domestic turnover generated by all software and IT service companies.

Table 7.4

Distribution of turnover among software and IT service companies by degree of export orientation

Degree of export orientation	>50%	25–50%	10–25%	0–10%	0% (purely domestic)	
Overall turnover	11%	14%	**47%**	13%	15%	100%
Domestic turnover	1%	12%	**51%**	16%	20%	100%
Export turnover	**40%**	22%	35%	3%	–	100%
Share of companies	11%	9%	20%	29%	31%	100%
Relative company size*	1.00	1.56	**2.35**	0.45	0.48	
Concentration domestic turnover**	0.09	1.33	**2.55**	0.55	0.65	
Concentration export turnover***	**3.64**	2.44	1.75	0.10	–	

* Relative company size measured in share of overall turnover per share of companies.
** Concentration of domestic turnover measured in share of domestic turnover per share of companies.
*** Concentration of export turnover measured in share of export turnover per share of companies.

most important trading partner for Tunisia's economy, after France and before Germany. Other Western European markets, such as Switzerland (1.38 per cent), Belgium (1.01 per cent), the United Kingdom (0.33 per cent) and the Netherlands (0.12 per cent) play a role for very few software and IT service companies. Exports to North America are mainly those to the United States, and to some extent also to Canada (0.04 per cent).

It is interesting to note that the higher the share of exports in the corporate turnover of a company, the stronger the market orientation towards Western Europe. Small exporters sell more in the regional market, mainly in Morocco, Algeria and Egypt. Chart 7.14 shows how different export markets contribute to the corporate turnover according to the degree of export orientation of the companies.

Hybrid exporters with a 10–25 per cent share of exports in their business have the major share in the domestic market (table 7.4). The ratio of overall turnover to share of companies belonging to this group indicates that these firms are large enterprises. The high share of 40 per cent of export turnover is generated by companies that do more than 50 per cent of their business abroad. It is interesting to see that these firms are of average size compared with the hybrid exporters and purely domestic firms, as the ratio of overall turnover to share of companies shows.

Linking turnover to export markets, it can be said that middle-size strong exporters take the lead regarding turnover generated abroad. They export mainly to Western Europe, with France and Germany being the most important target markets. On the other hand, there are large hybrid exporters with exports of 10–25 per cent. Hence, they greatly depend on the domestic market. Their main foreign target markets are in North Africa, not in Western Europe or North America.

In order to capture possible future dynamics in the internationalization of software and IT service companies, business leaders were asked to specify their target countries and regions for potential new customers (several answers were possible). There is no significant difference in attractiveness between the regional market, comprising Africa and the Arab world, and the Western European market (table 7.5). One question relates to the future role of North America and the low priority given by business leaders to this market. The responses in the survey indicate that no major changes should be expected here.

As far as country markets are concerned, two interesting developments might occur. The first is that export activities may be extended to Italy, although this has not yet been envisaged by any company despite the fact that Italy is the second most important export market for Tunisia as a whole. The second is that the English-speaking market might play a more significant role in the

Table 7.5

Future markets for software and IT service companies

(percentage of companies)

Rank	Country / region	%
1	Tunisia	69
2	Arab World and Africa	69
3	Western Europe/France	67
4	Western Europe/Germany	29
5	Western Europe/Italy	18
6	North America/USA	16
7	Western Europe/United Kingdom	14
8	Western Europe/French-speaking	6
9	North America/Canada	2
10	Western Europe/Switzerland	2

future. To what extent, however, is linked first of all to the obvious lack of attractiveness of the main English-speaking market, North America, for the majority of firms.

4. Competitors

As earlier research indicated, competitors for Tunisian IT exporters mainly originate from Eastern Europe and Morocco (ITC, 2004). A closer look at the firm level allows a more precise identification of the main competitors. For this purpose, target markets/countries were matched with competitors' countries of origin. The results show that for Tunisian software and IT service companies targeting the domestic market, the most important competitors are located in Tunisia. This is not surprising because of the rivalry from the public ICT sector (see earlier discussion in section B.4). Also important are companies located in Western Europe and, not surprisingly, companies from North Africa and Arab countries entering the local market.

The survey results indicate that there are different competitive advantages on which a company has to capitalize in order to enter and succeed in different markets. With regard to competition, the following emerged from the survey:

- Exporters that are also active in Tunisia view Asian companies as the most difficult competitors in their export markets. Also important (but significantly less important) competitors are Tunisian and other North African companies.
- In the regional market (North Africa and Arab countries), the strongest competition comes from Asia and Eastern Europe.
- In the Western European market, the main competitors are other North African and Arab firms.
- In the North American market, competitors from Asia are the most challenging, compared with North African and other Arab, including Tunisian, firms.

5. Products and markets

Choice of products

From a list of 18 products or solutions, companies were asked to select the portfolio they currently cover and to indicate which solutions they are planning to offer in the future. The results show that the range will increase significantly over the next few years and companies will have more similar product and service portfolios. Today, 47 per cent of the companies offer one specific solution, web design. In the future, 47–57 per cent of the companies are planning to offer the five most common solutions. Currently, Tunisian software and IT service companies are specialized in 4.08 areas (on average). The greater diversification will result in 5.78 areas in the product portfolios (chart 7.15).

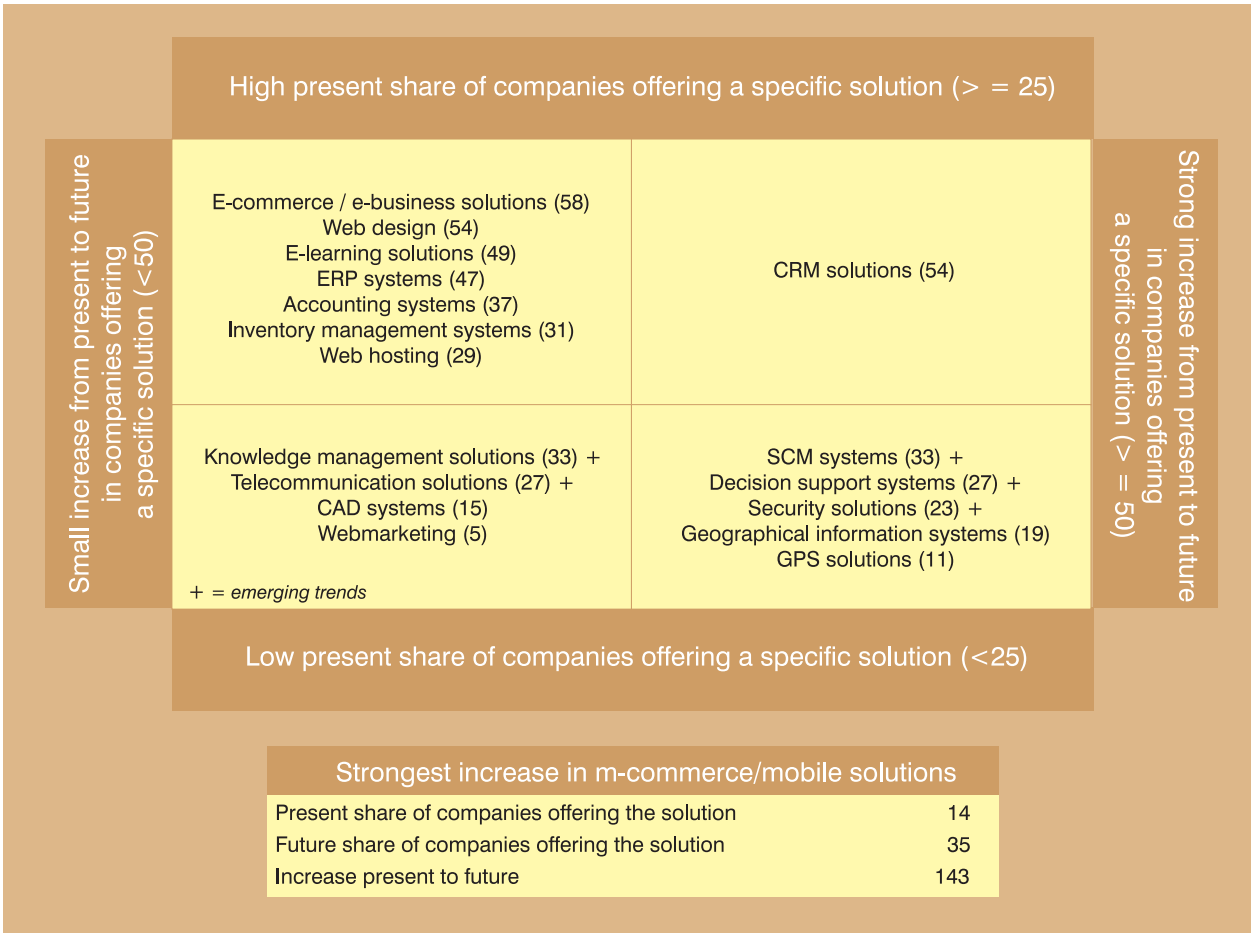
Many firms will extend their product and service range to include more complex solutions, such as enterprise resource planning (ERP) systems. Other services, such as web hosting, are gradually losing their importance in the portfolios of companies. The most common products and services will be e-commerce and e-business solutions, web design, customer relationship management (CRM) systems, e-learning solutions and training, and ERP systems.

Chart 7.15 provides a broad image of solutions which will play an increasing role for the companies in the future. The relative measures used categorize the solutions that are (more or less) present in current and future product and service portfolios, and identify areas of significant market dynamics to be expected. The thresholds chosen for both dimensions are based on the mean of

Chart 7.15

Present and future products and services of software and IT service companies

(percentages)



% Future share of companies offering a specific solution.
+ Indicator for leaping from a low present share to a high future share of companies offering a specific solution.

respective minimum and maximum values for all solutions. Both serve an illustration purpose and should not be regarded as indicators for evaluating the strategic meaning of certain solutions for the companies.

Less dynamic areas are more traditional solutions, such as those related to e-commerce and e-business. The number of companies engaged in these areas is relatively high, but they do not attract many new competitors. On the other hand, there are areas with quite a large number of competitors offering similar products and services, which still attract a relatively large number of new competitors, for example CRM solutions.

The main emerging trends regarding the future portfolio orientation of the companies are supply chain management (SCM) systems, decision support systems (DSS) and security solutions. Growing more slowly in importance, but already playing a significant role in product and service portfolios of companies, are knowledge management and telecommunication solutions. The most dynamic future trend is in mobile solutions. These products, which currently have a low presence in the market, have caught the attention of a large number of firms. In the light of the recent liberalization of the mobile communications market in Tunisia, it is not surprising that more and more companies perceive this as a promising market.

Business trend: Outsourcing

Various forms of outsourcing have developed together with the expansion of ICTs and new business models (UNCTAD, 2003b). Following the global trend, outsourcing also plays a role for

Table 7.6
Companies with outsourcing business by share in turnover
(percentages)

No outsourcing	0–25% turnover	25–50% turnover	50–75% turnover	75–100% turnover	Pure outsourcing
20%	53%	16%	4%	2%	4%

Tunisian software and IT service firms. They take over IT functions within their customers' business, such as software and database development, customer service, website management, IT training, data reporting, web content management and digital security services. Numerous software producers and IT service companies have entered the market.

As table 7.6 shows, only a few pure outsourcing specialists are in the Tunisian market. Most firms generate up to 25 per cent of their turnover in this field. A significant number (20 per cent) of companies do not conduct any outsourcing business at all.

The survey shows that 86 per cent of export companies are active in the field either off-shore (in export markets) or locally in Tunisia. The majority of off-shore outsourcing firms have entered the regional market, whereas North America and Europe have not yet caught the attention of many firms. Among the companies that concentrate exclusively on the domestic market, 64 per cent offer outsourcing services.

Looking at the added value of services offered, outsourcing companies focusing on the domestic market clearly concentrate on complex services with high added value, such as IT consultancy, systems analysis and systems design. Export-oriented companies offer both complex and more simple services, but low-value-added services, such as systems maintenance and customization of software, predominate.

This underlines again (see section D.3) the different sources of competitive advantages in different markets. For example, in Western Europe and North America, Tunisian software and IT service firms concentrate on low-value services for outsourcing. This indicates that companies compete with other regional and Asian competitors on the basis of cost rather than high service differentiation and hence more complex high-value service offerings. Furthermore, this might indicate that not all off-shore outsourcing companies can take full advantage of their local proximity to Europe, their highly skilled engineering work force or language skills, all of which should permit more companies to offer high-value services. There are several reasons for this.

First, close customer relationships play a key role for successful outsourcing at the top of the value hierarchy of services. This requires relationship-building skills and intensive communication. An essential question in this context is whether the existing ICT infrastructure supports cost-effective communication with distant outsourcing customers, such as voice-over IP (VoIP) and broadband Internet. Another important issue is the availability of management skills, which are crucial to successful relationship management (UNCTAD, 2003b) (see section D.7).

Second, at the regional and domestic levels, high-value-added services, requiring greater technological knowledge and relationship-building, are better represented. Here, Tunisian IT outsourcing firms compete not only on cost (i.e. simpler services), but also on differentiation (i.e. more complex services). This is underlined by the fact that, in addition to regional and Asian competitors, business leaders mentioned increased competition from Western and Eastern Europe in the field of outsourcing locally (in Tunisia) and at the regional level (in Arab and African countries). European IT outsourcing firms are forced to compete less on costs, and more on differentiated services (UNCTAD, 2003b).

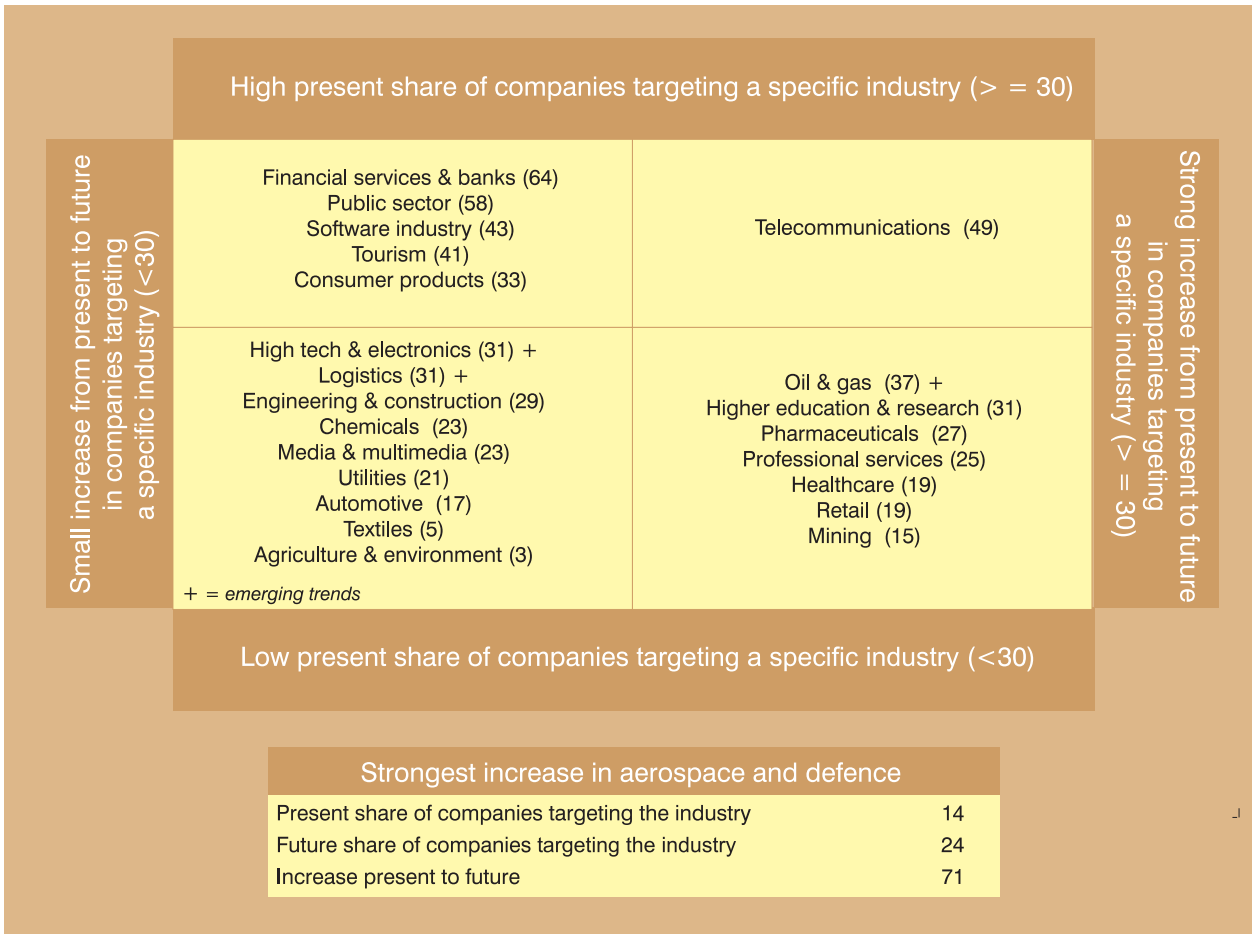
Choice of markets and industries

From a list of 22 industries, companies were asked to select present and future target industries. Results show that, apart from products and services, the average number of target industries will increase significantly over the next years. Currently, 51–53 per cent of the companies target two specific industries (financial services and public administration). Estimates show that this figure

Chart 7.16

Present and future target industries of software and IT service companies

(percentages)



% Future share of companies targeting a specific industry.
+ Indicator for leaping from a low present share to a high future share of companies targeting a specific industry.

may change to 41–63 per cent, targeting five industries of most interest to the companies. The number of target industries will increase from 5.45 to 6.80 per company.

Chart 7.16 provides an overview of types of customers and industries that will increasingly play a role for software and IT service companies. Small increases are expected in traditional customer industries, such as financial services and banks. The number of companies engaged in these fields is relatively high, but these markets do not attract significantly new competitors. On the other hand, some industries, already targeted by quite a high number of competitors, will attract a relatively high number of new competitors. This is the case for the telecommunications sector.

With regard to the future orientation of software and IT service companies, one of the main emerging markets could be the oil and gas industry. More gradually developing, but also important as customer industries, are high tech and electronics, and logistics. More and more firms are targeting the aerospace and defence sector, which might soon play a more important role for software and IT service companies.

Forty-eight per cent of the turnover of the companies surveyed is generated in the public sector. The share in the corporate turnover of firms is declining by the degree of export orientation, down to 7 per cent of turnover among exporters, with more than 50 per cent of business activities abroad.

Technology trend: Free and open source software

Much has been said about the significance of free and open source software (FOSS) for economic development. For example, it can help Governments and businesses to minimize their reliance on single suppliers of proprietary software. Moreover, FOSS development can play a central role in upgrading a country's human resource capacity and technological skill base (UNCTAD, 2003b).

FOSS is also an attractive business for Tunisian software companies. Currently, 10 per cent of the turnover of software companies is generated by FOSS-based solutions, compared with 90 per cent by the use of proprietary software. The minor role in terms of share of turnover should not be misunderstood as very often software solutions integrate both FOSS and proprietary software. In Tunisia, 45 per cent of software firms are such integrators. Fifty-two per cent are concentrating entirely on the development of solutions based on proprietary software, and 3 per cent could be identified as FOSS specialists, not using any proprietary software at all. An interesting finding of the survey is that there are significantly different FOSS requirements in export and domestic markets. While 67 per cent of exporters implement FOSS in their solutions, only 29 per cent of companies focused on the domestic market do so. Domestic customers possibly require fewer FOSS characteristics in software solutions than those located in the export market.

As far as the companies' experience with FOSS is concerned, 46 per cent of the companies engaged in FOSS development indicated that they had experienced positive impacts on their turnover and market share as a result of the implementation of FOSS in their solutions. The same number of firms did not experience any changes in these two areas. Eight per cent experienced decreasing numbers in terms of turnover and market share. Regarding revenues, the distribution is slightly different. Thirty-eight per cent were able to increase revenues, 50 per cent did not change, and 13 per cent said they faced a decline in revenue due to FOSS development (chart 7.17).

6. Capital and finance

Driven by weak capital supply from the banking sector and an insufficient number of financing models for the IT sector, the presence of private venture capital is not very common among the firms (chart 7.18).

As already discussed, public BDS plays an important role for Tunisian software and IT service companies in order to compensate for the lack of private funds. The most important public funds are listed in table 7.7. FAMEX and FOPRODEX are BDS programmes tailored for exports. Therefore, it is not surprising that the share of companies using the funds increases with their degree of export orientation. Since the objective of the export promotion funds is to increase firms' activities abroad, their value for companies that already have a strong export focus is rather low. Similarly, *Mise-à-Niveau* is not particularly designed for export or for IT firms, but it is attractive to many

Chart 7.17

Impact of FOSS on business performance of FOSS developing firms
(percentages)

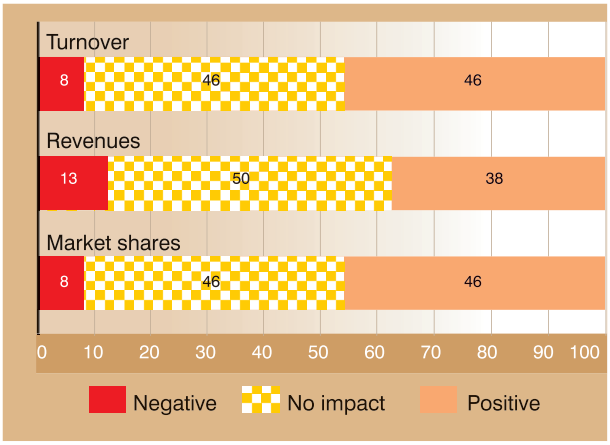
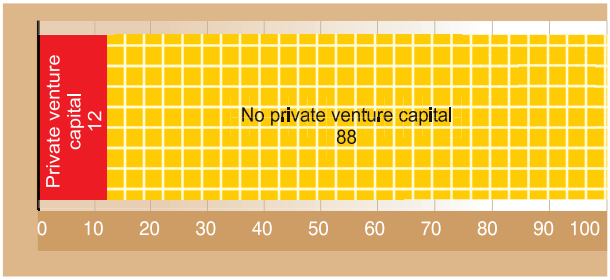


Chart 7.18

Private venture capital in software and IT service companies
(percentages)



Note: Percentage of companies using venture capital or not.

Table 7.7

Most important business development support programmes of companies using BDS

(percentages)

Rank	Business development support programme	All companies	100% domestic	Exports 0–10%	Exports 10–25%	Exports 25–50%	Exports >50%
1	FAMEX	41	7	46	56	100	40
2	Mis–à–Niveau	24	14	23	22	50	20
3	FOPRODEX	8	0	15	11	25	0
4	Others	2	0	31	0	25	0
	No use of BDS programmes	43	79	23	33	0	60

companies as it helps to implement international quality standards such as ISO 9001.

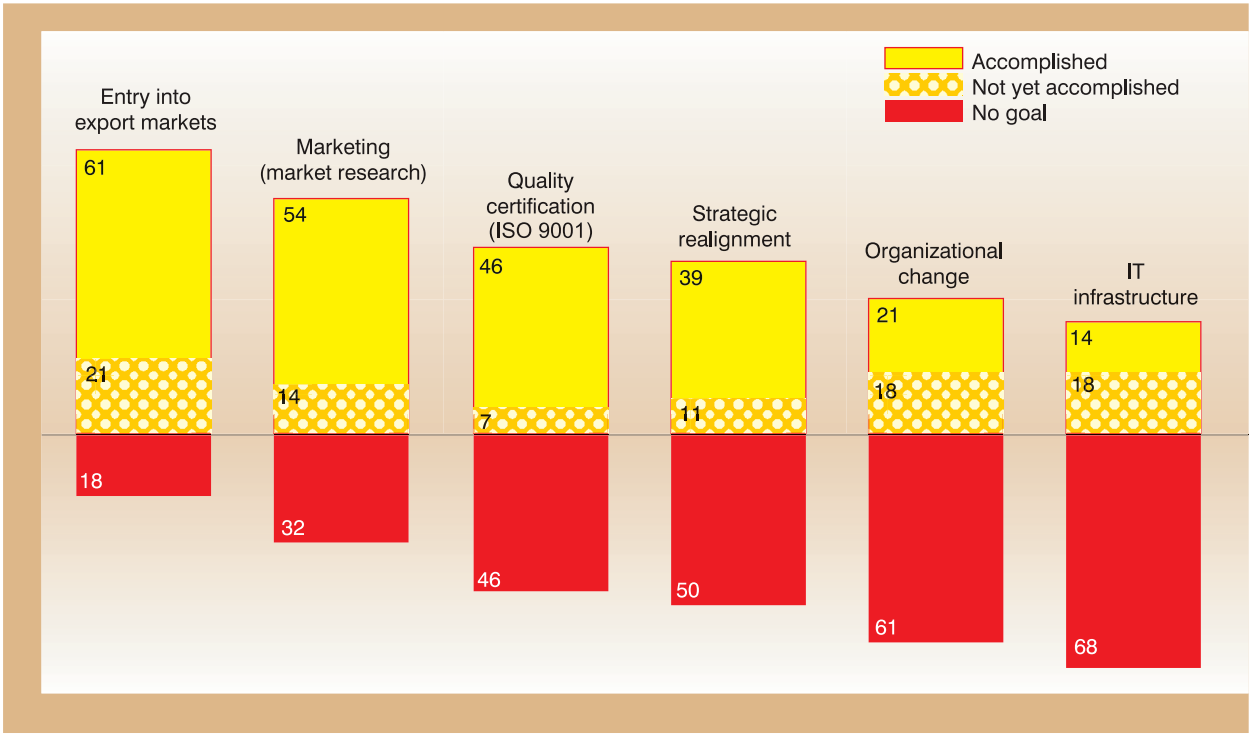
Exporters with a turnover of 25–50 per cent based on foreign business are the most advanced users of BDS funds across all programmes. They have the most diversified portfolio of sources of public finance. This might indicate a preference on the part of the funds for these companies. In fact, not only customers and banks are judging software and IT service companies on the basis of size and financial strength. For instance, the funds require a minimum commitment from the entrepreneur and external private sources of capital to a joint project. These requirements can hardly be fulfilled by small businesses.

Chart 7.19 shows how software and IT service companies use BDS. Exporters with the highest share of export turnover set different priorities. They invest in quality certification and marketing, including market research, and market positioning analysis.

Chart 7.19

BDS goals of software and IT service companies

(percentages)



Note: Goals are measured in percentage of companies having accomplished, not yet accomplished or not having specified this as a goal.

Chart 7.20

Impact of business development support on domestic performance in companies using BDS

(percentages)

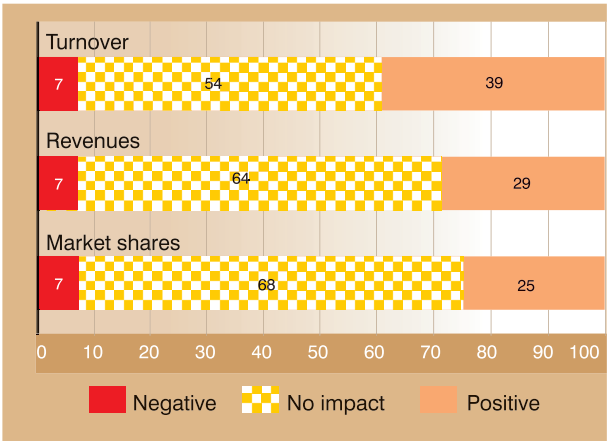
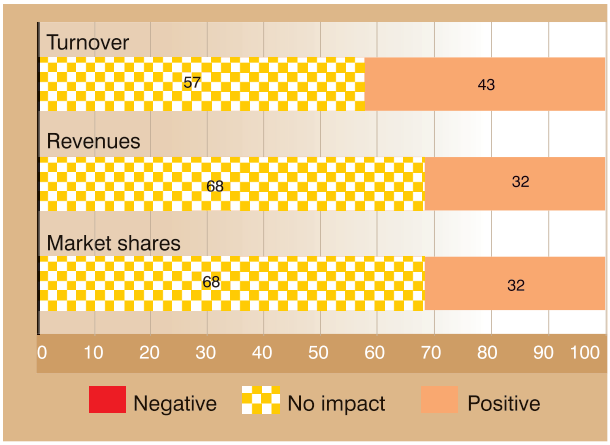


Chart 7.21

Impact of business development support on export performance in companies using BDS

(percentages)



Investments in IT infrastructure are more important for companies with a low or average export orientation. Advancing export businesses might require an advanced infrastructure as well. The survey results show that strong exporters might have already developed the necessary IT infrastructure as they do not have this priority any longer. Strategic realignment also plays a role for the hybrid exporter (with 25–50 per cent of overall export business), and a clear strategy formulation is a prerequisite for successful export businesses, as section D.7 will show.

To summarize, a significant share of the companies (32 per cent) which collaborated with the funds stated that they could increase their revenues and market shares in export markets (chart 7.21). Forty-three per cent experienced a growth in their export turnover. As outlined above, export promotion is only one of several BDS targets. Therefore, it is not surprising that for the majority of companies nothing changed regarding their export business. A strategic impact of the funds could be that for 33 per cent of the firms with an export orientation of 10–25 per cent, the domestic business decreased in terms of turnover, market share and revenue. This could be due to a strategic realignment of business towards foreign markets.

7. Sophistication of firm strategies

Important to a company's strategy setting is consideration of available resources, dynamics in markets and the potential of the company, within the given business environment. In other words, the strategy defines which resources create competitive advantages, and how to leverage the advantages most effectively with respect to the company's strengths, weaknesses, threats and opportunities in each market.

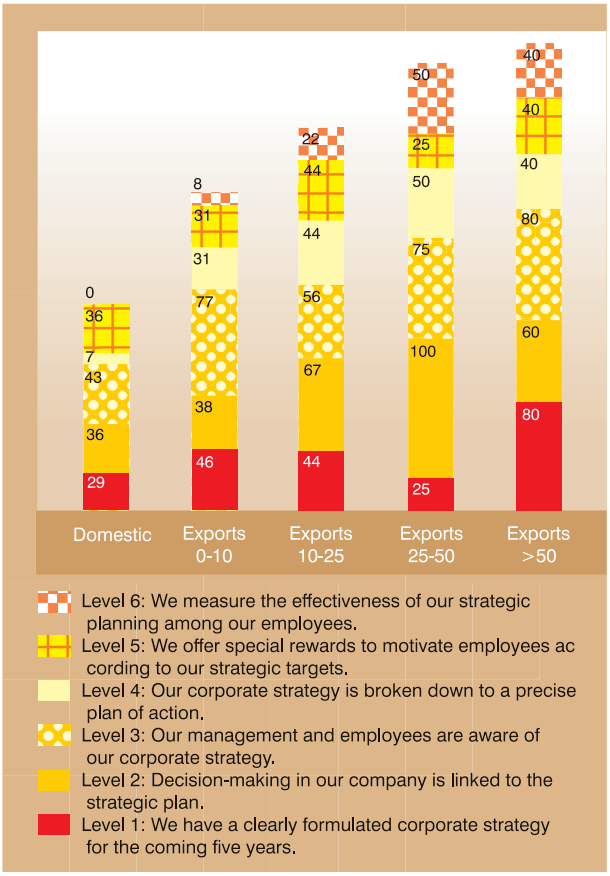
Successful organizational strategy implementation requires consideration of a number of important aspects, such as linkages to the operational business, firm-wide awareness of targets, clearly defined roles of single business units, organizational incentives to follow the targets, and control of effectiveness. Chart 7.22 shows the extent to which Tunisian software and IT service companies have developed and implemented their corporate strategies (although the time frame is rather short – less than five years).

The results show that there is a link between the degree of export orientation and the degree of strategy implementation. With an increasing focus on exports, companies tend to cover the whole range of options to support their strategic planning better within their organization, for example measurement of effectiveness and precise action plans. Therefore, it is valid to say that exporting could require companies to implement stronger and more comprehensive strategies in their organizations. A reason for that could be the need for a more precise definition of competitive advantages and a strategic choice on how to leverage the advantage in a specific market, or the choice of the most attractive market for the specific advantages that a company has vis-à-vis its competitors.

Chart 7.22

Strategy implementation in software and IT service companies

(percentages)



Note: The affirmative answers are presented by the number of companies in percentages.

Chart 7.23 lists the strategic priorities of Tunisian software and IT service companies. The top priority is product marketing, ranging from market research and market positioning analysis to marketing campaigns. The awareness of companies about these activities underlines the increasing importance of strategic planning and more dedicated customer orientation. A clear understanding of customer needs and requirements is a prerequisite for a successful strategy formulation and implementation.

The survey identified possible challenges for firms to develop and maintain customer relationships over time (chart 7.24). Most critical is the availability of resources for the preparation, development and implementation of customer projects. Large customer projects require serious commitments from both customers and suppliers, regarding financial means and human resources. As solution providers cannot be paid real-time, customers have to consider not only technical capabilities but also financial strength in their choice of providers. As discussed in section B.3, adequate financing models for large projects, which could help software and IT service companies in this regard, are rare in Tunisia.

The question remains to what extent companies will be able to face these challenges. Among the companies surveyed, the most favoured option for resolving problems of financial strength and firm size is inter-firm cooperation. As table 7.8 shows, 80 per cent of all companies consider this to be their strategy for market growth. While cooperation among firms can help in taking advantage of complementary resources and a stronger image for customers, successful collaboration also requires good management skills to coordinate two or more organizations successfully. The alternative organic growth may be hard to achieve given the limited opportunities to participate in large projects. Owing to weak financial and capital markets in Tunisia, mergers and acquisitions (M&A) are the least favoured option. They would require more intensive collaboration with experienced financial institutions to support the process of merging different companies and organizations.

Table 7.9 shows the level of e-business solutions implemented (or planned) by software and IT service companies in Tunisia. It is interesting to note that awareness of customer needs and marketing issues seems increasingly to influence the decisions of companies concerning e-business solutions. Traditional IT solutions, such as accounting systems, and telecommunication and knowledge management solutions, have an impact on organizational efficiency within the firm.

In the future, CRM systems as well as e-business solutions will gain most in importance. These tools can help software and IT service companies

Table 7.8

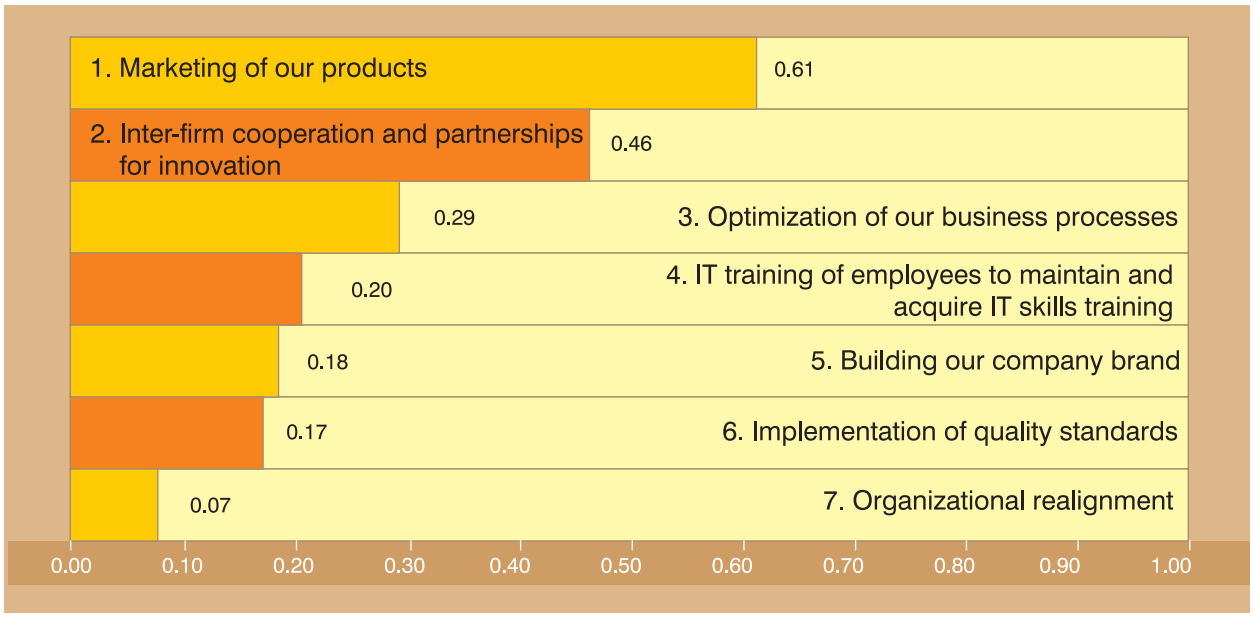
Growth strategies of software and IT service companies

(percentage of companies)

Rank	Strategy	%
1	Cooperation	80
2	Organic growth	18
3	Mergers & acquisitions	12

Chart 7.23

Strategic priorities for software and IT service companies over the next five years



Note: Number of companies normed to 1; weighted by priority 1, 2, 3.

Chart 7.24

Main challenges for software and IT service companies to develop new customer relationships

(percentage of companies)

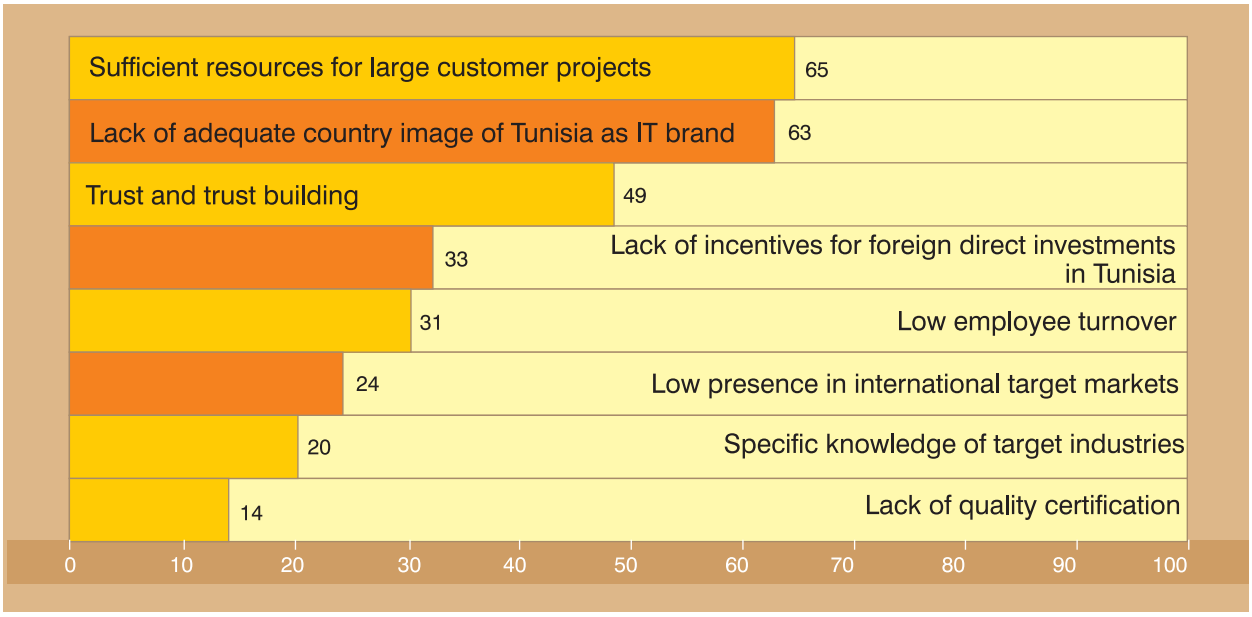


Table 7.9
E-business trends in software and IT service companies

Rank	System / solution	Present e-readiness in % of companies	Future e-readiness in % of companies	Change in ranking
1	Accounting systems	59	65	=
2	Telecommunication solutions	39	41	=
3	Knowledge management solutions	31	33	=
4	Security solutions	31	39	=
5	CRM systems (customer relationship management)	29	51	+
6	E-learning solutions for internal training	16	24	=
7	DSS (decision support systems)	14	24	=
8	E-business and e-commerce solutions for domestic business	8	22	=
9	E-business and e-commerce solutions for exports	4	18	=

Note: Percentage of all companies.

to optimize their downstream business activities and improve the handling of transactions and processes between firms and customers.

E. Conclusions: Implications for firm strategies and national ICT policies

The aim of the analysis was to look from a competitiveness point of view at Tunisian software and IT service companies in their specific business environment. For that purpose, links were identified between the national ICT strategy and corporate strategies of firms in order to evaluate the extent to which both approaches complement each other.

The conclusions therefore address both national and firm strategies and their role in maintaining and enhancing the competitiveness of the sector. The survey revealed that the successful implementation of firm strategies plays a crucial role in maintaining companies' competitive advantages. These could differ considerably according to the target market. For example, a company that is highly competitive in the European market may not be competitive in the domestic market (and vice versa). But companies with no clear strategy or weak implementation are clearly low performers (no matter in which market). To give an example, the more firms focus on the regional market the more they need to develop advantages based on firm-specific resources and their proximate business environment. Basic factor advantages, such as low labour cost, do not apply in the regional market, whereas cultural proximity is important. By contrast, in Western European markets, basic factor advantages apply and technological requirements are higher, whereas cultural proximity is less important. The company cases in annex II illustrate the diversity and innovative approaches of different strategies followed by companies focusing on different target markets. Successful firms formulate and consistently implement their business strategies. This is a prerequisite for actively developing and sustaining competitive advantages.

As far as the enabling business environment is concerned, and the success of government policies in promoting the sector, the survey revealed that more needs to be done to address the particular needs of ICT-sector firms. This includes policies related to enhancing the ICT infrastructure (in

particular as regards access, pricing and local content), and providing finance, skills and education (not only in IT related fields, but also in project management and business development). If software and IT services are a priority for the future development of the country, it is important for the Government to consider that other countries may do more to promote ICT-sector firms within their national ICT strategy. At the same time, business leaders have to be aware of the changing business environment in the country, and adapt their corporate strategies accordingly. Drawing on the results of the study, the following provides specific suggestions to business leaders and policy makers working towards enhancing the competitiveness of the sector.

1. ICT companies: From opportunity to strategy

The results from the survey and the interviews showed that companies will have to prepare to take an important step, namely the leap from opportunity to strategy. This is in particular the case for firms planning to expand their export businesses and heading for Western Europe or the regional market. Concerning the strategy content, the following strategic challenges should be pointed out.

Products and markets

The increasingly widespread range of solutions and services offered by the firms could present a problem with regard to a clear and competitive positioning in their markets. A stronger specialization would help to increase the productivity of companies and may be crucial for gaining competitiveness.

Since companies are entering the regional market or markets in developing countries, competitive advantages based on basic factor endowments such as low level of wages do not apply. Businesses should focus more on the value added of products and services. Knowledge-based competition is a promising field for Tunisian firms as the educational system provides the necessary quality and quantity of technicians and university graduates in ICT studies to create high-value-added software and service solutions. Firms focusing on the European or North American market can still take full advantage of basic factor conditions in Tunisia and benefit from low wages. At the same time, the high-quality engineering workforce is an advantage compared with many other countries.

Firm-level innovation and organizational implications

Greater emphasis on cooperation and partnerships among Tunisian firms or with foreign companies in target markets would support innovation since joint efforts and complementary skills of partners reduce investment risks related to innovation. But partnerships present a very specific management challenge and would require a stronger engagement in the development of management skills for the coordination of partnerships, inter-firm processes and decision-making procedures (Mansour, 2003). Given their (small) size and limited financial resources, companies are aware of the potential of (and need for) stronger inter-firm cooperation, for example in the field of technological innovation or external communication in markets. Nevertheless, only a few firms have developed inter-firm cooperation to enhance their resource base (Chaabouni and Mezghani, 2001).

Further concentration of business through M&A could help Tunisian firms gain the critical size for participation in large projects. But the feasibility of M&A depends on the markets for capital and finance. It remains to be seen to what extent these will develop as regards ICT business orientation and overcoming obstacles, such as the lack of tailored finance models and private venture capital for software and IT service companies.

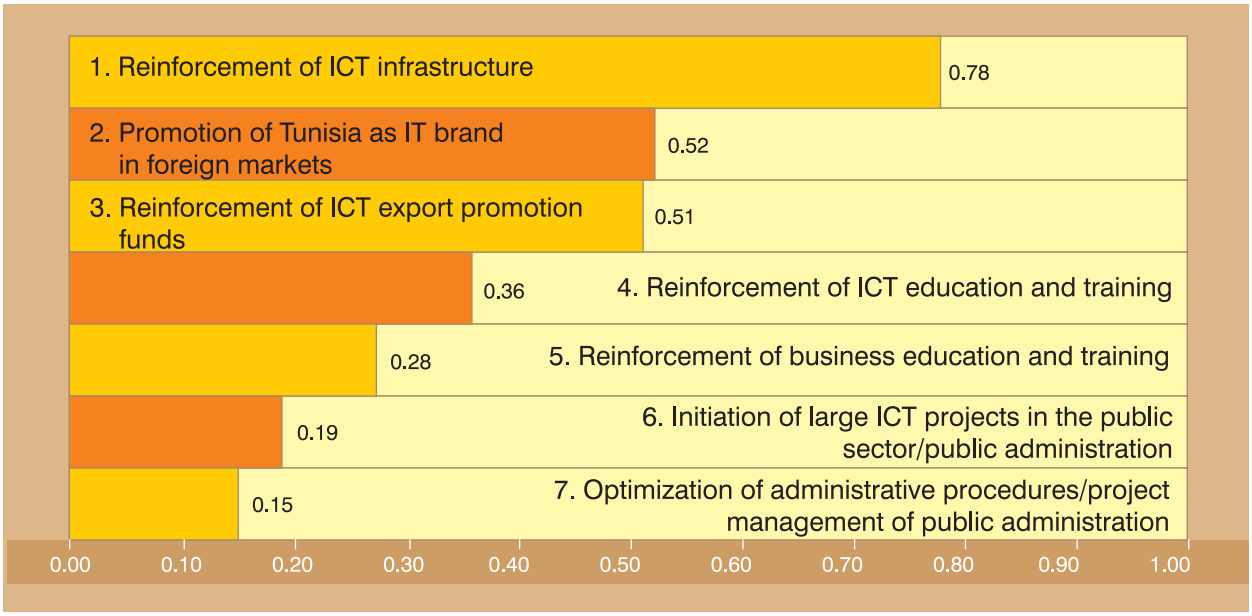
2. ICT policy priorities

Tunisia's e-strategy has created an environment that fosters technological progress at the level of the economy and society. The current achievements concerning the regulatory framework, infrastructure, business and development support, and education show some positive results. From the international point of view, Tunisia is taking a leading position as an ICT player among the developing countries.

However, the business environment needs to be such that it supports effectively the competitiveness of firms or a sector. According to the survey results, the Tunisian ICT sector has not yet fully benefited from national ICT policies, and the effective implementation of the national development plan regarding a supportive business envi-

Chart 7.25

Priorities for the Government for the next five years according to ICT business leaders



Note: Number of companies normed to 1; weighted by priority 1, 2, 3.

ronment for software and IT service companies is questionable. The priorities set by the Government do not entirely correspond to the needs of companies. The views of the business leaders captured in the study point to the most critical areas for government action (chart 7.25). As a result, a realignment of the national e-strategy is necessary with regard to those elements that limit the companies' strategic options and competitiveness. The following suggests several ICT policies that could play a key role in this context and makes recommendations for future steps that might be taken.

Infrastructure

Cost-efficient advanced communication technologies. The improvement of the telecommunications infrastructure is crucial to the companies' need for communicating with target export markets (UNDP and CEPEX, 2004). The results presented in chart 7.26 show that technologies such as broadband, satellite connections and VoIP play an important role for businesses and require improved access. This applies particularly to outsourcing, which requires close continuous customer relationships and hence relies heavily on communication. In this context, low-cost telecommunication becomes a key factor as an enabler for services at competitive prices (UNCTAD, 2003b). According to the business leaders, the Government should give this matter the highest priority in the national e-strategy (chart 7.25).

Business development support

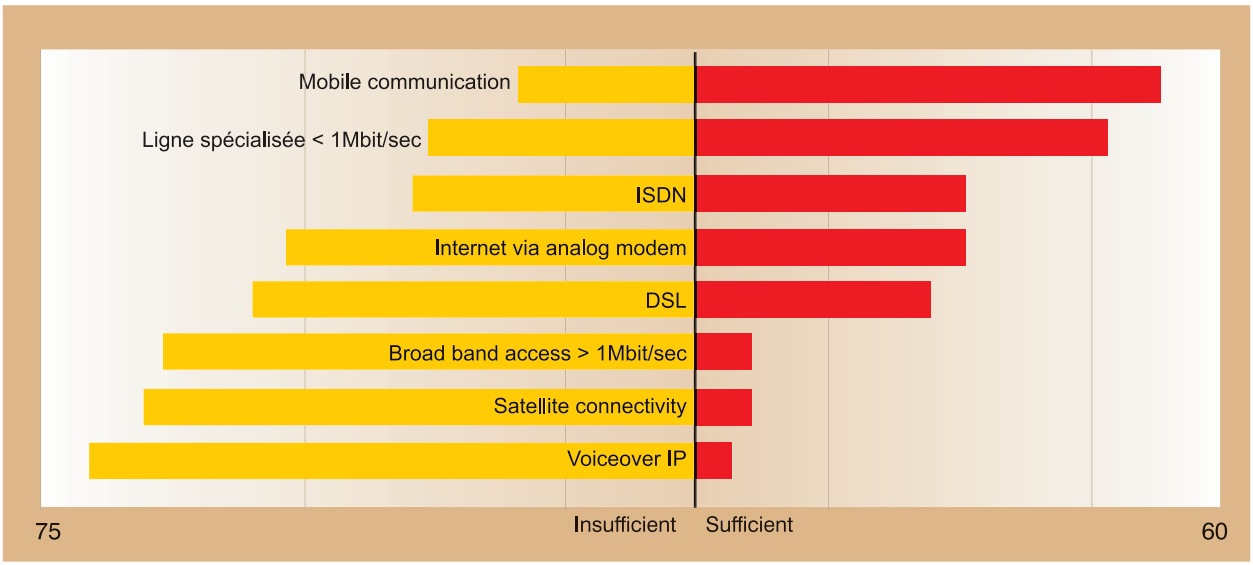
Stronger promotion of Tunisia as an IT brand in foreign markets. Branding is crucial, and currently the image of Tunisia in foreign markets is determined more by tourism than by technology. The Government will have to focus more on the promotion of "IT Made in Tunisia" in order to support the country's software and IT service exports (ITC, 2004). This could be done, for example, through a stronger presence at international trade fairs. Business leaders consider this to be the second highest priority for the Government's e-strategy.

Reinforcement of export promotion funds for ICTs. A further adaptation of BDS to the particular needs of ICT firms is necessary. The recent initiatives by the Government are the first signs of stronger support for ICT firms. The one-sided promotion of entrepreneurship and innovation primarily increases the domestic dynamics within

Chart 7.26

Availability of communication technologies

(percentage of companies)



the ICT sector. To enhance growth potentials in export markets, the Government has to consider whether the existing BDS structures are adequate to support effectively firms' export strategies. Access to export markets is still a challenge for many companies. Therefore, existing BDS programmes should be reviewed and optimized to allow ICT firms to participate effectively in funds such as FOPRODEX and FAMEX. The survey results clearly indicate that this subject should have the third highest priority within the national e-strategy.

Strategy consulting for SMEs. Apart from financial BDS, small firms suffer from a limited capacity to develop business strategies necessary for succeeding in (export) markets. Therefore, the current BDS system should be complemented by offering consulting services to SMEs in the area of strategy development and transfer of management know-how.[7]

Reduction of public ICT development. The Government established a number of institutions to boost ICT development in Tunisia and to support research and development at a time when no private companies were in a position to do so. Given the developing information economy in Tunisia, the role of the public sector in this field has to be reconsidered. One approach could be the gradual reduction of the role of the Centre National de l'Informatique (UNDP and CEPEX, 2004). This would also respond to the call of private businesses for large national investment projects. The reallocated financial resources would help firms to acquire the size, financial strength and experience necessary for becoming successful exporters. A gradual reduction of public ICT production should be in areas that support most effectively the competitiveness of private software and IT service companies, for example through greater participation in projects with the public sector and the public administration (ITC, 2004). Successfully stepping into export markets also requires a certain experience with customer projects in the public sector. Therefore, such projects should be assigned to private businesses.

Awareness creation for software and IT services. The Government could help the software and IT services companies in the domestic market by raising awareness about the potential of ICTs to improve productivity and hence competitiveness, and thus encourage other sectors to increase their adoption of ICT. This would also support the process of privatization and deregulation in the light of the ongoing opening of the economy to the global market (World Bank, 2002).

Gaining international experience. Ways should be found to effectively promote partnerships among private businesses at the international level, given

that this is an important challenge for Tunisian IT exporters. One way could be to attract FDI, which would allow Tunisian firms to join international networks by collaborating locally with foreign firms and thus integrate into customer value chains abroad. Moreover, the public sector could help local IT firms gain experience in international projects by also considering international companies in tenders for large ICT investment projects. Local firms would thus get the chance to collaborate with international partners (ITC, 2004). Action in this regard has been initiated at the national and regional level, in order to increase the participation of foreign enterprises in the domestic market.[8]

Facilitating partnerships. Public export promotion institutions should increasingly engage in the establishment of partnerships between Tunisian IT firms and foreign companies. This might be achieved through offices located abroad, which could enhance presence in the target markets. Another measure would be the creation of databases shared by Chambers of Commerce and companies looking for partners abroad, and vice versa (UNDP and CEPEX, 2004).

Open source promotion. The potential of open source for IT companies to gain competitiveness as identified in section D.4 calls for a greater promotion of FOSS to support private businesses. This could be done by projects in future growth areas of software and IT services. Relevant areas for public engagement could be e-government, e-learning and digital security.

Education

Cross-functional skills. The survey results emphasize that the success of ICT companies does not depend solely on a highly skilled engineering workforce. With the increasing complexity of high-value-added IT services it becomes more and more important for companies to be able to resort to excellent management knowledge. A greater promotion of studies that serve as a cross-functional interface between technology and business might be a solution.

Learning target markets and languages. As the numbers for international student exchanges show, Tunisian graduates who have studied abroad have a strong orientation towards French-speaking countries. Not only language skills but also valuable knowledge about key ICT target markets could be generated if Tunisian students gained international experience in other countries. In that way, the market potential of software and service solutions could be leveraged more efficiently since access to new markets abroad would be facilitated by internationally experienced graduates, for instance in Italy, Germany or the United Kingdom (ITC, 2004).

ANNEX I

Competitiveness "à la une"

Competitiveness is a widely discussed, but nonetheless often misunderstood term. According to Porter (2003), it is measured by the productivity of firms, or more precisely, by their capacity to increase productivity.

An essential question is how to explain why certain firms perform better than others. Management theory has made various attempts to identify and examine the origins of competitive advantages that cause performance differences, and the strategies that lead to them (Barney, 1991; Porter, 1991; Jacobson, 1992).

Porter (2003) states that the ability of firms to develop and enhance competitive advantages depends primarily on two interrelated aspects – the quality of the national or immediate business environment, and the sophistication with which firms compete in the domestic and international markets. The origin of competitive advantage is thus to be found not only within the firm, but also in the proximate business environment. The latter is crucial for providing essential input factors, skills and knowledge that firms can draw on, influencing goals that determine investments, and putting pressure on firms to innovate and accumulate resources.

According to this approach, four attributes, collectively termed the "diamond", determine the business environment in a country and its impact on firms with regard to developing and enhancing competitive advantages. These are factor conditions, demand conditions, the presence of related and supporting industries, and the context of firm strategies and rivalry.

Industrial organization (IO) economics aims to explain competition among firms in industrial structures from an external view of the firm. The traditional structure-conduct-performance or Bain/Mason paradigm of IO offers a systematic model for assessing competition within an industry. According to this approach, the success of a firm and of an industry is the result of a certain industry structure, which determines the behaviour and strategic choice of firms, and their profitability (Porter, 1981).

Porter also notes that the structural evolution of industries can be significantly influenced by rivalry among competitors, uncertainty of events and the strategic choices that firms make. In this sense, industry structure and business strategy are complementary and connected by feedback loops, rather than a strategy being an automatic consequence of the particular structural context.

In order to better reflect this interdependence, Porter (1991) extended the structure-conduct-performance paradigm and developed what he called the "industry structure analysis". This framework aims to explain sustainable performance differences on the basis of a firm's relative position within an industrial structure, which is influenced five forces: the threat of new entrants into an industry, the bargaining power of buyers and suppliers, the threat of substitute products or services, and the rivalry among existing competitors (Bresser, 1998).

ANNEX II

Company case studies

The following case studies illustrate in more detail how Tunisian ICT firms have positioned themselves within their business environment. The cases shed light on the operations of the companies and their corporate strategies and show that there are numerous possibilities for strategic planning within the same business environment. Technological expertise is important for all of them, but in terms of financing, markets envisaged, and partnership models they all differ.

	Telnet ***Telecom Networks Engineering***
	Immeuble Ennour, Centre Urbain Nord, 1082 Tunis Mahrajène
Contact	Internet: www.telnet.com.tn Phone: +216 71 706 922 E-mail: info@telnet.com.tn Fax: +216 71 706 939
	Year of establishment: 1994 Employees: 100 Quality certification: ISO 9001
Specialization	The company targets the telecommunication sector, the automotive industry and the information technology industry. The business has a clear focus on the private sector, which accounts for 90 per cent of its turnover. The range of products and services concentrates on information systems and software development, electronic systems design and client-server systems. Twenty-six per cent of the turnover is generated by offshore outsourcing contracts with Western European enterprises.
Strategy	Eighty-five per cent of the business is based on exports to Western Europe, mainly France. In 2002, Telnet opened a sales and consulting office in Paris in order to be more present and visible to their existing and potential customers. The company is aiming at an extension of exports to other Western European countries. Extensive market research was therefore carried out before the export strategy was adopted. The audit aligned the strategy to the requirements identified for the future target markets. Crucial to the strategic realignment was the financial support of public BDS funds.
Competition	Telnet capitalizes on a decade of experience with Western European customers. The proximity to Europe has always been an important factor for its success. Therefore, this advantage was chosen as a strategy and is implemented via sales offices in target markets. Technological competencies and low costs are the key advantages envisaged by Telnet.

	WebOne ***E-Business Solutions***
	21 Rue Abd El Hamid Ibn Badis, 1002 Tunis
Contact	Internet: www.webone.com.tn Phone: + 216 71 784 726 E-mail: info@webone.tunisie.com Fax: + 216 71 894 326
	Year of establishment: 1999 Employees: 21 Quality certification: none

Specialization	The company targets the automotive and electronics industry, the financial services and professional services sector, and the media industry. WebOne has customers only in the private sector. The range of products and services concentrates on J2EE-based e-commerce, m-commerce and e-business solutions, CRM, ERP and content management systems. WebOne is an offshore outsourcing specialist whose entire turnover is generated by software development for the German partner company Think Tank Corporate Consulting. The partner specializes exclusively in consulting and customer relationship management in the German and Swiss markets. Software development and implementation are carried out solely by WebOne.
Strategy	The whole of the business is based on exports to Germany and other German-speaking countries in Western Europe. In 2001, WebOne decided to acquire Think Tank, which was sold by the former owner, an international consulting group. It kept the existing customer relationships and is acquiring new customers in the German-speaking part of Europe. The company is aiming at an extension of the partnership model to other Western European markets, and at software development and offshore outsourcing in connection with an experienced partner (or a subsidiary) in a target market with expertise in IT consulting and acquisition of customers. Public BDS is used by the company to explore foreign markets for potential partners.
Competition	WebOne can capitalize on a clear focus on the target market with a permanent presence and visibility for customers through its subsidiary Think Tank. The specialization in customer relationship management and software development for highly competitive prices combines three advantages: costs, local proximity and cultural proximity. WebOne is thus facing up to the strong competition in the market, which also challenges the capabilities of firms to continuously develop the basis of success, namely technological leadership.

	HexaByte Group ***Connecting the dots ...***
	11 Rue du Niger, 1002 Tunis
Contact	Internet: www.hexabyte.tn Phone: + 216 71 288 682 E-mail: info@hexabyte.tn Fax: + 216 71 287 754
	Year of establishment: 2001 Employees: 22 Quality certification: none
Specialization	The HexaByte Group consists of four cross-linked companies which cover different businesses. The group addresses the telecommunication and software industry, and the information technology sector. Fifteen per cent of turnover is generated in the public sector, and 85 per cent in the private sector. The group offers solutions in the field of telecommunication, Internet services, digital security, e-commerce, m-commerce, e-business and web marketing. Offshore outsourcing contributes five per cent to the overall turnover. The core business is the private Internet service provider HexaByte. Promotions.com.tn is the web marketing specialist in the group, e-Serve offers mobile solutions for GSM networks and Punica.com is about to be launched as the first Tunisian tourism web portal. The core competencies are clearly separated and highly specialized for each of the four firms.

Strategy	HexaByte's businesses concentrate on the Tunisian market (95 per cent of turnover). The remaining five per cent derives from activities in Western Europe, mainly in the United Kingdom and France. With its subsidiaries, the group pursues consistent niche market exploration and development. Businesses are developed around opportunities arising out of existing business activities. The group is aiming at the extension of its activities by leveraging spin-off opportunities for highly specialized independent businesses. In this connection, it sees itself as a business incubator ("We take the market where nobody has been before...").
Competition	HexaByte competes in each of its businesses separately in different markets. The common target is to be the first mover in each field of business. Therefore, the company brand plays a key role in success. Each subsidiary of the HexaByte Group can capitalize on reputation and brand values.

	Oxia ***Your partner of choice***
	11 Rue Claude Bernard, 1002 Tunis Belvédère
Contact	Internet: www.oxiasoft.com Phone: +216 71 288 682 E-mail: infoxia@oxiasoft.com Fax: +216 71 287 754
	Year of establishment: 2000 Employees: 59 Quality certification: ISO 9001
Specialization	The company targets the chemical and pharmaceutical industry, the financial services sector, consumer goods, the engineering and construction sector, and the software industry. Eleven per cent of turnover is generated in the public sector, and 89 per cent in the private sector. The group specializes in ERP, CRM, SCM systems, and telecommunication solutions. Offshore outsourcing contributes 16 per cent to the overall turnover.
Strategy	The target markets are Tunisia with 50 per cent of turnover, 34 per cent for Western Europe (mainly France) and 16 per cent for North Africa. Oxia emphasizes human resource development. In 2002, the company bought out a complete team of developers and consultants in Tunisia from a former project with a European customer. Oxia thus kept the experience and know-how of the successful collaboration for future projects. An additional office for software development was established in Algeria, which was supposed to further complete the human resources of Oxia. The extension of businesses is aiming at more exports to the regional market, Africa and Middle East, and Western Europe. Public BDS plays an important role in the process of exploring and learning about new target markets, and in evaluating business opportunities. Private venture capital was the enabling factor for Oxia's M&A activities and helped in the establishment of the subsidiary abroad with know-how in finance and organizational issues.
Competition	Oxia is taking advantage of the combination of highly specialized human resources regarding technological knowledge and experience in different target markets. It explores and chooses markets, which makes it possible to leverage the maximum potential of the organizational capabilities of the company, such as combined complementary skills. The experience in the utilization of private venture capital is a key factor in Oxia's success, as M&A have always been the necessary tool for the integration of organizational complements.

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Notes

1. The second phase of the WSIS will take place in Tunis from 16 to 18 November 2005. The first phase took place in Geneva from 10 to 12 December 2003.

2. It defines the ICT sector as a combination of manufacturing and services industries that capture, transmit and display data and information electronically. For manufacturing industries, the products of a candidate industry must be intended to fulfil the function of information processing and communication, including transmission and display, and must use electronic processing to detect, measure and/or record physical phenomena or control a physical process. For services industries, the products of a candidate industry must be intended to enable the function of information processing and communication by electronic means (OECD, 2003).

3. Excluding the telecommunication sector.

4. A comprehensive discussion of national ICT strategies, in particular policies to foster the adoption of ICT by the business sector in developing countries, is provided in UNCTAD (2003b).

5. Tunisian households benefit from bank loans at reduced interest rates and reduced prices to purchase computers. A total of 22,600 personal computers were sold with the help of the Ordinateur Familial programme up until 2001. Three per cent of households were equipped with personal computers in 2001. Estimates for the dissemination of personal computers among households in 2006 rise to 10.5 per cent.

6. The participation in the Mise-à-Niveau programme requires firms to provide a comprehensive analysis of their whole business and strategy. The strategy has to be approved by the advisory committee of the programme. After approval, 10–20 per cent of material investments, such as hardware, and 70 per cent of immaterial investments, such as software and IT consulting, are covered by the funding of the programme.

7. Empretec is UNCTAD's integrated capacity-building programme; it helps to foster entrepreneurial capabilities and the growth of internationally competitive SMEs. The programme identifies promising entrepreneurs, provides them with training aimed at strengthening their entrepreneurial behaviour and business skills, assists them in accessing business services and financing for their business ventures, helps to establish cooperation with domestic and foreign companies, and puts in place long-term support systems to facilitate growth and internationalization. For further information see www.empretec.net.

8. www.tunisurf.com, www.appeldoffres.mincom.tn, www.tunisieappelsdoffres.com

Printed at United Nations, Geneva
GE.04-52782–December 2004–3,820

United Nations publication
Sales No. E.04.II.D.42

UNCTAD/SDTE/ECB/2004/1

ISBN 92-1-112653-3