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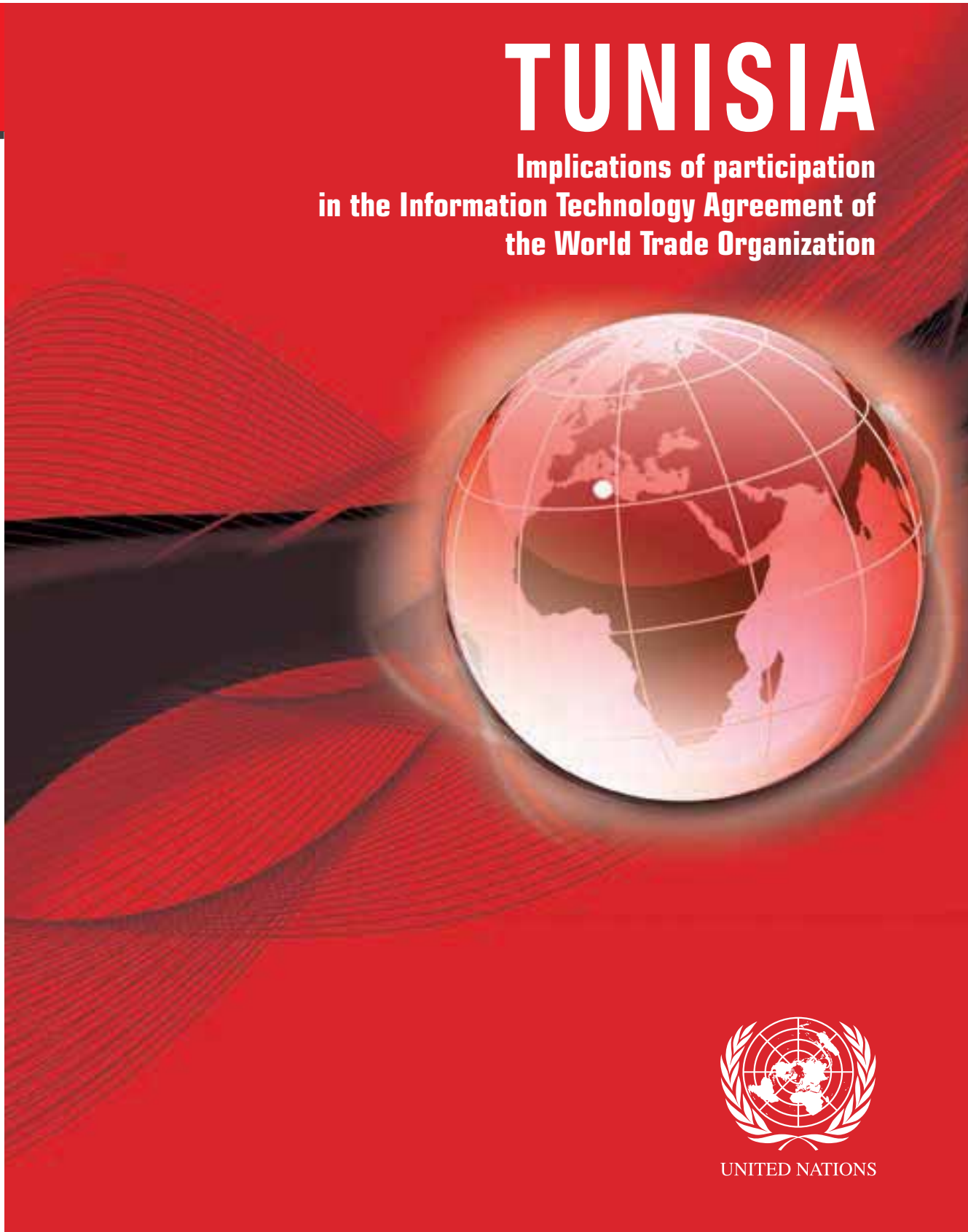
TRADE POLICY FRAMEWORK

TUNISIA

Implications of participation in the Information Technology Agreement of the World Trade Organization



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Implications of participation in the Information Technology Agreement of the World Trade Organization

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Reference to dollars ($) means United States of America dollars.

In tables, two dots (..) indicate that data are not available.

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The study was prepared by a team led by Mina Mashayekhi, Head, Trade Negotiations and Commercial Diplomacy Branch, Division of International Trade in Goods and Services and Commodities. The team comprised Thomas Mathew, Ralf Peters and Mesut Saygili, Trade Negotiations and Commercial Diplomacy Branch.

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INTRODUCTION AND LEGAL ASPECTS

1. INTRODUCTION

1.1. Background

The twenty-first century has been, to date, the era of information and communications technology (ICT), and the Ministerial Declaration on Trade in Information Technology Products, or Information Technology Agreement (ITA), of the World Trade Organization (WTO), has played a vital role in promoting affordable access to such technology.[1]

The use of information technology (IT) is pervasive in almost every aspect of modern life. Consumer electronics, medical technology, informatics, digital hardware and software, telecommunications and all ICTs embody this catalytic technology, which helps enhance productivity, drive innovation and boost economic expansion and growth.

According to the WTO, global exports of IT products have almost tripled in value since the ITA was concluded in 1996. In 2010, global exports of IT products were valued at an estimated $1.4 trillion, or 9.5 per cent of world merchandise trade. Together, ITA participants account for 96 per cent of world trade in IT products. As they provide duty-free treatment to imports on a most-favoured nation basis, they have created opportunities for exporters in all WTO member countries, including those in least developed countries.

Global value-added by ICT industries has more than doubled, from $1.2 trillion in 1995 to $2.8 trillion in 2010, while their share of global gross domestic product has increased to 6 per cent.[2] Similarly, the employment share of ICT industries increased from 5.1 per cent in 1995 to 5.8 per cent in 2010 in economies of member countries of the Organization for Economic Cooperation and Development.[3] Yet the impacts of ICTs on the global economy reach beyond direct contributions of the industries to gross domestic product and employment: ICTs are the strongest drivers of productivity and innovation in non-ICT industries in the global economy.[4]

Developing countries have consistently increased their participation in world trade of IT products since 1996, and accounted for approximately 64 per cent of exports and 51 per cent of imports in 2010. There is growing potential for ICTs to contribute to the social and economic progress of developing countries. For the first time, it is possible for many entrepreneurs in developing countries to benefit from ICTs in their activities and thereby enhance productivity. By improving communications along the value chain, both domestically and internationally, application of relevant ICTs can greatly enhance the competitiveness of the enterprise sector as a whole.[5]

1.2. Objective and Scope

Tunisia, a developing country, became a member of the WTO in March 1995, but has not become a participant in the ITA since its conclusion in 1996. A request was received from the Government of Tunisia for UNCTAD to undertake a feasibility study on whether the country should become a participant in the ITA.[6] The Government requested UNCTAD to examine in particular the impacts of becoming a participant in the ITA in terms of the overall objective of the Government to attract greater foreign direct investment (FDI) into the country, in particular the IT sector, thereby boosting domestic industrial output and exports of IT and IT-related products.

The scope of this study therefore encompasses the following:

a) The revenue effects of eliminating import tariffs on all IT products under the product coverage of the ITA;[7]

[1] WTO, 2012, *15 Years of the Information Technology Agreement* (Geneva).
[2] J Neuffer, 2012, The power of ICT, presented at the Symposium on the Fifteenth Anniversary of the Information Technology Agreement, Geneva, 15 May.
[3] Organization for Economic Cooperation and Development, 2010, *Information Technology Outlook 2010* (Paris).
[4] RD Atkinson, SJ Ezell, SM Andes, LA Stewart, S-G Chang and A Sunami, 2011, *Innovation, Trade and Technology Policies in Asia-Pacific Economies: A Scorecard* (Washington, D.C., Information Technology and Innovation Foundation).
[5] UNCTAD, 2011, *Information Economy Report 2011: ICTs as an Enabler for Private Sector Development* (New York and Geneva, United Nations publication).
[6] Permanent Mission of Tunisia to the United Nations Office at Geneva, 2013, Note verbale, 15 February.
[7] This study does not include the cost of having to bind other duties and charges at zero, which is one of the three basic principles of the ITA.

b) Whether becoming a participant in the ITA will contribute towards achieving the overall objective of the Government to attract greater FDI into the country, in particular the IT sector, through elimination of import tariffs on all IT products and binding other duties and charges at zero for those products that fall under the product coverage of the ITA;

c) The economy-wide implications of becoming a participant in the ITA, through a linkage analysis to gauge whether establishment of an IT sector in Tunisia might have strong backward and forward linkages with other sectors of the economy and thus boost their growth and expansion as well (apart from the assumption that investments in various sectors under the product coverage of the ITA will have an overall positive effect on the economy);

d) Complementary measures and/or policies that should be adopted by the Government to further encourage the growth and expansion of the IT sector through both FDI and domestic direct investment.

The study provides policy recommendations for consideration by the Government of Tunisia.

2. LEGAL ASPECTS

The ITA is a sectoral agreement in the WTO. It is currently a plurilateral agreement as, although membership is open to all WTO members, the majority have chosen to remain outside the ITA. One reason for this may be that the market access benefit accruing from the elimination of import tariffs and binding of other duties and charges at zero by ITA participants is extended to the entire membership by virtue of the most-favoured nation principle.

Nevertheless, participation in the ITA has grown from an initial 28 members to 76 members, the majority of which are developing countries.

All ITA participants must adhere to the following three basic principles:

a) All products listed in the declaration must be covered

b) All products must be reduced to a zero tariff level

c) All other duties and charges must be bound at zero

There are no exceptions to product coverage. However, for sensitive items, it is possible to have an extended implementation period.

The main product categories covered by the ITA include computers, semiconductors, semiconductor manufacturing equipment, telecommunications apparatuses, instruments and apparatuses, data storage media and software and parts and accessories. Many consumer ICT products are excluded from product coverage.

From a legal perspective, Tunisia may still enjoy the benefits of FDI and domestic direct investment in IT and IT-related sectors without becoming a participant in the ITA. The country may unilaterally eliminate its import tariffs on all or a majority of IT products listed under the product coverage of the ITA at the applied level without having to bind them, thus making available imported inputs at nil duty to FDI and domestic direct investment, for value addition in the country. Assuming that all other factors related to attracting greater FDI and domestic direct investment are feasible and desirable, Tunisia may still aim to be a major IT and IT-related manufacturing hub. In addition, with respect to exports, as a WTO member, Tunisia already enjoys most-favoured nation treatment, including benefiting from nil import tariffs and other duties and charges bound at zero for its exports of IT products under the product coverage of the ITA – ITA products – in WTO member States that are participants in the ITA.

Compelling factors for becoming a participant in the ITA and additional benefits that Tunisia may derive

It may be argued that joining the WTO itself provides legal certainty for would-be investors, as good governance and tariff reform are thereby locked in. Similarly, becoming a participant in the ITA would also provide legal assurances and predictability for all investors.

At the time this study was undertaken, ITA participants were negotiating the expansion of product coverage in the Committee of Participants on the Expansion of Trade in Information Technology Products, and intended to reach an agreement by July 2013, to be endorsed at the Ninth Ministerial Conference in December 2013. Given the dynamic and fluid nature of the negotiations, the product list proposed by participants is subject to frequent changes. The United States, which proposed the relaunch of the product expansion negotiations, suggested that ICT products include products capable of processing digital signals, products able to send or receive digital signals with or without lines, ICT manufacturing equipment and related components.[8]

The revenue impacts on Tunisia of the products suggested for inclusion were calculated based on the information available at the time this study is undertaken. Whether Tunisia will have the option of choosing the products in the expanded product coverage will depend on the structure of the agreement between existing ITA participants, as one of the basic principles of the ITA states that

[8] The paper was co-sponsored by Canada, Costa Rica, Japan, Malaysia, Republic of Korea, Singapore and Taiwan Province of China. It was expressly supported by Australia, Israel, New Zealand and Peru.

there must not be any exemptions with respect to the original ITA products coverage list. Similarly, although all import tariffs on products in the product coverage list must be eliminated upon becoming a participant in the ITA, Tunisia may wish to negotiate for staged reduction for a limited number of products. Tunisia has leverage to negotiate its participation, as it is already a member of the WTO.

The present work of the Committee of Participants also includes work on non-tariff measures. A work programme commenced in 2000 but has made little progress.

To attract FDI and domestic direct investment to the industrial and manufacturing sectors, including the IT and IT-related sectors, Tunisia may avail itself of several provisions in the WTO agreements as part of its overall development strategy (see subsection 4.4).

II

CURRENT SITUATION AND ANALYTICAL ASPECTS

3. CURRENT SITUATION

Trade in ITA products and the effects of the ITA on trade flows are analysed in this chapter. The experiences of Bahrain, Egypt and Malaysia, which became ITA participants in 2003, 2003 and 1997, respectively, are used as a basis of comparison. It is important to recall that product classification and data collection is particularly important when analysing trade in ITA products, as evidenced by protracted discussions, including in the Committee of Participants, on some products that are seemingly ITA products and have dual purposes in many instances.

Global exports of ITA products were valued at $1.6 billion in 2011 (see table 1) which corresponds to approximately 8.4 per cent of global merchandise exports (see figure 1). During the period 1996–2011, exports of ITA products more than tripled. However, most of the increase was during the second half of the 1990s, as the share of ITA products climbed to 14.7 per cent of total merchandise trade. The beginning of the 2000s, however, marked the start of a gradual decline in this share, down to 9.1 per cent in 2011.

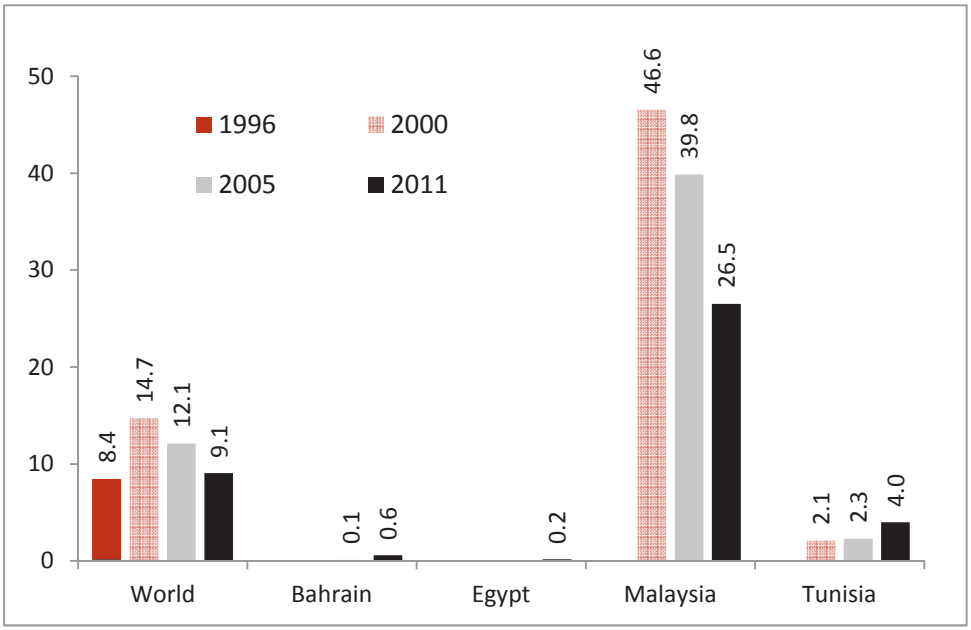
Among the sample countries, only Malaysia registered a solid performance in exports of ITA products. Almost half of Malaysia's merchandise exports, nearly $46 billion, were in ITA products in 2000. This figure increased to approximately $60 billion in 2011 but its share fell to 27 per cent as exports of other product categories outpaced ITA products. Bahrain and Egypt were not major exporters of ITA products before their participation in the ITA, and there has been no significant change in this trend since 2003.

Table 1. Information Technology Agreement Products Exports
(Millions of dollars)

	1996	*2000*	*2005*	*2011*
World	456 478	947 278	1 270 709	1 657 286
Bahrain	..	..	12	115
Egypt	..	..	..	50
Malaysia	..	45 749	56 179	60 496
Tunisia	..	122	240	713

Source: UNCTAD secretariat calculations, based on the United Nations commodity trade statistics database, available at http://comtrade.un.org/db/default.aspx.

Figure 1. Share of Information Technology Agreement Products in Merchandise Exports (Percentage**)**

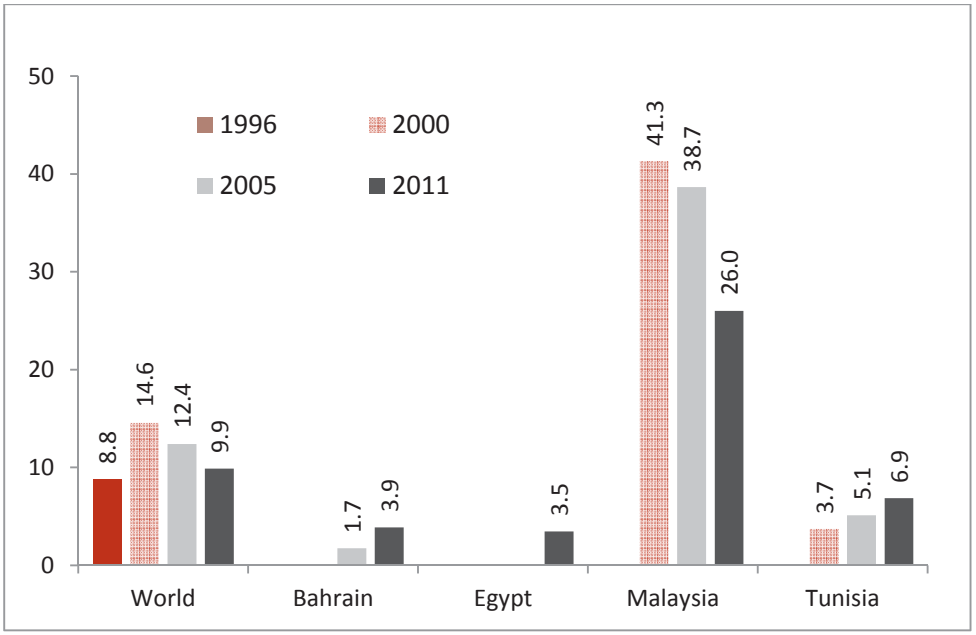


Source: UNCTAD secretariat calculations, based on the United Nations commodity trade statistics database.

With regard to imports, Malaysia registered a decline in the share of imports of ITA products in total merchandise in the last decade (see figure 2). This share has been gradually increasing in Bahrain and Egypt, which joined the ITA in 2003; their imports of ITA products increased from almost 0 per cent in the year 2000 to 3.9 per cent and 3.5 per cent, respectively, of their total merchandise imports in 2011. In other words, for Bahrain and Egypt, the ITA mainly affected imports and left exports unchanged.

Tunisia has experienced a different trend in the last decade. Exports and imports of ITA products have increased gradually, indicating that the country has established productive capacities in such products. As of 2011, ITA products accounted for 4 per cent and 6.9 per cent of merchandise exports and imports, respectively.

Figure 2. Share of Information Technology Agreement Products in Merchandise Imports (Percentage)



Source: UNCTAD secretariat calculations, based on the United Nations commodity trade statistics database.

3.1. Tariffs

Tunisia's current applied tariffs on ITA products are already low. Out of 337 tariff lines, 203 tariff lines have been granted free access, while 48 tariff lines attract a tariff rate of between 5.1 per cent and 10 per cent and 14 tariff lines attract a tariff rate of between 10.1 per cent and 15 per cent. Only 72 tariff lines attract high tariff rates, of between 25.1 per cent and 30 per cent.[9] Becoming a participant in the ITA is thus not expected to result in any significant tariff revenue loss or intensive competition from imported products, or higher levels of competition than Tunisia already faces, in almost 80 per cent of the tariff lines. A total of 203 tariff lines have been bound at various levels, as shown in table 2.

[9] This analysis does not include the possibility that Tunisia may import ITA products at a preferential rate from its bilateral trading partners, in which case the revenue loss would be much lower, as the figure of 72 tariff lines attracting high tariff rates represents the rate at the most-favoured nation level.

Table 2. Distribution of import tariffs on Information Technology Agreement Products by Tariff Rate

Tariff rate	Number of tariff lines Applied	Bound
Zero	203	0
Between 0.1 and 5 per cent	0	0
Between 5.1 and 10 per cent	48	0
Between 10.1 and 15 per cent	14	0
Between 15.1 and 20 per cent	0	40
Between 20.1 and 25 per cent	0	35
Between 25.1 and 30 per cent	72	35
Between 30.1 and 40 per cent	0	41
Above 40 per cent	0	52
Total ITA tariff lines	**337**	**203 (The remaining 134 are unbound)**

Source: R Santana, 2013, Tunisie: Le projet de liste – Accord sur les technologies de l'information, presented at workshop in Tunisia, 29–30 January.

With regard to product categories, relatively higher tariff rates are observed in telecommunications equipment (21 per cent) and parts and accessories (15 per cent), as shown in table 3. The overall average tariff rate of ITA products at the applied level is 8 per cent.

Table 3. Distribution of Import tariffs on Information Technology Agreement Products by Product Category

	Number of tariff lines	Average tariff rate
Computers	32	2.8
Memory units, information and software	47	0.0
Instruments and devices	36	4.7
Parts and accessories	121	14.7
Equipment used for producing semiconductors	36	0.6
Semiconductors	34	0.0
Telecommunications equipment	31	20.8
Total	**337**	**8.0**

Source: Santana, 2013.

China and the European Union are the main sources of Tunisia's imports of ITA products. In 2010, imports from the former reached $500 million and imports from the latter $1 billion.[10] A study by the WTO identified the European Union as Tunisia's main exports destination, which indicates Tunisia's potential to further integrate in global value chains and expand its exports to the European Union. The study also indicated that out of 357 companies active in the electric, electronics and appliances sectors in Tunisia, 62 per cent were engaged exclusively in international trade and 233 of them owned by foreigners.[11]

3.2. Global Foreign Direct Investment Inflows to the Information Technology Agreement Sector

The UNCTAD classification used in FDI flows does not allow for the exact measurement of FDI flows to ITA products. The sum for the electrical and electronic equipment and precision instrument sectors, under the category of manufacturing, is therefore used in analysing FDI flows to the ITA sector.

The sector received $2.8 billion during the period 1990–1992, of which approximately 31 per cent was directed to developing countries (see table 4). FDI inflows increased to $34.7 billion during the period 2008–2010, and the share to developing countries increased to 44 per cent. These figures are relatively low compared with the amount of total FDI flows. The electrical

[10] Santana, 2013.
[11] Ibid.

and electronic equipment sector, together with the precision instrument sector, barely attracts 2 per cent of world FDI flows. Nevertheless, during the last two decades, the sector strengthened its position, as its share in manufacturing and total FDI inflows rose both globally and in developing countries.

Table 4. Foreign Direct Investment Inflows to the Electrical and Electronic Equipment Sector

	1990–1992		*2008–2010*	
	Developing countries	*World*	*Developing countries*	*World*
Value of inward FDI flow (Millions of dollars)	882	2 817	15 383	34 655
		Percentage		
Share in total FDI flow	2.2	1.6	3.0	2.4
Share in manufacturing sector FDI flow	6.1	5.4	10.9	9.9

Source: UNCTAD, 2013, *World Investment Report 2013*: Statistical annex tables (accessed 18 May 2013).

3.3. The Information Technology Agreement in Tunisia

Tunisia is compared with other countries in the Middle East and North Africa in terms of soundness of economic fundamentals, especially human capital, and attractiveness to foreign investments.

3.3.1 Human Capital

Human capital is not only a crucial element of comparative advantage in the IT industry but also the enabling factor in enhancing technology-related absorptive capacities and technology transfer via learning by trading or learning by doing. Being able to adopt new technologies, adapt to new technological frontiers and benefit more from becoming a participant in the ITA, as well as from a more liberal trading regime, require skilled human capital.

The United Nations Development Programme Human Development Index ranks Tunisia at 94, below many competitors in the region (see table 5). However, most of the countries ranked above Tunisia are oil-rich States that may not be direct competitors of Tunisia in the IT market.

In Tunisia, the current number of years of schooling is also relatively low (6.5 years), tied at sixth place with Turkey. However, this statistic reflects the average number of years of education of adults aged 25 and older and does not measure the educational prospects of students still in the education system. The expected years of schooling figure is the number of years of schooling that a child of school-entrance age can expect to receive if prevailing patterns of age-specific enrolment rates persist throughout the child's life. This figure is currently 14.7 years in Tunisia, surpassing all other countries in the region. Although this statistic is not indicative of the compatibility of the developing skill structure of the younger generation with the needs of the IT industry, it is a positive indicator in terms of technology adoption capacity.

Table 5. Human Development Index and Education Statistics in Selected Middle Eastern and North African Countries

	Human development index 2012	*Mean years of schooling 2010*	*Expected years of schooling 2011*
Bahrain	0.796	9.4	13.4
Egypt	0.662	6.4	12.1
Jordan	0.700	8.6	12.7
Kuwait	0.790	6.1	14.2
Morocco	0.591	4.4	10.4
Oman	0.731	5.5	13.5
Saudi Arabia	0.782	7.8	14.3
Tunisia	0.712	6.5	14.5
Turkey	0.722	6.5	12.9
United Arab Emirates	0.818	8.9	12.0

Source: United Nations Development Programme, 2013, Human Development Index (accessed 28 May 2013).

3.3.2 Foreign Direct Investment Attractiveness and Business Environment

The Organization for Economic Cooperation and Development FDI Regulatory Restrictiveness Index measures the attractiveness of rules and regulations governing FDI flows on foreign investments in various countries, ranging between 0 and 1. Higher index values indicate higher FDI restrictiveness. A comparison of Tunisia with four other countries in the region is shown in table 6. Tunisia ranks second in terms of restrictiveness after Saudi Arabia. Tunisia's index value of 0.207 is high compared to the index average of both countries that are members of the Organization for Economic Cooperation and those that are not, signifying a fairly restricted business environment for foreign investments.

Table 6. Foreign Direct Investment Restrictiveness Index and Foreign Direct Investment in Selected Middle Eastern and North African Countries

	2012 FDI Regulatory Restrictiveness Index Total	*2011 FDI Stocks (Current, Percentage of Gross Domestic Product)*
Saudi Arabia	0.342	0.32
Tunisia	0.207	0.41
Turkey	0.077	0.18
Morocco	0.067	0.64
Egypt	0.062	0.46
Organization for Economic Cooperation and Development member countries	0.081	..
Non-member countries of the Organization for Economic Cooperation and Development	0.148	..

Source: Organization for Economic Cooperation and Development FDI Regulatory Restrictiveness Index, available at www.oecd.org/investment/index.

Table 7 shows that, based on statistics used to compute the potential for attracting FDI, Tunisia is among the countries that have the lowest labour costs, together with Egypt, Jordan, Oman and Turkey, giving it an edge over other countries in the region. For example, a comparison of salaries of technicians and engineers highlights that Tunisia is the lower labour-costs option vis-à-vis many Eastern European countries such as Romania and Hungary and North African countries such as Morocco.[12]

[12] Santana, 2013.

Table 7. Per Capita Income and Unit Labour Cost in Manufacturing in Selected Middle Eastern and North African Countries, 2011

	Per capita gross domestic product (Dollars)	*Labour force in manufacturing (Hundred thousand employees)*	*Unit labour cost in manufacturing (Dollars)*
Bahrain	27 556.2	..	..
Egypt	6 539.8	1 005	0.08
Jordan	5 899.7	174	0.08
Kuwait	41 690.6	114	0.16
Morocco	5 052.3	489	0.13
Oman	26 519.4	46	0.08
Saudi Arabia	24 237.4	609	0.06
Turkey	14 517.4	2 538	0.08
Tunisia	9 477.5	..	0.08
United Arab Emirates	48 157.8	..	..

Source: UNCTAD, 2013.

Tunisia's physical infrastructure in electricity and transportation, which are vital elements of industrial production and international trade, does not rank high in terms of FDI attractiveness compared with other countries in the region, as shown in table 8. Tunisia has among the lowest electricity consumption per capita, road density and linear shipping connectivity indexes.

Table 8. Physical Infrastructure in Electricity and Transportation in Selected Middle Eastern and North African Countries, 2011

	Electric power consumption (Kilowatt hours per capita)	*Road density (Kilometre of road per 100 square kilometres of land area)*	*Paved roads (Percentage of total roads)*	*Rail lines (Total route in kilometres)*	*Liner shipping connectivity index (Maximum value in 2004 = 100)*
Bahrain	9 214.4	575	82.1	..	9.77
Egypt	1 548.6	10	89.4	5 195	51.15
Jordan	2 111.9	9	100.0	294	16.65
Kuwait	17 610.0	37	85.0	..	5.60
Morocco	755.6	13	70.3	2 109	55.13
Oman	5 723.9	18	46.0	..	49.33
Saudi Arabia	7 427.2	11	21.5	1 020	59.97
Tunisia	1 311.3	12	75.2	1 119	6.33
Turkey	2 297.8	46	88.7	9 594	39.40
United Arab Emirates	11 463.6	5	100.0	..	62.50

Source: UNCTAD, 2013.

Tunisia's telecommunications infrastructure levels are shown in table 9. Many oil-exporting States rank higher, while Tunisia's potential competitors as participants in the ITA and in attracting IT and IT-related industries, such as Egypt and Morocco, rank lower than Tunisia in attracting FDI.

Table 9. Physical Telecommunications Infrastructure in Selected Middle Eastern and North African Countries, 2011

	Telephone lines	*Mobile cellular subscriptions*	*Fixed broadband Internet subscribers*
	(per 100 inhabitants)		
Bahrain	18.07	124.17	5.36
Egypt	11.86	87.11	1.79
Jordan	8.03	109.48	3.24
Kuwait	20.70	160.82	1.68
Morocco	11.73	100.10	1.56
Oman	10.12	165.51	1.63
Saudi Arabia	15.18	187.86	5.45
Tunisia	12.22	105.36	4.57
Turkey	22.27	84.90	9.73
United Arab Emirates	19.69	145.45	10.47

Source: UNCTAD, 2013.

Tunisia ranked 50 out of 185 countries in the 2013 World Bank ease of doing business index. This placed Tunisia somewhere in the middle of the group of countries shown in table 10, higher than non-oil exporting countries such as Egypt, Jordan, Morocco and Turkey. Similarly, in 2011, Tunisia ranked 76 out of 181 countries in the UNCTAD inward FDI Attraction Index.[13]

Table 10: Ease of doing business rank of selected countries, 2013

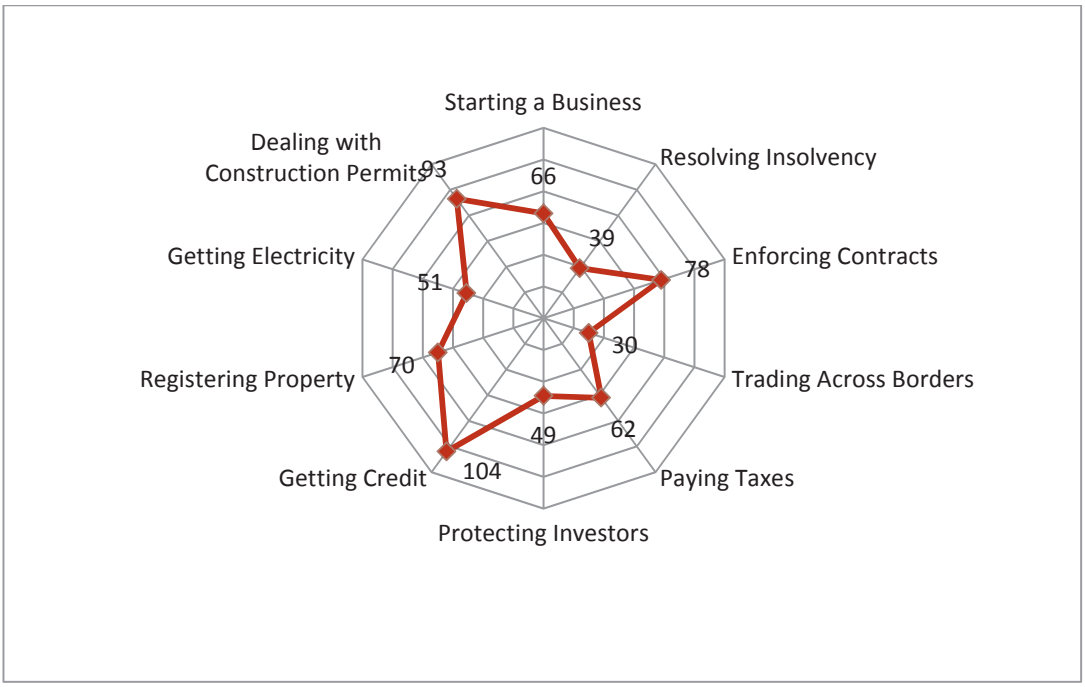
Saudi Arabia	22
United Arab Emirates	26
Bahrain	42
Oman	47
Tunisia	**50**
Turkey	71
Kuwait	82
Morocco	97
Jordan	106
Egypt	109

Source: World Bank and International Finance Corporation,2013, *Doing Business 2013* (Washington, D.C.).

As shown in figure 3, protecting investors, trading across borders, getting electricity and resolving insolvency are four categories in which Tunisia performs well. These are particularly important determinants of FDI inflows. However, Tunisia ranks poorly in some other categories, such as getting credit, dealing with construction permits and enforcing contracts. Getting credit is a major issue for domestic direct investments, in particular for small and medium-sized enterprises, while dealing with construction permits and enforcing contracts are obstacles to both FDI and domestic direct investment. A permit costs 256 per cent of per capita income and there are 17 different procedures for obtaining a permit. Enforcing contracts could also hinder FDI and domestic direct investment. Tunisia has 39 different procedures to be followed when pursuing a contractual claim, which costs 21.8 per cent of the claim amount and takes 565 days to be resolved.

[13] UNCTAD, 2013.

Figure 3. Ease of Doing Business Rankings, 2013



Source: World Bank and International Finance Corporation, 2013.

Tunisia's overall ease of doing business rank in 2013 is a drop from its rank of 45 in 2012. A detailed analysis reveals a decrease in all benchmarks, with the exception of trading across borders (ranked 31 in 2012 and 30 in 2013). Decreased rankings in individual benchmarks that are particularly relevant in attracting FDI and domestic direct investment in the IT and IT-related sectors included the following: starting a business (ranked 54 in 2012 and 66 in 2013); dealing with construction permits (ranked 87 in 2012 and 93 in 2013); getting electricity (ranked 48 in 2012 and 51 in 2013); registering property (ranked 64 in 2012 and 70 in 2013); protecting investors (ranked 46 in 2012 and 49 in 2013); and getting credit (ranked 97 in 2012 and 104 in 2013).[14]

Another index that is commonly used in assessing the level of economic competitiveness of an economy is the World Bank Logistics Performance Index.[15] Tunisia's overall score decreased from 3.17 in 2012 to 2.84 in 2013 and its rank dropped from 41 in 2012 to 61 out of 155 countries in 2013. A detailed analysis reveals a decrease in all logistical areas, with the largest in logistics competence, that is, the competence and quality of logistics services such as transport operators and customs brokers.[16]

[14] For comparative purposes, Malaysia, which is often cited as having a thriving IT and IT-related sector, ranked 12 in 2013 and 14 in 2012.
[15] The index reflects assessments of a country's logistics based on the efficiency of customs clearance processes, quality of trade and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments and frequency with which shipments reach consignees within scheduled time frames. The index ranges from 1 to 5; a higher score represents better performance. Data are derived from surveys conducted by the World Bank in partnership with academic and international institutions and private companies and individuals engaged in international logistics (see http://lpi.worldbank.org/).
[16] For comparative purposes, Malaysia registered an overall score of 3.44 and ranked 29 out of 155 countries in 2013 and registered an overall score of 3.49 and ranked 29 in 2012.

4. ANALYTICAL ASPECTS

4.1. Literature Review

Trade in all IT products (not only those under the product coverage of the ITA) increased globally from $1.2 trillion in 1996 to $4 trillion in 2011.[17] Increased use of IT globally and the spread of IT-related services such as mobile money and crowdsourcing of microwork, has supported the development of the sector and two-way trade flows. During the period 1996–2010, global exports of IT products outpaced non-IT manufactured exports with a 160 per cent cumulative increase of the former compared to 110 per cent of the latter. As of 2010, IT products accounted for 9.5 per cent of world merchandise exports. In the last 15 years, the share of developing countries in IT product exports surged from 31 to 64 per cent, attributable in large part to the spread of global value chains in IT industries in the developing world. Nevertheless, experiences among developing countries vary significantly. For instance, the trade deficit in IT has widened persistently in India since it became a participant in the ITA while in China the trade deficit turned into a surplus.[18] A more detailed analysis of India's trade deficit is, however, necessary before any conclusions can be drawn as to the reasons for the widening trade deficit.

Different country experiences underpin the importance of complementary trade and development policies and the need for a holistic approach in trade policy formulation that impacts positively on economic growth. Studies indicate that ubiquitous use of IT products creates backward and forward linkages with other sectors of the economy. Trade liberalization in IT products facilitates the spread and use of the latest technologies by making them more affordable. In the United States, over 80 per cent of the benefits from IT are related to its use by organizations rather than its production. Another study found that IT was responsible for 44 per cent of productivity growth in the United States from 2000 to 2006, 34 per cent of growth in Japan from 2005 to 2010 and 38 per cent of growth in China.[19] Reducing the cost of IT products reduces the cost of production in downstream manufacturing and services sectors that use IT and boosts their competitiveness. Tariff cuts in IT products also support the diffusion of new technologies and products in the lives of consumers in both developed and developing countries.

On the supply side, lower tariffs have supported the exports of ICT products in some developing countries and led them to be integrated in global supply chains. IT products account for a significant share of total exports in Malaysia (38 per cent), the Philippines (54 per cent) and Thailand (20 per cent).

Participation in the ITA can boost exports if a country can further integrate into global supply chains. Global value-added in the ICT sector doubled in 15 years, reaching $2.8 trillion, equal to 6 per cent of global output, in 2010.[20] In member countries of the Organization for Economic Cooperation and Development, the sector employed 5.8 per cent of workers in 2010.[21]

4.2. Case Studies

Kenya aims to become one of the leading global ICT hubs and ICT policies are therefore integrated into development plans in order to sustain the ongoing growth of the sector. The Government's policies are aimed at enabling the country to adopt ICT by promoting partnerships, investments and infrastructure growth. The Government plans to create 50,000 jobs and 500 new organizations across various ICT sectors by 2017. In order to promote the sector, policies focus on developing human capacity (revising training curricula), developing markets for ICT products and supporting physical infrastructure development that spurs the connectivity of the industry.[22] Kenya is not a participant in the ITA.

[17] FK-H Liang, 2012, ITA expansion and the experience of WTO developing members, presented at the Symposium on the Fifteenth Anniversary of the Information Technology Agreement, Geneva, 14 May.
[18] A Maurer, 2012, Trade liberalization and global trade since 1996: An overview, presented at the Symposium on the Fifteenth Anniversary of the Information Technology Agreement, Geneva, 14 May.
[19] RD Atkinson, 2012, Boosting trade, jobs and economic growth by expanding the ITA, presented at the Symposium on the Fifteenth Anniversary of the Information Technology Agreement, Geneva, 15 May.
[20] Neuffer, 2012.
[21] P Valero, 2012, Role of ICT diffusion in the global economy, presented at the Symposium on the Fifteenth Anniversary of the Information Technology Agreement, Geneva, 14 May.
[22] P Kukubo, 2012, Kenya's information communications Industry development and the learnings of efforts in ICT diffusion, presented at the Symposium on the Fifteenth Anniversary of the Information Technology Agreement, Geneva, 14 May.

Costa Rica became a participant in the ITA in 1997, signalling its commitment to transform its economy from an agricultural exports-dependent one towards a focus on ICT products. Costa Rica's trade policies attracted FDI inflows that supported its growth in exports. The transformation was successful, with the share of ITA products in total exports increasing from 3 per cent in 1996 to 22 per cent in 2011. As of 2011, electronic integrated circuits had surpassed other export products and become the leading export product, with an 18 per cent share of total exports. Costa Rica's achievement relied on its success in attracting FDI inflows to the IT sector and integrating in global supply chains. During the period 2009–2011, having propelled itself into global supply chains, and as a manufacturer of products embodying high technology, including ITA products, the country's global value added-related exports surged to 37 per cent of the country's total exports. Costa Rica now ranks first in Latin America and fourth worldwide in terms of the share of high-tech exports in manufactured goods. Costa Rica followed a holistic approach and supported the industry with an improved business environment, including political and economic stability and exports processing zones, a robust transportation network and improved quality of education. The Government is further supporting negotiations to expand coverage of the ITA signatories and products.[23]

Thailand was one of the original participants in the ITA in 1996. Eliminating tariffs on ICT products encouraged the spread of such products in the economy. Both imports and exports of ITA products increased significantly after 2001, up to $37 billion in 2011, and employment in ICT increased by 37 per cent to 424,000 employees during the period 2002–2010. Currently, the Government is seeking to further improve access to ICT products in all sectors of the economy and plans to strengthen the competitiveness of the IT industry, as well as that of the entire economy, distribute educational personal tablet computers free-of-charge for students and improve the use of ICT in national health care and disaster prevention.[24]

In India, the trade balance in electronics deteriorated as the domestic manufacturing sector eroded. In 2009 and 2010, India's exports of ITA products registered an almost $16 billion trade deficit, around 69 per cent of the average trade in this period, and India's exports of ITA products were around 0.3 per cent of total exports. Investment in the country's electronics hardware manufacturing industry declined sharply and the share of domestically produced electronic components has fallen from 50 to 20–22 per cent over the last 10 years.[25]

However, the diffusion of IT products has supported the IT-enabled services sector in India and Bangladesh. From 2008 to 2010, the share of India in Amazon's Mechanical Turk crowdsourcing marketplace increased from 8 to 34 per cent. Freelance services, such as software development, graphic design and social media marketing, provided by Bangladesh to clients in the United States and Europe, have increased. Currently, there are 10,000 active online freelancers in Bangladesh.[26]

4.3. Modelling Participation in the Information Technology Agreement

4.3.1 Analysis of Tariff Revenue Effects

Eliminating all import tariffs on IT products would cause a revenue loss, and it is possible but unlikely that this loss may be partly compensated for by greater imports of other products that would generate tariff revenues due to higher levels of economic activity in Tunisia. For example, if the production of manufactures became more competitive in Tunisia due to lower input prices for IT products, larger amounts of other intermediate goods could be imported. Furthermore, the consumption of imported products could increase due to higher overall income if the effect of becoming a participant in the ITA was positive. Such overall effects are difficult to estimate. Economy-wide effects are assessed using a general equilibrium model (see subsection 4.3.2).

[23] F Monge, 2012, ITA: A key ingredient for integrating Costa Rica in global value chains, presented at the Symposium on the Fifteenth Anniversary of the Information Technology Agreement, Geneva, 14 May.
[24] B Saragganda, 2012, The experience of developing ITA participants: Association of Thai Information and Communications Technology Industry perspective, presented at the Symposium on the Fifteenth Anniversary of the Information Technology Agreement, Geneva, 14 May.
[25] SK Marwaha, 2012, The experience of developing ITA participants, presented at the Symposium on the Fifteenth Anniversary of the Information Technology Agreement, Geneva, 14 May.
[26] T Fredriksson, 2012, Socioeconomic benefits of ICT diffusion and its significance for world trade and economic development, presented at the Symposium on the Fifteenth Anniversary of the Information Technology Agreement, Geneva, 14 May.

The direct impacts on tariff revenue of the elimination of tariffs on IT products were assessed using the Smart partial equilibrium model available in the World Integrated Trade Solution of the World Bank (see http://wits.worldbank.org/). This model assesses the change in imports resulting from a tariff change, with trade creation and diversion effects taken into account. For Tunisia, only most-favoured nation tariffs for 2008 are available in the Trade Analysis and Information System database of UNCTAD and the Integrated Database of the WTO. A rough comparison with data for 2012 available for certain sectors shows that between 2008 and 2012, while some tariffs were reduced, for example from 10 to 0 per cent, most were unchanged and no tariff was increased. The estimates presented therefore provide an upper bound limit for potential tariff loss.

Total maximum loss for Tunisia based on 2008 trade and tariff data would be $54.36 million or 1.39 per cent of total tariff revenue. Taking into account the lower tariff rates for 2012 for the main components of the tariff revenue from IT products, the upper bound for tariff revenue loss is reduced to $22.72 million. This figure is further reduced if existing preferential trade agreements are taken into account, for instance, Tunisia's bilateral Association Agreement with the European Union, which came into force in 1998. The European Union – mainly France – is a major trading partner of Tunisia. Tunisia finalized the dismantling of its tariffs for industrial products in 2008.

However, imports of IT products increased by 48 per cent during the period 2008–2011 and the upper bound may therefore be higher due to the higher level of imports. Without taking preferential tariffs into account and assuming that the distribution of imports among tariff line subheadings remains similar to during the period 2008–2011, the upper bound would increase to about $33.6 million. However, since 42 per cent of all IT imports to Tunisia are sourced from the European Union, the actual tariff loss is likely to be well below this upper limit.

Due to the lack of exact data, the short-term actual tariff revenue loss cannot be calculated. However, the rough assessment shows an upper limit that is a relatively small share of Tunisia's total tariff revenue.

4.3.2 Analysis of Economy-Wide Effects

a) Model, Data and Scenarios

The economy-wide effects of becoming a participant in the ITA are assessed using a computable general equilibrium trade model. The Global Trade Analysis Project (GTAP) was designed for trade policy analysis of this nature and includes bilateral trade and tariff data necessary to model the impacts of trade and domestic policy changes in the context of preferential agreements.[27]

The GTAP 8 Database refers to the base year 2007. The model divides labour into two types, skilled and unskilled. Input–output tables link the sectors in each economy. The base data specify the use of each primary factor (e.g. land, labour and capital) and intermediate input in the production of each good. Changes in tariffs of a product affect the consumption of the product and its use as an intermediate good in production according to the production function and the Armington elasticity parameter, which determines the elasticity of substitution between domestic and imported intermediate goods from different countries.

GTAP has data for 57 sectors. However, there is no sector equivalent to the products covered by the ITA, which are mostly in electronics, with few in machinery and equipment or chemical, rubber and plastic products. The electronics sector contains some non-ITA products and since it includes the most ITA products, was chosen for the analysis of the effects of eliminating import tariffs on all ITA products.

Table 11 shows the share of electronics as an intermediate input in the production of 14 goods and services in Tunisia, which varies from 0 per cent in textiles to 32 per cent in electronics, with an average of 1.33 per cent. Primary factors such as capital and labour typically account for a high share in the production of goods and services and, according to the GTAP database, account for about 39 per cent of input values in Tunisia. This suggests that a tariff reduction in electronics would have a limited effect on sectors other than the electronics sector itself. However, about 69 per cent of electronics used as an intermediate input in Tunisia are imported.

[27] TW Hertel, ed., 1997, *Global Trade Analysis: Modelling and Applications* (Cambridge and New York, Cambridge University Press).

Table 11. Share of Electronics as an Intermediate Input in the Production of Goods
(Percentage)

Agriculture	0.03
Forestry and fish	0.02
Petroleum and coal	0.38
Textiles and leather	0.00
Apparel	0.06
Chemicals	0.15
Metal manufactures	1.06
Wood and paper products	0.16
Motor vehicles	0.80
Electronics	32.43
Manufactures not elsewhere classified	3.57
Transport, communications	0.42
Business services	0.13
Services, activities not elsewhere classified	0.71
Average	***1.33***

Source: UNCTAD secretariat calculations, based on the GTAP 8 Database.

The GTAP database includes tariffs in Tunisia from 1 per cent on imports from the European Union to 16 per cent on imports from South Asia and South-East Asia. Tariffs vary according to the composition of exports of the aggregated product and the existence of bilateral or regional trade agreements.

In order to assess the potential economy-wide effects and the indirect sectoral effects of becoming a participant in the ITA, a hypothetical scenario is analysed in which all import tariffs on electronics from Tunisia's trading partners are eliminated. In this application of GTAP, the standard closure is modified to reflect a semi-flexible labour market for skilled and unskilled labour, implying that a change in the demand for labour leads to some change in employment. Labour is assumed to be mobile in each country. This is a frequently used approach to assess the impacts of trade policy changes on unemployment.[28] Another modification of the GTAP standard closure is the assumption of mobile capital, whereby capital can flow between countries, implying that the assessed effects are long term and allowing for estimates of impacts on investment. This application of GTAP is used to compare the trade and welfare effects of changes in trade policy once impacts have worked through. There is no attempt either to phase-in policy changes or trace the time profile of impacts. Changes such as growth in trade that may occur over the implementation period are therefore not taken into account.

b) Results

Table 12 shows that the elimination of tariffs on electronics leads to an increase in electronics imports by 4.2 per cent. Imports of all other goods and services also increase, but at low rates, e.g. due to higher incomes. Total imports increase by 0.61 per cent. Exports of electronics rise by 7.2 per cent, due to increased competitiveness resulting from lower import prices and a high share of imported electronic products used as an intermediate input in electronics production. Exports of manufactures, where the share of electronics as an input in production is at 3.6 per cent (higher than in other sectors except electronics (see table 11)), increase by 1.1 per cent. Changes in exports in sectors that do not intensively use electronics as an input in production are small. In agriculture (with a share of 0.03 per cent of electronics as an intermediate input) the effect on trade is below 0.23 per cent. Similarly, in other sectors with relatively low shares of electronics as an intermediate input and with significant exports, such as textiles, apparel, chemicals, transport and services, changes in imports and exports are fairly low. This confirms the positive effects of the elimination of tariffs on electronics on competitiveness and exports in sectors that intensively use electronics as an input in production and the mostly positive though small effects in sectors with minimal use of electronics as intermediate goods.

[28] D Vanzetti and R Peters, 2013, Trade and Agricultural Employment Linkages in General Equilibrium Modelling, in: D Cheong, M Jansen and R Peters, eds., *Shared Harvests – Agriculture, Trade and Employment* (Geneva, International Labour Office and UNCTAD).

Table 12. Hypothetical Scenario: Changes in Imports and Exports

Sector	*Imports (Millions of dollars)*	*Change in imports (Percentage)*	*Exports (Millions of dollars)*	*Change in exports (Percentage)*
Agriculture	2 011	0.18	1 411	0.23
Forestry and fishing	26	0.66	55	-0.47
Petroleum, coal products	2 349	0.52	1 846	-0.23
Textiles and leather products	2 668	0.35	1 736	0.44
Wearing apparel	467	0.28	2 884	0.34
Chemical, rubber, plastic products	2 295	0.44	1 639	0.40
Metal manufactures	1 881	0.66	602	0.45
Wood and paper products	663	0.35	370	0.42
Motor vehicles and parts	1 031	0.53	368	0.44
Electronics	**857**	**4.16**	**617**	**7.15**
Manufactures not elsewhere classified	4 342	0.58	3 196	1.11
Transport and communications	707	0.35	2 127	0.21
Business services not elsewhere classified	518	0.42	569	0.34
Services and activities not elsewhere classified	937	0.36	1 116	0.32
Total	**20 753**	**0.61**	**18 537**	**0.62**

Source: UNCTAD secretariat calculations, based on the GTAP 8 Database.

Table 13 shows the positive effect on output in all sectors, and on the employment of skilled and unskilled labour, of the elimination of tariffs on electronics. The highest increase in output and employment is in the electronics sector, where output and employment increase by 2.4 per cent and 2.3 per cent, respectively. Employment effects are also sizeable in manufactures (+1.23 per cent) but insignificant in other sectors. In agriculture, for example, output and employment increase by about 0.3 per cent, in metal manufactures by about 0.7 per cent and in textiles by about 0.5 per cent. The results are unchanged in a more disaggregated analysis of all 57 sectors (see annex). The highest positive impacts resulting from participation in the ITA are seen in the following sectors: electronics; machinery and equipment not elsewhere classified; manufactures not elsewhere classified; metal products; and transport equipment not elsewhere classified. In all other sectors the share of electronics as an input is relatively small and the impacts on output and employment are small. In total, employment increases by 0.55 per cent.

Table 13. Hypothetical Scenario: Changes in Output and Skilled and Unskilled Employment (Percentage)

Sector	*Change in output*	*Change in employment (Skilled and unskilled)*
Agriculture	0.34	0.35
Forestry and fishing	0.17	0.27
Petroleum, coal products	0.18	0.24
Textiles and leather products	0.56	0.50
Wearing apparel	0.41	0.36
Chemical, rubber, plastic products	0.60	0.54
Metal manufactures	0.75	0.71
Wood and paper products	0.61	0.54
Motor vehicles and parts	0.69	0.63
Electronics	**2.39**	**2.34**
Manufactures not elsewhere classified	1.26	1.23
Transport and communications	0.43	0.37
Business services not elsewhere classified	0.64	0.58
Services and activities not elsewhere classified	0.59	0.55
Total	**0.56**	**0.55**

Source: UNCTAD secretariat calculations, based on the GTAP 8 Database.

Higher output is associated with higher costs, while eliminating tariffs reduces tariff revenues on products. Welfare is a measure that takes such costs into account and measures the impacts on

the economy as a whole. Table 14 shows that annual welfare is estimated to increase in Tunisia by about $139 million and therefore, as a whole, becoming a participant in the ITA is assessed to be welfare increasing.

The impacts on other economies depend on the specific scenario. In the long-term hypothetical scenario addressed in this analysis, impacts are positive but insignificant for all other economies. Only South Asia and South-East Asia benefit at a level above $40 million, which is still a low figure for such a large region. Annual welfare impacts for each region are divided into allocative efficiency, endowment and terms of trade effects. Allocative efficiency effects refer to how well resources are allocated within a country or region and reflect variations in tariffs and other taxes within an economy. If this effect is positive, as in Tunisia ($49 million), it means that policy changes result in resources moving into less-protected sectors. Endowment refers to changes in the use of skilled and unskilled labour as well as capital in the hypothetical long-term scenario, which are endogenous in the ITA scenario, i.e. the variables are determined in the model. The endowment effect is $114 million, and thus a major contribution to the positive welfare gains for Tunisia. The third component, terms of trade effects, is negative, but small ($-23.9 million).

Table 14. Hypothetical Scenario: Changes in Welfare
(Millions of Dollars)

Tunisia	**139.1**
China	18.9
Japan	1.4
United States	0.3
European Union	3.2
Other developed countries	6.6
South-East Asia	42.9
Eastern Europe and Western Asia	29.7
Latin America	10.8
North Africa and Middle East	8.9
Sub-Saharan Africa	6.2
Rest of world	0.0
Total	**267.9**

Source: UNCTAD secretariat calculations, based on the GTAP 8 Database.

The impact of labour and capital mobility was assessed using two scenarios with different model assumptions regarding mobility and the possibility of adjustment of labour and capital. First, in a scenario with fixed employment and fixed capital, i.e. a short-term scenario where neither employment nor the capital of firms can adjust, welfare gains in Tunisia shrink significantly from $139 million to $5 million. Second, in a short-term scenario with endogenous labour, i.e. where employment adjustment is possible due to initial unemployment, but without capital mobility, welfare effects in Tunisia are $36 million. Thus, the welfare gains of $139 million seen in the original hypothetical scenario depend significantly on the mobility of labour and capital.

Table 15 shows that, following the elimination of electronics tariffs, capital flows into Tunisia are positive. Capital for production increases by 2.4 per cent in the electronics sector and by 1.3 per cent in manufactures. The total increase of capital in Tunisia is modest, at 0.57 per cent.

Table 15. Hypothetical Scenario: Changes in Capital Endowment
(Percentage)

Agriculture	0.40
Forestry and fishing	0.28
Petroleum, coal products	0.25
Textiles and leather products	0.59
Wearing apparel	0.45
Chemical, rubber, plastic products	0.63
Metal manufactures	0.80
Wood and paper products	0.63
Motor vehicles and parts	0.72
Electronics	**2.43**
Manufactures not elsewhere classified	1.32
Transport and communications	0.48
Business services not elsewhere classified	0.67
Services and activities not elsewhere classified	0.65
Total	**0.57**

Source: UNCTAD secretariat calculations, based on the GTAP 8 Database.

The positive effects on trade, output, welfare and employment stem from the lower costs of the intermediate goods of ITA products, due to lower tariffs and thus lower import costs. Due to reduced production costs, the final demand for products and competitiveness vis-à-vis foreign producers increases, leading to higher demand for primary factors such as labour and capital. The effect is relatively high in sectors that use a significant share of ITA products as an input and smaller in other sectors. Within the electronics sector, used to represent the ITA products sector, subsectors that intensively use ITA products as intermediate goods are affected the most.

It is possible that sectors that produce ITA products would be negatively affected by higher levels of foreign competition, which may not be seen in the results of the hypothetical scenario, as these subsectors may be aggregated with other sectors that benefit from lower input prices and are not as affected by lower output prices. However, generally, the fragmentation of production in ITA products is relatively high, i.e. products are often produced in value chains, so that a significant share of the production value is intermediate goods that can be imported. Most ITA sectors are therefore expected to benefit. GTAP does not allow for a further disaggregation of the electronics sector; at this level of aggregation, the results are positive and this shows that the potentially negative effects in some sectors are compensated for by higher gains in other sectors. Indirect effects comprise income effects, i.e. due to more employment the total income from labour rises, and this in turn has a positive effect on all sectors as demand increases. This effect is positive but small.

In interpreting the results, several limitations must be considered. First, analysis is limited due to the lack of a sector or several disaggregated subsectors equivalent to the product coverage of the ITA. The electronics sector used in the analysis contains some non-ITA products, and non-liberalized sectors such as manufactures contain some ITA products. Although the electronics sector covers the ITA sector fairly well, it is unclear whether the lack of a perfect match with one sector over or underestimates the effects. Since the electronics sector includes some non-ITA products and other sectors contain fewer ITA products, the effects may be overestimated. However, the bias may not impact qualitative results, i.e. the direction of effects remains correct.

Second, the group of primary factors such as labour and capital are combined in GTAP with intermediate inputs and produce outputs in fixed proportions.

Third, the analysis assumes that scenarios would be implemented as specified. If non-tariff measures on electronics prevent imports at lower prices as calculated by eliminating all import tariffs, the weakened level of ambition reduces potential gains. No specific data are available on paratariffs and non-tariff measures. If tariffs are reduced, such other impediments are likely to play a greater role. A further data limitation is in the input–output table, which is based on technologies used in the past; correlating the relevant sectors in the construction of such a table is therefore difficult.

Finally, the general equilibrium model used is static, with no account taken of dynamic gains related to technology, competition and productivity growth. The costs of structural adjustment, such as temporary unemployment, are also not taken into account.

Nevertheless, the model allows for the following overall assessments of the possible economy-wide effects and backward and forward linkages of becoming a participant in the ITA:

a) The share of ITA products (measured in the analysis as electronics, the sector that best matches ITA products) as an intermediate input in most sectors is relatively small, about 1 per cent. In electronics and manufacturing the share is higher, at 32 per cent and 4 per cent, respectively. Direct effects are thus expected to be small. About 69 per cent of electronics used as intermediate inputs in Tunisia are imported.

b) Eliminating import tariffs on electronics has positive effects on exports, output, welfare and employment. In most sectors, the effect is small, often below 0.5 per cent. In sectors that intensively use ITA products (electronics), such as electronics and manufactures, the positive effect is significant.

c) Potential negative effects on ITA sectors due to increased foreign competition may exist, but are unlikely due to a generally high share of intermediate inputs used in production of ITA products. In the aggregate, as analysed, no such negative effects are estimated.

4.4. Complementary Measures

In order to maximize the benefits of becoming a participant in the ITA, complementary macroeconomic, trade (including fiscal) and industrial policies need to be in place, along with the requisite institutional and regulatory framework, as detailed in this subsection.

4.4.1. Widening the Talent Pool: Human Resource Capital Development and Upgrading of Specialized Skills

It is crucial for the success of any industrial strategy to have adequately trained human resources with the right skill sets. Technology transfer cannot be effected in the absence of skilled human resources. Education in the sciences, including IT, may enable the Government's strategy to benefit from IT and IT-related industrial growth in Tunisia, through FDI and direct investment. This may be achieved through various means, such as the establishment of vocational schools and joint initiatives between individual firms or the IT industry as a whole and the Tunisian Chambers of Commerce and/or Tunisian IT industry association. Joint IT training institutes, including in-house training programmes organized by the IT industry association, should also be encouraged, with the provision of suitable fiscal and tax incentives to drive this initiative, as well as financing from the industry association, individual firms and the Government. Continuous efforts should be undertaken to ensure the availability of a labour force that is proficient in the technology.

4.4.2. Providing Fiscal and Tax Incentives

Suitable fiscal and tax incentives may be provided to the IT and IT-related sectors, including for start-up operations. Such incentives can be made generally available for the IT and IT-related sectors, along with other manufacturing and industrial activities, with the scale of the incentives contingent on the capital and technological intensity of the industries.

4.4.3. Re-Examining the Effectiveness of the Existing Tax Structure, Including the Corporate Tax Rate

Re-examining the effectiveness of the existing tax structure is a complementary measure Tunisia may wish to consider for the medium and long term, as countries increasingly compete to attract FDI and direct investment. Tunisia may wish to re-examine whether its existing tax structure, including the 30 per cent levied as corporate tax, might be gradually lowered. For comparative, purposes, the rate is 0 per cent in Bahrain, 20 per cent in Egypt and 30 per cent in Morocco.

4.4.4. Establishing Special Economic Zones and Similar Infrastructure for Information Technology and Information Technology-Related Industries

The establishment of special economic zones, free trade zones and/or exports processing zones in strategic locations in Tunisia where IT and IT-related industries may be located will enable concerted efforts by all government agencies, focusing on the provision of infrastructure, both hard and soft, to nurture such industries. In addition, locating such industries in such designated areas provides the additional benefit of importing all other required inputs (including those imported from Tunisia, but from outside such designated areas) at nil duties. Manufactured IT products can then be exported directly from such designated areas. If they are exported to Tunisia, however, the import duty forgone on inputs used in their manufacture will have to be recouped by the Government. Industries located outside such designated areas can also benefit from imported raw materials and inputs used in the manufacture of IT and IT-related products destined for Tunisia's exports markets, through the introduction and implementation of a viable customs duty drawback system, as allowed for by the Agreement on Subsidies and Countervailing Measures of the WTO. However, being located outside a special economic zone, free trade zone and/or exports processing zone deprives industries of the other advantages of such designated areas, such as the provision of consolidated infrastructure.

Infrastructure development, including enhancing trade-related infrastructure and trade logistics, may be undertaken through initiatives such as public–private partnerships.

4.4.5. Establishing Public–Private Annual Dialogues

An annual dialogue between the private sector and the Government, chaired by the Minister of Commerce of Tunisia, would greatly facilitate private sector development and facilitate businesses in the country. The private sector may be represented by inter alia, the Tunisian Chamber of Commerce and Industry, the Tunisian International Chamber of Commerce and Industry and other industry associations. All issues and bottlenecks faced by the private sector should be tabled and discussed with the relevant Government agencies, with a view to finding amicable and expeditious resolutions.

4.4.6. Entering into Bilateral Investment Treaties, Concluding Double-Taxation Agreements and Reviewing Existing Treaties and Agreements

Tunisia has concluded 54 bilateral investment treaties, ranking third among Arabic-speaking countries in terms of the number of such treaties concluded (see http://investmentpolicyhub.unctad.org/IIA/CountryBits/213#iiaInnerMenu). Such treaties generally include all typical investment protection provisions, such as broad asset-based definitions of investment, national treatment, most-favoured nation, fair and equitable treatment, transfer of funds, expropriation, compensation and investor–State dispute settlement. Most of the agreements concluded by Tunisia do not include emerging treaty elements found in recent bilateral investment treaties that aim at preserving regulatory space for public policies or minimizing exposure to investment litigations. Few of the bilateral investment treaties concluded by Tunisia include sustainable development-oriented features aimed at the protection of health, labour rights and the environment.

Tunisia may wish to take stock of its existing network of bilateral investment treaties, giving special emphasis to agreements concluded with key home countries of FDIs involving IT firms and reviewing them with a view to ensuring that sustainable development objectives are adequately addressed and that their overall development dimension is strengthened. In doing so, Tunisia may wish to take advantage of the UNCTAD *Investment Policy Framework for Sustainable Development*, which provides concrete guidance and policy options for policymakers and government officials on the formulation of sustainable development-oriented provisions in bilateral investment treaties (see http://unctad.org/en/Pages/DIAE/International%20Investment%20Agreements%20(IIA)/IIA-IPFSD.aspx). The framework assists in the formulation of a strategic approach to bilateral investment treaties and in ensuring that a country's international engagement in investment policies is embedded in its national development strategy.

Tunisia may also wish to explore engaging in double-taxation agreements, as these may be a useful tool in facilitating bilateral investments.

4.4.7. Enhancing Economic Competitiveness and Creating a More Favourable Environment for Foreign Direct Investment and Domestic Direct Investment

The various indices detailed in chapter 3 underscore the importance of a closer examination of the causes that have contributed to a decline in Tunisia's scores, and concerted efforts should be undertaken to address the causes. Indicators such as that on the ease of doing business are vital sources of reference for investors, particularly in a highly competitive globalized economy with competition for the relatively limited stock of FDI, in which decisions on where to invest are made based on the factors that a country or region can offer. Trade logistics also feature prominently in this equation. While a decrease in overall rankings and individual benchmarks may be attributed to the current political and economic situation in Tunisia and may be a transient phase, it is imperative that necessary measures be taken to arrest this decline and enhance the competitiveness of the economy. This is necessary for Tunisia to benefit from participation in the ITA and not merely to enhance exports of IT and IT-related products but, more importantly, to utilize new technology to boost economic growth in all sectors of the economy. As noted, infrastructure development, including enhancing trade logistics, may be undertaken through initiatives such as public–private partnerships.

4.4.8. Establishing a One-Stop Agency to Facilitate Foreign Direct Investment and Domestic Direct Investment in the Information Technology Sector

A one-stop agency that handles and expeditiously resolves issues affecting the day-to-day operations of IT and IT-related industries should be established. Such an agency would handle issues such as land matters, permits, approval of entry and/or exit visas, residential requirements for investors and their families, business transferees and import permits and licenses. A one-stop agency would greatly facilitate the IT and IT-related industries and businesses in general.

4.4.9. Attracting Research and Development and Innovation

The research and development, product design, distribution and marketing stages are higher up the value chain of any manufacturing activity and command higher returns. Tunisia's objective in becoming a participant in the ITA should not merely be limited to becoming an attractive host for FDI and domestic direct investment in IT and IT-related industries. While this may be a near-term objective, the medium to long-term objective should be to attract IT and IT-related research and development and product design centres to relocate to Tunisia, with the aim of becoming the regional headquarters for the research and development and product design centres of IT and IT-related industries in the Middle East and North Africa region. This would represent Tunisia moving up the value chain.

At the same time, emphasis should be placed on productivity-driven growth such that the value-added per employee rises to a higher stage at all levels of the value chain, which will result in moving the entire value chain to a higher stage. Empirical evidence suggests that high-income economies invested heavily in research and development, creativity and innovation and that these were the elements that contributed to their rise in the value chain. Therefore, as Tunisia moves up the value chain from an upper middle-income country, a higher percentage of its annual budget should be invested in research and development activities (see http://data.worldbank.org/country/tunisia).

A national culture of promoting innovation through science and technology should be engendered, given that successful companies are those that have the ability to incorporate creativity and innovation in products and services to increase productivity and retain a competitive edge, while at the same time earning a premium from such products.

III

STUDY OUTCOME AND POLICY RECOMMENDATIONS

5. STUDY OUTCOME

Based on the facts available and the analysis conducted, this study indicates that joining the ITA would be a feasible option for Tunisia to consider. This conclusion is from the perspective of the possible impacts of a loss of revenue following the elimination of tariffs on products under the product coverage of the ITA, as well as economy-wide implications. The study reveals that participation in the ITA is not expected to result in any significant tariff revenue loss or any further competition from imported products than already exists in almost 80 per cent of tariff lines, given that only 72 tariff lines attract high tariff rates of between 25.1 per cent and 30 per cent.

The upper limit for tariff revenue loss is estimated at around $33 million. Since preferential tariffs – including those of the bilateral Association Agreement with the European Union, i.e. Tunisia's largest trading partner – were not available, it is likely that the actual loss of tariff revenue would be well below this amount. The tariff revenue from IT products is a relatively small share, in the order of 1 per cent (given the limitations detailed in chapter 4), of Tunisia's total tariff revenue.

The assessed effects of becoming a participant in the ITA are positive for Tunisia. This positive effect depends to a large extent on the endowment effect, i.e. the flexibility of increasing employment in sectors, particularly the ITA sector. This depends on the proper qualifications and mobility of unemployed labour. If the labour market is not sufficiently flexible, it is possible that wages in the sector will increase without a significant increase in employment. Education, training and other complementary measures that support the flexibility of workers, including appropriate social welfare systems, could contribute to positive employment effects.

The analysis shows that the overall effects could be positive, due to lower input prices for electronics that increase competitiveness and thus the output, employment and investment in sectors that use these inputs as intermediate goods in a relatively intensive way.

Becoming a participant in the ITA would be a natural progression for Tunisia, to move to a higher stage of production of IT products from the level it has achieved hitherto, with exports of IT products in 2011 accounting for 4 per cent of merchandise exports and imports in the same year accounting for 6.9 per cent. Tunisia has the established productive capacities, and becoming a participant in the ITA will move Tunisia and the industry into a higher level of production of IT and IT-related products, including the possibility of moving into high technology and higher value-added production. This outcome is further supported by several factors that weigh in Tunisia's favour, as follows:

a) Availability of a young labour force that has the potential to acquire the right skill sets if provided with opportunities for vocational and technical training in IT operations. This is a positive element for technology transfer and technology absorption.

b) Relatively low labour costs, along with Egypt, Jordan, Oman and Turkey, giving Tunisia an edge over other countries in the region. For example, a comparison of salaries of technicians and engineers highlights that Tunisia is the lower labour-costs option vis-à-vis many Eastern European countries such as Romania and Hungary and North African countries such as Morocco. This augurs well for the country in attracting FDI, particularly from Europe.

c) The existing physical infrastructure in the telecommunications sector, though it requires strengthening, already favours Tunisia, as its competitors (in the context of being a participant in the ITA and attracting IT and IT-related industries), such as Egypt and Morocco, rank lower than Tunisia in telecommunications penetration rates;

d) As the global economy recovers from the financial crisis and the debt crisis of the eurozone, Tunisia can position itself to benefit from the expected global FDI inflows in the IT sector, which fell precipitously during the crisis. To do so, Tunisia will have to improve its fundamentals and implement various complementary policy measures (see subsection 4.4).

6. POLICY RECOMMENDATIONS

Participation in the ITA should not merely be limited to becoming an attractive host for FDI and domestic direct investment in IT and IT-related industries. While this may be a near-term objective, the medium to long-term objective should be to attract IT and IT-related research and development and product design centres to relocate to Tunisia, with the aim of becoming the regional headquarters for the research and development and product design centres of IT and IT-related industries in the Middle East and North Africa region. This would represent Tunisia moving up the value chain. At the same time, emphasis should be placed on productivity-driven growth such that the value-added per employee rises to a higher stage at all levels of the value chain, which will result in moving the entire value chain to a higher stage.

Participation in the ITA should be complemented by various policy measures, including macroeconomic, trade (including fiscal) and industrial policies, as well as measures aimed at strengthening the regulatory and institutional framework, enhancing the productivity and competitiveness of the economy and creating a more favourable environment for FDI and domestic direct investment (see subsection 4.4).

ANNEX

ANNEX

Tunisia: Share of Electronics as an Intermediate Input in Production in Disaggregated Sectors and Changes in Output and Employment

Sector	*Share of electronics*	*Change of output*	*Change of employment*
Paddy rice	0.00	0.39	0.42
Wheat	0.02	0.19	0.22
Cereal grains not elsewhere classified	0.04	0.35	0.38
Vegetables, fruit, nuts	0.01	0.23	0.25
Oil seeds	0.00	0.39	0.42
Sugar cane, sugar beet	0.00	0.36	0.39
Plant-based fibres	0.00	0.39	0.41
Crops not elsewhere classified	0.00	0.30	0.32
Bovine cattle, sheep and goats, horses	0.00	0.35	0.38
Animal products not elsewhere classified	0.00	0.35	0.38
Raw milk	0.01	0.37	0.40
Wool, silkworm cocoons	0.01	0.47	0.50
Forestry	0.00	0.05	0.07
Fishing	0.02	0.17	0.28
Coal	0.00	0.07	0.10
Oil	0.19	0.07	0.09
Gas	0.26	0.09	0.11
Minerals not elsewhere classified	0.29	0.48	0.58
Bovine meat products	0.00	0.35	0.30
Meat products not elsewhere classified	0.00	0.36	0.31
Vegetable oils and fats	0.47	0.39	0.34
Dairy products	0.01	0.32	0.26
Processed rice	0.00	0.43	0.35
Sugar	0.00	0.36	0.31
Food products not elsewhere classified	0.00	0.23	0.17
Beverages and tobacco products	0.00	0.38	0.33
Textiles	0.00	0.47	0.42
Wearing apparel	0.06	0.37	0.32
Leather products	0.00	0.56	0.50
Wood products	0.01	0.58	0.51
Paper products, publishing	0.38	0.57	0.51
Petroleum, coal products	0.81	0.48	0.39
Chemical, rubber, plastic products	0.15	0.55	0.50
Mineral products not elsewhere classified	0.23	0.57	0.55
Ferrous metals	0.47	0.64	0.60
Metals not elsewhere classified	0.66	0.67	0.62
Metal products	2.07	0.83	0.80
Motor vehicles and parts	0.80	0.66	0.60
Transport equipment not elsewhere classified	0.78	0.81	0.76
Electronic equipment	32.43	2.39	2.33
Machinery and equipment not elsewhere classified	4.17	1.40	1.39
Manufactures not elsewhere classified	4.46	1.17	1.11
Electricity	1.85	0.52	0.45
Gas manufacture, distribution	0.87	0.65	0.56
Water	0.12	0.49	0.44
Construction	2.60	0.56	0.53
Trade	0.00	0.65	0.56
Transport not elsewhere classified	0.05	0.40	0.34
Water transport	0.02	0.30	0.23
Air transport	0.19	0.34	0.27
Communications	2.39	0.60	0.53
Financial services not elsewhere classified	0.00	0.65	0.58

Insurance	0.00	0.53	0.47
Business services not elsewhere classified	0.23	0.60	0.54
Recreational and other services	0.26	0.40	0.40
Public administration, defence, education, health	0.06	0.46	0.45
Dwellings	0.00	0.48	0.39

Source: UNCTAD secretariat calculations, based on the GTAP 8 Database.

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