TRADE IN INFORMATION TECHNOLOGY PRODUCTS AND THE WTO AGREEMENTS

CURRENT SITUATION AND VIEWS OF EXPORTERS IN DEVELOPING COUNTRIES

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Electronic equipment, **computers**, **software**, **telecommunications**, **services**, Uruguay Round **trade agreements**. Market study of information technology (IT) products – reviews trade patterns, technological trends and market opportunities for telecommunication and electronic data processing equipment, semiconductor devices, semiconductor manufacturing equipment and computer software; examines impact of WTO Agreements on IT products, manufacturers and exporters in developing countries and makes recommendations on technical assistance programmes to improve IT market access.

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NOTE

Unless otherwise specified, all references to dollars ($) are to United States dollars.

The following acronyms are used:

ADB	Asian Development Bank
APEC	Asia-Pacific Economic Cooperation forum
ASEAN	Association of South-East Asian Nations
ATM	Asynchronous transfer mode
BTA	Agreement on Basic Telecommunications Services
CASE	Computer aided software engineering
CDMA	Code division multiple access
CD	Compact disc
CD-ROM	Compact disc - read-only memory
CEFTA	Central European Free Trade Agreement
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CISC	Complex instruction set computer
CMP	Chemical mechanical polish
CPE	Customer premises equipment
CPU	Central processing unit
DBS	Direct broadcast satellite
DOS	Disk operating systems
DRAM	Dynamic random access memory
DTH	Direct to home (television)
DVD	Digital video disk
EAC	European Accreditation of Certification
EAL	European Cooperation for Accreditation of Laboratories
EBRD	European Bank for Reconstruction and Development
EC	European Community
ECMA	European Computer Manufacturers' Association
EDI	Electronic data interchange

EDP	Electronic data processing
EEIG	European Economic Internet Grouping
EFTA	European Free Trade Association
EIAJ	Electronics Industry Association of Japan
EMAS	European Eco-Management and Audit Scheme
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
EOTC	European Organisation for Testing and Certification
ESCAP	Economic and Social Commission for Asia and the Pacific
ETSI	European Telecommunications Standards Institute
EU	European Union
EUROBIT	European Association of Manufacturers of Business Machines and Data Processing Equipment
FCC	Federal Communications Commission
FDI	Foreign direct investment
FDMA	Frequency division multiple access
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
GII	Global information infrastructure
GSM	Global System for Mobile communications
GSP	Generalized System of Preferences
GUI	Graphical user interface
HDD	Hard-disk drives
HS	Harmonized Commodity Description and Coding System (Harmonized System)
IC	Integrated circuit
ICE	Integrated Circuit Engineering Corporation
IDC	International Data Corporation
IEC	International Electrotechnical Commission
ILAC	International Laboratory Accreditation Conference
IMF	International Monetary Fund
I/O	Input/output (device)
ISDN	Integrated services digital network
ISO	International Organization for Standardization
IT	Information technology
ITA	Information Technology Agreement (WTO)
ITC	International Trade Centre UNCTAD/WTO
ITI	Information Technology Industry Council (United States)
ITP	International Trade Practices
ITU	International Telecommunication Union
JEIDA	Japan Electronic Industry Development Association
LAN	Local area network
LDCs	Least developed countries

MAI	Multilateral agreement on investment (OECD)
MFN	Most favoured nation
MNC(s)	Multinational corporation(s)
MOS	Metal oxide semiconductor
MRA	Mutual recognition agreement
NAFTA	North American Free Trade Agreement
NC	Network computer
NECTEC	National Electronics and Computer Technology Center (Thailand)
NII	National information infrastructure
OECD	Organisation for Economic Co-operation and Development
PC	Personal computer
PCB	Printed circuit board
PCS	Personal communication services
PTO	Public telecommunications operator
R & D	Research and development
RDBMS	Relational database management system
RISC	Reduced instruction set computer (chip)
SAPTA	South Asian Preferential Trade Agreement
SCM	Subsidies and Countervailing Measures (WTO Agreement on the Application of)
SIA	Semiconductor Industry Association
SITC	Standard International Trade Classification
SME	Semiconductor manufacturing equipment
SME(s)	Small and medium-sized enterprise(s)
SMPS	Symmetric multiprocessors
SPS	Sanitary and Phytosanitary Measures (WTO Agreement on)
SRAM	Static random access memory
TBT	Technical Barriers to Trade (WTO Agreement on)
TDMA	Time division multiple access
TICQA	Testing, Inspection, Calibration and Quality Assurance
TRIMs	Trade-Related Investment Measures (WTO Agreement on)
TRIPS	Trade-Related Aspects of Intellectual Property Rights (WTO Agreement on)
TNCs	Transnational corporations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
WAN	Wide area network
WIPO	World Intellectual Property Organization
WLL	Wireless local loop
WTO	World Trade Organization
Y2K	Year 2000

Tables

Figures may not add up owing to rounding.

Executive Summary

The World Trade Organization (WTO) Agreements on Information Technology (IT) and Basic Telecommunications Services are expected to provide a springboard for economic growth into the twenty-first century. This study aims to place international trade in IT products in the context of the WTO Agreements. It provides an assessment of the current market situation and an empirical analysis of the implications of the WTO Agreements for the international trade in IT products. The study presents the current perceptions of the WTO Agreements among the IT business community and has the major objective of increasing awareness of evolving market liberalization among technology exporters from developing and transition economies.

International exports of IT products in 1997 exceeded the combined world trade in agriculture, automobiles and textiles. Global exports of IT products in 1997 amounted to $681 billion, while imports were valued at $618 billion. In terms of exports, electronic data processing goods accounted for 37%, semiconductors 20% and other components, 20%.

The European Union (EU), the United States of America and Japan are the main exporters; EU and the United States are also leading importers. Japan, the Republic of Korea, Singapore, Hong Kong (China), Malaysia, Mexico and Thailand are net exporters, whilst EU, Canada and the United States are net importers. Taiwan Province (China), the Republic of Korea, Singapore, China, Hong Kong (China) and the Philippines among developing nations have emerged as significant players in the international trade in IT products.

In 1998, the global market[1] for the hardware products falling within the scope of the WTO Information Technology Agreement (ITA) was valued at an

1 The global market is equivalent to the sum of the sale of all goods or services within a specified product sector, comprising all goods or services produced and sold within every individual national market and all goods or services sold across international markets. The value of the global market or individual markets may differ from the value of trade, owing to the inclusion of goods or services produced and sold domestically. Values have been calculated according to the final selling price of the product to the customer.

estimated $1,095.95 billion. The market is expected to expand to $1,364 billion by the year 2000. The computer industry will be a major impetus for this growth, with the market for computer software expected to increase to $450 billion by the year 2000, and the market for computer hardware forecast to reach $485 billion. Semiconductors, telecommunications equipment, and semiconductor manufacturing equipment should present market opportunities worth $370 billion, $135 billion, and $38 billion respectively in 2000.

The United States, Japan and EU hold more than 80% of the global market and a major share in world production and exports. Companies from these countries/areas dominate the ITA market in semiconductors, telecommunications, computer hardware and software, as well as in semiconductor manufacturing equipment.

Transnational corporations (TNCs) hold a large share of the markets, production and investment in this knowledge-intensive sector. Of the leading 100 TNCs in 1997, 22 were in the electronics sector. Among these, eight originated in the United States and EU respectively, and six in Japan. Companies based in the United States dominate the sectors for high-end computers, semiconductors, telecommunications, computer software, and semiconductor manufacturing equipment.

The globalization of the IT industry has led to the gradual elimination of wholesalers. The large TNCs, which dominate ITA production, have their own marketing organizations, strategic business alliances and authorized distributors. The role of supermarkets, mail-order houses, IT system integrators and electronic commerce via the Internet is increasing in this intensely competitive market environment.

The IT manufacturing industry is expected to continue to relocate to areas where it can operate cost effectively. While developed countries are likely to maintain their core competencies in high-technology areas, developing countries will find opportunities in outsourcing and skills-intensive sectors such as research and development (R & D), software applications and services, repair, maintenance, installation, commissioning and the production of components. Many ASEAN (Association of South-East Asian Nations) and other Asian countries have already geared themselves to take advantage of mass production opportunities.

The IT industry is knowledge-intensive and characterized by rapid obsolescence. Product life cycles are short, in some cases less than a year. Companies from the United States, Japan, EU, and some of the more advanced developing countries hold the technological advantage, having invested heavily in R & D to maintain their lead over small and medium-sized enterprises (SMEs). The major companies spend about 8% of their turnover on R & D. The leading

companies also maintain their technical superiority through strategic acquisitions or mergers of companies or technologies, which increases their competitiveness.

The WTO system, which emerged from the Uruguay Round of trade negotiations conducted between 1986 and 1994, comprises three main legal instruments, all of which have a bearing on the information technology sector. All WTO members are required to implement the rules prescribed by these main Agreements which are listed below:

- General Agreement on Tariffs and Trade (GATT 1994) and its associate Agreements which lay down multilateral rules applicable to trade in goods. Four basic rules are embodied in GATT 1994: the protection of domestic industry through tariffs, the binding of tariffs, the principle of non-discrimination through both the most-favoured-nation (MFN) rule and the national treatment rule.

- General Agreement on Trade in Services (GATS), which establishes a framework for liberalizing trade in services.

- Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which lays down uniform standards for intellectual property rights.

The impact of the WTO Agreements on the international trade in information technology products is pronounced. The implications of the TRIPS Agreement for computer software and semiconductors, of the Agreement on Trade-Related Investment Measures (TRIMs) for the proliferation of manufacturing activities, telecommunications services and balanced trade development, and of the Agreement on Technical Barriers to Trade (TBT) for inducing confidence in various certification systems, are significant. The Agreements on Implementation of Article VII of GATT 1994 (Customs Valuation), Subsidies and Countervailing Measures (SCM), Implementation of Article VI of GATT 1994 (Anti-dumping) and the Application of Sanitary and Phytosanitary Measures (SPS) have an impact, as has the plurilateral Agreement on Government Procurement.

Since the conclusion of the Uruguay Round further agreements have been negotiated, including the Agreement on Basic Telecommunications Services (BTA) and the Information Technology Agreement (ITA). The principal objective of BTA is to liberalize trade in basic telecommunications services and to enable countries to take advantage of this technology by opening up domestic markets to foreign competition. Embodied in the WTO Ministerial Declaration on Trade in Information Technology Products, ITA went into effect in March 1997. It provides for its participants to eliminate customs duties and other duties and charges on information technology products by the year 2000, on a most-favoured-nation (MFN) basis.

The potential of the opportunities presented by these Agreements is immense. BTA is expected to provide a $1 trillion business opportunity, leading to greater digitalization, cellular mobile telephone services, low earth-orbit satellite communication and value-added services, such as video conferencing, video phones and multimedia applications. The implications of ITA are vast; by eliminating tariffs, an estimated $50 billion - $100 billion could be saved annually, while the market for ITA products will be opened up.

During the field research carried out for this study, various concerns emerged among the business community in developing countries over the implications of ITA. These concerns were directed at the added cost of conforming to export and import regulations and the differing documentation and procedural requirements in global markets. The TRIPS Agreement also aroused negative reactions, in that it would not only increase the cost of technology acquisition, but also block re-engineering and the development of applications.

National reactions to ITA have been mixed and largely dependent upon a country's status as a developed or developing nation, the level to which its trade policy has already evolved and whether it is currently a net importer or exporter of IT products. Even within a particular country or region, reactions may differ. Amongst the areas covered by this study, both ends of the spectrum can be seen. Broadly speaking, reactions in Japan, EU, Singapore and China were largely positive, while in the Republic of Korea, India and Malaysia the response was mixed, often with government and industry taking differing views or with disagreement existing between different industry associations. At the other end of the scale, ITA has aroused a negative response from elements of the business community in Thailand. Local manufacturers and exporters felt that the domestic IT industry is at too early a stage of development to compete effectively under the Agreement and is likely to benefit less from it than competitors from developed nations.

The response from some least developed countries (LDCs) indicates that ITA will have little effect as they are hardly involved in the manufacture of ITA products. The main benefit to LDCs will be the reduction in the cost of products, resulting from the integration of global markets.

Many developing countries of the Asia-Pacific region expressed the view that the ITA discussions gave them narrow margins for negotiating, and they were concerned that ITA might lead to an unbalanced trade situation. While they agreed that the market would expand, they feared that their infant industries could be swamped by foreign competition which had the inherent strengths of large companies in marketing and technology. Furthermore, recognizing the strong bonds between large corporations and their vendors, companies from developing countries were expecting to encounter increasing difficulty in penetrating such 'closed' networks, which have the appearance of cartels.

Several of the national IT industry associations visited felt that safeguards such as countervailing and anti-dumping, should be sparingly used and only when there are genuine reasons for them. They should not become a means of protecting local industry; they will, otherwise, prove to be more detrimental than tariffs and quantitative restrictions.

Many representatives of business communities from developing countries expressed their reservations on the multilateral agreement on investment (MAI) proposed by members of the Organisation for Economic Co-operation and Development (OECD), which they feel will have severe repercussions on their manufacturing capabilities and competitiveness. The proposed agreement covers rights of establishment, national treatment at both pre- and post-establishment stages, and dispute settlement.

An integral part of this study involved field research to collect opinions on the WTO Agreements from business and public-sector representatives through direct interviews with senior executives and government officials from Germany, the United Kingdom and Japan; China, India, Malaysia, Pakistan, the Philippines, the Republic of Korea, Singapore and Thailand.

The views of the business community and public-sector representatives in the countries visited are incorporated into this study. These views outline the eventual business avenues for import and export agencies and manufacturers in developing countries to enable them to gain more from the challenges and opportunities presented by the WTO Agreements. For exporters they focus on practical supply-side and marketing advice. For manufacturers, they propose the promotion of R & D, building upon core competencies in terms of clustering sites and expertise, and conforming with international standards and regulatory requirements.

This study provides an empirical analysis of the implications of the WTO Agreements for the international trade in IT products, and presents the initial views of the IT business community in developing countries.

Purpose and scope of this study

This study provides an empirical analysis of the implications of the WTO Agreements for the international trade in IT products, and presents the views of the IT business community in developing countries. The study has the principal objective of increasing awareness of evolving market liberalization among developing country exporters. It has a threefold purpose:

- To analyse the impact of the WTO Agreements on IT producers and exporters;
- To summarize the challenges and opportunities available to developing country IT exporters in the current business environment; and
- To synthesize the initial responses from IT business communities in developing countries to the WTO Agreements and business community recommendations regarding their needs in the process of adjusting to the emerging globalization of the IT sector.

This study forms part of ITC's activities on international trade and business development in technology-based products. The study's coverage was defined in coordination with the WTO Secretariat to include electronic data processing, telecommunications, semiconductors, semiconductor manufacturing equipment and computer software. For these product groups, the study focuses on the identification of major products, trade patterns, industry trends and evolution, developments in technology, emergence of transnational corporations, and the opportunities these developments offer to developing countries.

Scope of the Information Technology Agreement

The IT products covered by this study are as follows:

- Electronic data processing equipment (SITC[2] 7521, 7522, 7523, 7526, 7527, 7529, 7599);

2 Standard International Trade Classification.

- Telecommunications equipment and services (SITC 7641, 7643, 76481, 76491);
- Semiconductors (SITC 7763, 7764);
- Other active and passive components (SITC 7711, 7712, 7722, 7723, 7724, 7725, 7731, 7762, 7768, 8984);
- Scientific instruments and others (SITC 5985, 7648, 7788, 8743, 8744, 8747);
- Office equipment (SITC 7511, 7512, 7513, 7591, 7633, 7638);
- Computer software products and services;
- Semiconductor manufacturing equipment (various SITC from 66591 to 88136).

The following product groups were not covered by ITA and are excluded: consumer electronics, medical electronics, military electronics, and control and instrumentation products. An effort was made to align product codes with the Harmonized System codes identified under Attachments A and B of ITA. The detailed SITC codes for the ITA products covered by this study are provided in appendix III.

Regional and country coverage

This study covers global importers and exporters of IT products and provides information on the major national and regional players, including the United States, Japan, Canada, the European Union, the Association of South-East Asian Nations, the Central European Free Trade Agreement (CEFTA), the South Asian Preferential Trade Agreement (SAPTA).

Desk and field research

The desk research consisted of the following steps:

- Collection of data from published sources, reports and the Internet;
- Identification of the individual WTO Agreements with an impact on IT;
- The preparation of a questionnaire and its distribution to selected trade and industry organizations, government bodies, associations, importers and exporters, to obtain their views and reactions;
- Identification of international organizations, trade and industry associations, export promotion bodies, government departments and professional institutions.

For the field research, the following activities were carried out:

- In-depth discussions with target groups dealing with the IT industry in international bodies such as IEC, ITU, UNCTAD, UNDP,[3] WTO, and the International Organization for Standardization (ISO).
- Research and verification of data collected during desk research among OECD member countries and in the European Union, and in China, India, Malaysia, Pakistan, the Philippines, the Republic of Korea, Singapore and Thailand. Discussions were held with more than 160 senior government officials and business executives in the countries visited.

The ITC team covered the European continent (including the United Kingdom, Belgium, Germany and Switzerland) from April to May 1997, most of the Asia and Pacific region [including China, Hong Kong (China), India, Japan, Malaysia, Pakistan Philippines, Singapore and Thailand from June to July 1997].

Analysis

An analysis was carried out on replies to the questionnaire, the information obtained through personal contacts by the ITC team, statistical and other documentary information gathered during the field research, and trade information from various databases. The findings of the analysis as well as the contributions made by organizations like ITU, the European Organisation for Testing and Certification (EOTC) and Thailand's National Electronics and Computer Technology Center (NECTEC) are presented in the various chapters of this study. The questionnaire is reproduced in appendix I and the sources of statistical and other information are listed in appendix II.

3 International Electrotechnical Commission; International Telecommunication Union; United Nations Conference on Trade and Development; United Nations Development Programme.