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國際學碩士學位論文

**Assessing the Impact of the Revised WTO
Information Technology Agreement (ITA)
Towards Korea's IT Industry:
A Partial Equilibrium Model**

**ITA 확대협상이 한국 IT 산업에 미치는 경제적
효과분석: 부분균형분석**

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**Assessing the Impact of the Revised WTO
Information Technology Agreement (ITA)
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A Partial Equilibrium Model**

BY

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TABLE OF CONTENTS

ABSTRACT

ACKNOWLEDGEMENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION	1
2. OVERVIEW OF ITA	3
2.1 BACKGROUND ON THE DEVELOPMENT OF ITA NEGOTIATIONS	3
2.2 ITA MEMBERSHIP	5
2.3 ITA PRODUCT COVERAGE	7
2.4 DATA CHALLENGES ON ITA CLASSIFICATIONS	10
3. ITA TRADE	12
3.1 GLOBAL ITA TRADE	12
3.2 KOREA'S ITA TRADE	16
3.3 KOREA'S ITA TRADE COMPARED WITH CHINA AND JAPAN	17
4. METHODOLOGY	23
4.1 EMPIRICAL ANALYSES	23
4.2 RESEARCH HYPOTHESIS	26
4.3 RESEARCH METHODOLOGY	27
5. RESULTS	32
6. CONCLUSION	36
7. REFERENCE	38
APPENDIX	40
APPENDIX A – PRODUCT COVERAGE OF ITA1	40
APPENDIX B – PRODUCT COVERAGE OF ITA2	54
APPENDIX C – KOREA'S ITA2 TRADE EFFECT BY PRODUCT CODE	67

Abstract

Korea is a small yet important IT country; it is the fourth largest exporter and seventh largest importer of IT products covered in the Information Technology Agreement (ITA). Although ITA has contributed to increasing global IT trade and has benefited consumers around the world, some industries have been subjected to increasing competition from strong IT countries. This is the case for Korea, a country that is being “sandwiched” between China and Japan in the global IT market.

The objective of this research paper is to simulate the effects of ITA2, which is an expansion of ITA1, on Korea’s IT industry using the World Integrated Trade Solution SMART (Software for Market Analysis and Restrictions on Trade) program – a partial equilibrium modeling tool – to measure Korea’s trade competitiveness against China and Japan. The partial equilibrium approach can generate useful insights on the relatively complex, multi-country trade policy changes at the industry level.

LIST OF TABLES

TABLE 1 ITA MEMBER COUNTRIES BY ECONOMIC STATUS, 1996-2015.....	6
TABLE 2 ITA1 PRODUCTS AND NUMBER OF HS 1996 CODES, BY ATTACHMENT.....	8
TABLE 3 ITA2 PRODUCTS AND NUMBER OF HS 2007 CODES, BY PRODUCT GROUP.....	9
TABLE 4 TOP 10 EXPORTERS OF ITA, 2014.....	13
TABLE 5 TOP 10 IMPORTERS OF ITA, 2014.....	14
TABLE 6 EXPORT AND IMPORT OF ITA TOTAL TRADE, BY PRODUCT GROUP.....	15
TABLE 7 TOP 10 ITA EXPORT AND IMPORT DESTINATIONS OF KOREA, CHINA AND JAPAN IN 2014.....	18
TABLE 8 KOREA, CHINA AND JAPAN'S ITA EXPORT IN 1996 AND 2014, BY PRODUCT GROUP.....	19
TABLE 9 KOREA, CHINA AND JAPAN'S ITA IMPORT IN 1996 AND 2014, BY PRODUCT GROUP.....	20
TABLE 10 TOP 10 ITA1 EXPORTS TO WORLD IN 2014, BY PRODUCT CODE.....	21
TABLE 11 TOP 10 ITA2 EXPORTS TO WORLD IN 2014, BY PRODUCT CODE.....	22
TABLE 12 TRADE EFFECTS BY PRODUCT GROUP.....	32
TABLE 13 TRADE EFFECTS IN TERMS OF KOREA'S TOP 10 ITA EXPORTS IN 2014.....	34

LIST OF FIGURES

FIGURE 1 EFFECTS OF HS AMENDMENTS ON THE NUMBER OF HS SUBHEADINGS COVERED BY ITA.....	11
FIGURE 2 ITA WORLD TRADE, 1996-2014.....	13
FIGURE 3 KOREA ITA EXPORTS AND IMPORTS TO WORLD, 1996-2014.....	17

1. Introduction

On July 24th 2015, WTO announced that 54 WTO members finalized a “landmark deal” to expand the product scope of the 1996 Informational Technological Agreement (ITA), aiming to eliminate tariffs on 201 additional information technology (IT) products. According to WTO Director-General Roberto Azevêdo, the revised ITA, otherwise also known as ITA2, is the first major tariff-cutting deal at the WTO in 18 years. Annual trade of these 201 ITA products is valued at over \$1.3 trillion per year, and accounts for approximately 7% of total global trade today. This surpasses the global trade in automotive products, and also total trade in textiles, clothing, iron and steel combined.¹

Informational technology goods trade flows provide the most important physical infrastructure for current e-commerce and digital trade,² and has become the most dominant feature in international trade. Among the WTO’s multilateral agreements, ITA stands out as being the most wide-ranging and complex agreement that attempts to eliminate all tariffs on information technology products.

In general, there is still very little quantitative and qualitative research on ITA trade. Research examining the econometric analyses of trade impact of the ITA remains scarce (Henn and Gnutzmann-Mkrtchyan 2015). Most quantitative analyses on ITA are based on aggregated data using the gravity model, and the results lead to a simple conclusion that ITA is beneficial to world trade as a

¹ “WTO members reach landmark \$1.3 trillion IT trade deal”, 24th July 2015, WTO News, https://www.wto.org/english/news_e/news15_e/ita_23jul15_e.htm

² Sasha Wunsch-Vincent, *The WTO, The Internet and Trade in Digital Products, EC-US Perspectives* (Oxford and Portland, Oregon, 2006)

whole. Yet, it can be misleading to assume that all industries manufacturing ITA goods can benefit from trade liberalization. Hence, using the partial equilibrium model approach to analyze relatively complex, multi-country trade policy changes at the industry level can provide a different perspective on the outcome of ITA.

There is even less research on ITA in South Korea. There are not many studies available on the implication of ITA on South Korea, a country that is known to be one of the leading manufacturers and exporters of cutting edge electronics products that faces fierce competition with the two of the world's largest exporter and importer of ITA, China and Japan. Only two notable econometric analysis on the impact of ITA on Korea's IT trade can be found – a non-disclosure research report submitted to the Korean Ministry of Trade, Industry and Energy by the Korean Institute for International Economic Policy (KIEP 2013), and a simulation analysis on the ITA effects on real and nominal tariff changes (Chang 2005). Other reports on ITA have only reviewed and highlighted the significance of ITA and ITA2 adapted from the summaries provided by WTO. Therefore, a more recent update on the trade impact of the ITA2 is conducive to understanding the current technological environment and bilateral/multilateral trade flows on IT products.

The paper builds upon and improves on the existing studies on the ITA in three important ways. First, the paper provides a comprehensive overview of the classification of product coverage groups in ITA and ITA2 that makes it easier to identify and compare the product segments of each agreement. Second, the paper provides an updated review on the ITA and the recently concluded ITA2. The author collected the most recent data available to update the overall trend

in ITA trade, and put together limited information and data from various sources on ITA2. Third, the paper analyzes the impact of ITA2 on Korea's IT industry by examining trade gains and losses at the industry level in the global market. The author hopes this will contribute new insights to ITA research.

2. Overview of ITA

2.1 Background on the Development of ITA Negotiations

ITA is a sectoral agreement negotiated in isolation from a comprehensive multilateral trade round (Mann and Liu 2007). The primary objective of the ITA was to improve market access and promote global trade through elimination of bound duties on IT products on a Most Favored Nation basis that applies to all WTO members. ITA was first formally concluded at the WTO Ministerial Meeting in Singapore on December 1996 by 29 participating countries that covered the minimum "critical mass" threshold of 90 percent of world IT trade. Since the Uruguay Round in 1994, it was the first concluded agreement of a large group of developed and developing countries over zero-for-zero negotiations in a sector, which was estimated to be valued at US \$500 billion annually.³ The total value of trade accounted for 90 per cent by all the ITA participants, which is the minimum requirement for ITA to come into effect.

³ *USTR Release on APEC Leaders Declaration and ITA*, 25th November 1996, <http://usembassy-israel.org.il/publish/press/ustr/archive/november/ot21126.htm>

Under the auspices of ITA, countries agreed to bring tariffs to zero on 203 products covering computers, software, telecom equipment, semiconductors, semiconductor manufacturing equipment and scientific instruments. With the ITA coming into effect on April 1 1997, participants began a schedule of phased duty reductions, either immediately or by equally staged tariff reductions in four installments from July 1997 to January 2000. Several developing countries, including Chinese Taipei, Costa Rica, India and Indonesia, implemented extended duty staging to 2005 on a product-by-product basis (Anderson and Moh 2010).

Negotiations on the expansion of ITA product coverage to eliminate 201 additional tariff lines, also known as ITA2, began soon after ITA was implemented. However, negotiations for ITA2 broke down due to conflict of interests on product coverage and tariff elimination. It took a while for countries to settle these issues. The European Union's failure to lower tariffs on certain ITA products caused Japan to request the first ever consultation on ITA in the Dispute Settlement Body (DSB) in 2008, with the result of DSB ruling in favor of Japan.⁴ China, the world's largest exporter and importer of technological goods, was hesitant to make consensus on tariff elimination for ITA products that caused US and other developed countries, including South

⁴ On July 2008, Japan requested consultation with EC on tariff treatment on ITA products that included flat panel display devices, set-top boxes and multifunctional digital machines, also known as "EC-IT Product Dispute" (DS376)., US and Chinese Taipei also joined in with Japan for consultation with EC. On August 2010, the Dispute Settlement Body (DSB) was concluded, and the panel ruled in favor of Japan. This was the first and only dispute regarding ITA, which has garnered renewed attention to the ITA.

Korea, to demand that China drop duties on semiconductors and flat-panel displays.⁵

On December 16th 2015, 53 WTO members closed the deal on the revised ITA2, which would eliminate tariffs on 201 products valued at about \$1.3 trillion in annual trade. The products covered in the ITA2 include new generation semiconductors, GPS navigation equipment and medical equipment, machine tools for manufacturing printed circuits, telecommunications satellites and touch screens. Approximately 65% of tariff lines will be fully eliminated by July 1st 2016, and the remaining tariff lines will be eliminated in four stages by 2019.

2.2 ITA Membership

During the inception of the ITA in 1997, 29 WTO member countries that originally participated in the ITA negotiations. There are 54 WTO member countries in the ITA2. As of now, the ITA covers 80 countries that represent roughly 97 per cent of world trade in IT products (WTO). There are 47 high-income countries, 14 upper middle-income countries, 16 lower middle-income countries and 2 low-income countries that signed ITA2 (see Table 1).

Most ITA member countries are major IT exporters from the developed world. However, there has been steady increase of participation by developing countries over the years that shows increasing technology diffusion across

⁵ *ITA Trade Deal Evades WTO Amid China-South Korea Dispute*, December 13 2014, Bloomberg Business, <http://www.bloomberg.com/news/articles/2014-12-12/ita-trade-deal-evades-wto-amid-china-south-korea-dispute>

countries. Non-ITA member countries that also play a significant part in the ITA trade include Brazil, Mexico and South Africa (Perez et al 2010).

TABLE 1 ITA member countries by economic status, 1996-2015

Year joined ITA	Developed countries	Developing countries		
	Economic status*			
	High income	Upper middle income	Lower middle income	Low income
1996	<u>Australia, Austria, Belgium, Canada, Denmark, EU15/28, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Italy, Japan, South Korea, Luxembourg, Netherlands, Norway,</u>	<u>Turkey</u>	Indonesia	
1997	<u>Czech Republic, Estonia, Israel, Macao, New Zealand, Slovakia</u>	<u>Costa Rica, Malaysia, Poland, Romania</u>	El Salvador, India <u>Philippines, Thailand</u>	
1998		Panama		
1999	<u>Croatia</u>	<u>Latvia, Lithuania, Mauritius</u>	<u>Albania, Georgia, Jordan</u>	Kyrgyzstan
2000	Cyprus, Oman, <u>Slovenia</u>			
2001		<u>Bulgaria</u>	Moldova	
2003	Bahrain		<u>China, Egypt, Morocco</u>	
2004	<u>Hungary, Malta</u>			
2005			Nicaragua	
2006	Saudi Arabia	Dominic Republic	Guatemala, Honduras	
2007	United Arab Emirates			Vietnam
2008		Peru	Ukraine	
2010	Kuwait			

2012		<u>Colombia,</u> <u>Montenegro</u>		
2013	Russia			
2014		Seychelles		

Source: Anderson and Mohs 2010, Updated from WTO News

Notes: 54 WTO members that participated in the ITA2 negotiations are underlined
Original participants of ITA1 are: EU and its 15 member countries; Australia; Canada; Chinese Taipei; Hong Kong SAR; Iceland; Indonesia; Japan; Korea; Norway; Singapore; Switzerland (including Liechtenstein); Turkey and the United States

* Number of participating countries in the EU has increased from 15 member countries in ITA 1 to 28 member countries in ITA2.

*Based on World Bank income classification

2.3 ITA product coverage

ITA covers certain IT-related products, and it does not include provisions on non-tariff issues. According to WTO's classification of product coverage in ITA, there are seven broad categories: (1) computers and calculating machines; (2) telecommunication equipment; (3) semiconductors; (4) semiconductor manufacturing equipment; (5) instruments and apparatus; (6) data storage media and software provided on physical media; and (7) parts and accessories. In the last category, it includes all parts and accessories of all products falling within the ITA, including parts and accessories of semiconductor manufacturing equipment.

In ITA1, 203 products were classified under the nomenclature HS1996. Product coverage is listed in two annexes to the Declaration, commonly referred to as Attachments A and B (Anderson and Mohs 2010), under the Harmonized Schedule (HS) system (see Table 2). Attachment A is a list of items at the 6-

digit HS level that are divided into two sections, A1 and A2. A1 is comprised of 112 major IT products that include computers, telecommunication equipment, semiconductors, software, instruments and apparatus (WTO 2012). A2 covers 78 product items that include semiconductor manufacturing and testing equipment. Of these, 42 items are labeled “For Attachment B”. Attachment B is a list of 13 items without HS codes, however, can be identified with HS codes listed in Attachment A (Santana 2012). These include computers with multimedia capability, cathode ray tube computer monitors, optical disc storage units for computers, network equipment and set-top boxes.

TABLE 2 ITA1 products and number of HS 1996 codes, by attachment

	Number of HS codes	Sample Products
Attachment A1	112	1. Computers: Personal computers, laptops, work stations, monitors, keyboards, hard drives, CD-ROM drives, smart cards, printers, scanners, and other input/output units
		2. Semiconductors: microprocessors, integrated circuits, printed circuits, diodes, resistors
		3. Telecommunication equipment: telephone sets, cordless phones, mobile handsets, pagers, answering machines, switches, routers, hubs, modems, fiber optic cables
		4. Instruments and apparatus: certain photocopy machines, fax machines, cash registers, adding machines, calculators, ATMs, spectrometers, chromatographs, flow meters, gauges, optical radiation devices
		5. Data storage media and software: magnetic tapes, unrecorded media
		6. Parts and accessories: Loudspeakers, still digital cameras, chromatographs
		7. Semiconductor manufacturing equipment (SME): etching and stripping apparatus, vapor deposition devices, sawing and dicing machines for wafers, spinners, ion implanters, wafer transport, handling and storage

		machines, injection molds, optical instruments, parts and accessories
Attachment A2	78	Computers, electric amplifiers, flat-panel displays, network equipment, monitors, pagers, CD and DVD drives, plotters, printed circuit assemblies, removable storage devices, set-top boxes
Attachment B	13	
TOTAL	203	

Source: WTO and Anderson & Mohs

In ITA2, 201 products have been added as expanded product coverage under the nomenclature HS2007. Unlike ITA1, the classification divergence of ITA2 is still under negotiation. However, in general terms, ITA2 broadly consists of: (1) equipment for the manufacturing of: printed circuit/wiring boards, flat-panel display devices, and capacitors; (2) additional assembly and testing equipment; (3) additional manufacturing and testing equipment; (4) parts of products already included in ITA1, but which were not themselves covered by the Agreement; and (5) a variety of other miscellaneous products (WTO 2012). To be specific, the product coverage of ITA2 can be classified into 12 product groups (see Table 3). Similar to ITA1, ITA2 has 10 unspecified items under Attachment B. These include light-emitting diode (LED), touch-sensitive data, ink cartridges, self-adhesive circular polishing pads, vacuum pumps and plasma cleaner machines.

TABLE 3 ITA2 products and number of HS 2007 codes, by product groups

Product Groups	No. of HS Codes	Sample Products
Semiconductor	6	MCO, processor or controllers, memories, amplifiers
Imaging devices	14	Television cameras, digital cameras and video camera recorders, CCFL for flat panel displays, portable interactive

		electronic education devices for children, parts for TV, camera, radio and monitor
Optical instruments	13	Filter, other lenses, microscopes and parts, diffraction apparatus
IT material	8	Optically clear free-film adhesives used for semiconductor, other plates and film, ink cartridges
IT manufacturing equipment	24	Fans used for cooling microprocessors, telecommunication apparatus etc, heat exchange units, filter used for semiconductor and display, semiconductor manufacturing equipment and parts, vacuum pumps
Measuring instruments	38	Rangefinders, machines and appliances for testing metals, electricity meters, instruments and apparatus for measuring or detecting ionizing radiations, manostats
Machineries	16	Plates, cylinders and other printing components, hybrid printer, parts of printing machines, duplicating machines, money-changing machines
Audio equipment	19	Microphones and stands, single loudspeakers, headphone & earphone, pocket-sized radio cassette-players, car stereos
Electromechanical equipment	19	Static converters, signal generators and other electronics including switches and fuses
Medical equipment	17	Electro-cardiographs, ultrasonic scanning apparatus, ultra-violet or infra-red ray apparatus, other ophthalmic instruments and appliances, parts and accessories based on the use of X-rays
Telecommunication equipment	6	Parts for telecommunication equipment, transmission apparatus
Others	21	Storage devices, GPS, air combat simulators, projection screens
Total	201	

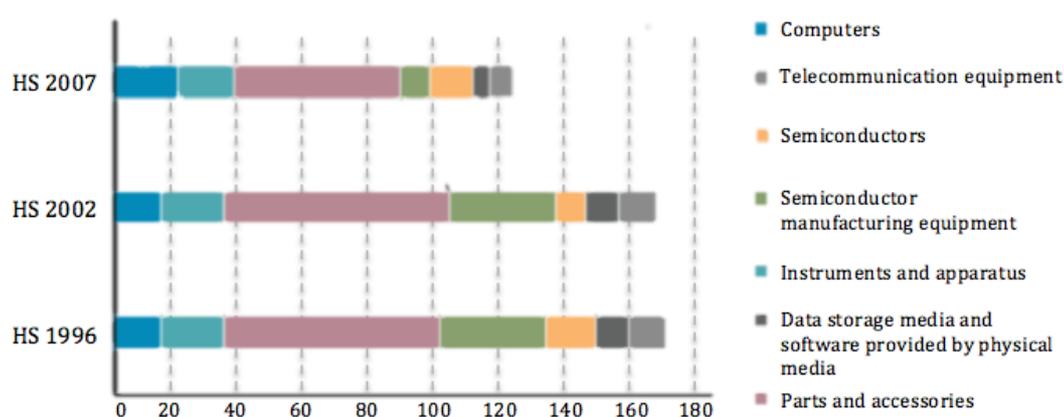
Source: South Korea Ministry of Trade, Industry & Energy

2.4 Data Challenges on ITA classifications

Many scholars argue that the HS listing of ITA is insufficient, outdated and complicated. Therefore, it is difficult to quantify the scope of ITA trade based

on the rigid product structure of ITA (Dreyer and Hindley 2008; Henn and Gnutzmann-Mkrtchyan 2015). Firstly, due to rapid evolution of IT products, it has become a challenge to define complex multifunctional products that combine features of various HS codes. Appendix B is the result of such dilemmas where it becomes difficult to specify a product into one listing, instead, leading to two or more possible classifications. Secondly, it is difficult to achieve a common classification within the HS due to divergences in interpretations. Most countries provide their own list of tariff codes at the national line level (Anderson and Mohs 2010), making it difficult to ensure data consistency. Thirdly, HS system underwent nomenclature revisions in 2002 and in 2007, complicating the construction of a consistent times series for ITA product trade (see Figure 1). In fact, there have been problems with the revised nomenclature, as it covers some, not all, of the ITA products. Hence, existing studies have adopted different methodologies in calculating trade volume of ITA, which has resulted to different estimations on the volume of ITA trade.

Figure 1 Effects of HS amendments on the number of HS Subheadings covered by ITA



Source: WTO 2012

When calculating the overall trade volume of ITA, the author used data based on the product coverage in ITA1 under nomenclature HS1996 six digit codes from 1996 to 2014 to examine trade patterns, product composition and country market share in a time-consistent manner. Data on ITA was collected from UNCTAD COMTRADE. In ITA1, 203 products correspond to 160 HS1996 subheadings of six digit product codes.⁶ Because some of the products in ITA1 enlisted as HS1996 are not included in HS2002 and HS2007, the author avoided transposing product coverage across nomenclatures by sticking to HS1996. Attachment B was not included in the data.

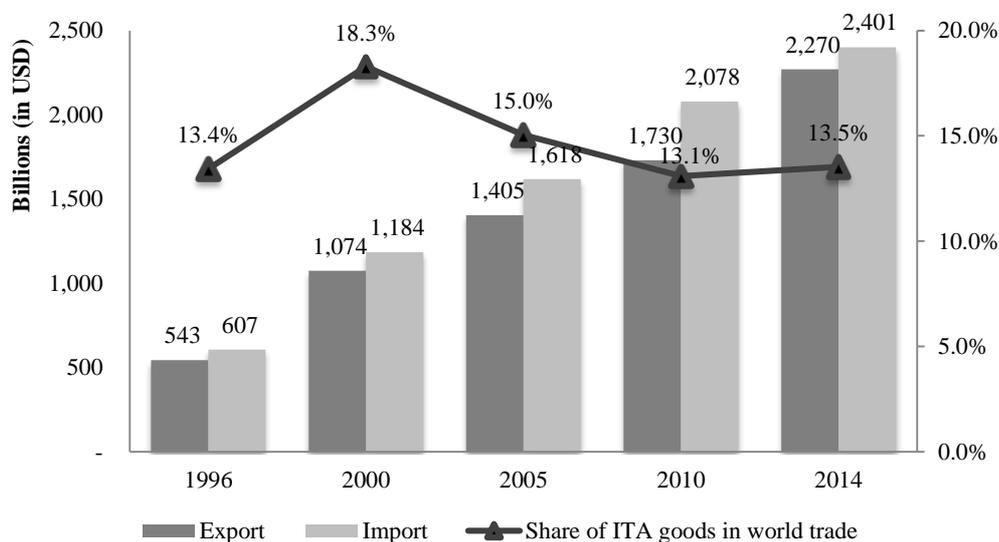
3. ITA Trade

3.1 Global ITA Trade

With the expansion of IT platform and convergence technology, global trade in ITA has grown rapidly over the years. Total trade in ITA goods has quadrupled from 1.15 trillion USD in 1996 to 4.67 trillion USD in 2014 (see Figure 2), and ITA product trade peaked at 18.3% in 2000. In 2014, the total share of ITA goods in global trade was roughly 13.5%, while export in ITA products valued at 2.27 trillion USD, and import at 2.40 trillion USD.

⁶ This excludes Appendix B, and the various items under the same subheading in Appendix A.

Figure 2 ITA World Trade, 1996-2014



Source: UNCTAD COMTRADE, Author's Calculation
 Based on product coverage on ITA1, nomenclature HS 1996

Looking at the top 10 exporters of ITA in 2014, six out of ten countries are Asian countries that take up 51% of total ITA exports. China ranked number one as the largest ITA exporter, followed by EU, Singapore, South Korea and Germany. Japan's total ITA export was ranked lower than Korea and China at number eight. Looking at the compound annual growth rates, growth has slowed down in recent years compared to 10-15 years ago. China's growth rate was the biggest at 11% in 2014, Korea at 10%, and only 1% for Japan.

TABLE 4 Top 10 Exporters of ITA, 2014

No.	Exporter	Exports 2014 (million \$)	Share of total, 2014	Compound annual growth rates		
				1996- 2000	2001- 2008	2009- 2014
1	China	641,351	26	29	38	11
2	EU	180,857	7	9	6	5

3	Singapore	145,648	6	6	12	7
4	Korea	138,612	6	18	17	10
5	Germany	130,947	5	7	11	6
6	US	124,696	5	10	1	4
7	Taiwan	119,908	5	40	0	10
8	Japan	112,341	5	8	7	1
9	Netherlands	79,678	3	13	12	8
10	Malaysia	71,097	3	12	0	5
	World	2,269,791	100	18	11	10

Source: Anderson & Mohs (2010), Author's Calculation
Based on nomenclature HS 1996

Most of the top 10 importers of ITA are also top 10 exporters of ITA. The largest importer of ITA products is China, followed by US, and EU. Japan is ranked fifth and Korea is ranked seventh in the list. Mexico, a non-ITA member, ranked number eight in the list. As can be seen, calculations show that imports have increased immensely in terms compound annual growth rates between 2009 and 2014 (see Table 5).

TABLE 5 Top 10 Importers of ITA, 2014

No.	Importer	Imports 2014 (million \$)	Share of total, 2014	Compound annual growth rates		
				1996- 2000	2001- 2008	2009- 2014
1	China	369,204	14	25	25	58
2	US	338,299	13	12	7	49
3	EU	265,524	10	10	-	11
4	Germany	121,427	5	9	9	13
5	Japan	106,931	4	10	7	41
6	Singapore	105,027	4	6	11	29
7	Korea	86,825	3	12	13	28
8	Mexico	81,157	3	24	10	36
9	Taiwan	76,928	3	49	-7.6	26
10	Netherlands	74,704	3	15	11	30
	World	2,401,139	100	17	-	-

Source: Anderson & Mohs (2010), Author's Calculation

2014 data obtained from HS96, data for EU and World's compound annual growth rates between 2001 and 2008 are missing in Anderson & Mohs 2010.

Across the seven different product segments defined in the ITA1, “parts and equipment” takes up the largest share in total exports and imports from 1996 until 2014, and “data storage media and software provided on physical media” takes up the smallest share. Share of exports and imports of “telecommunication equipment” increased the most from 11 percent in 1996 to roughly 22 percent in 2014. Both export and import share of telecommunication equipment jumped from 11 percent to 22 percent. Share of ITA trade in semiconductor manufacturing equipment decreased relative to total ITA trade, whilst semiconductors increased from 1996 to 2015 (see Table 6).

TABLE 6 Export and Import of ITA total trade, by product group

(in USD, in Millions, share of exports/import)

	Exports		Imports	
	1996	2014	1996	2014
Computers and Calculating Machines	108,633 (18)	396,867 (18)	142,239 (23)	386,353 (16)
Data storage media and software provided on physical media	23,007 (4)	37,794 (2)	19,322 (3)	48,338 (2)
Instruments and apparatus	23,203 (4)	74,021 (3)	24,026 (4)	84,787 (3)
Parts and accessories	206,709 (34)	647,185 (29)	199,527 (33)	646,296 (27)

Semiconductor manufacturing equipment	45,754 (8)	133,940 (6)	38,917 (6)	124,346 (5)
Semiconductors	124,991 (21)	478,800 (22)	124,287 (20)	624,323 (26)
Telecommunication equipment	65,928 (11)	449,229 (22)	67,206 (11)	498,669 (21)
TOTAL	598,227 (100)	2,217,838 (100)	615,527 (100)	2,413,116 (100)

Source: UNCTAD COMTRADE, Author's Calculation

Based on nomenclature HS 1996; ITA product group based on WTO classification

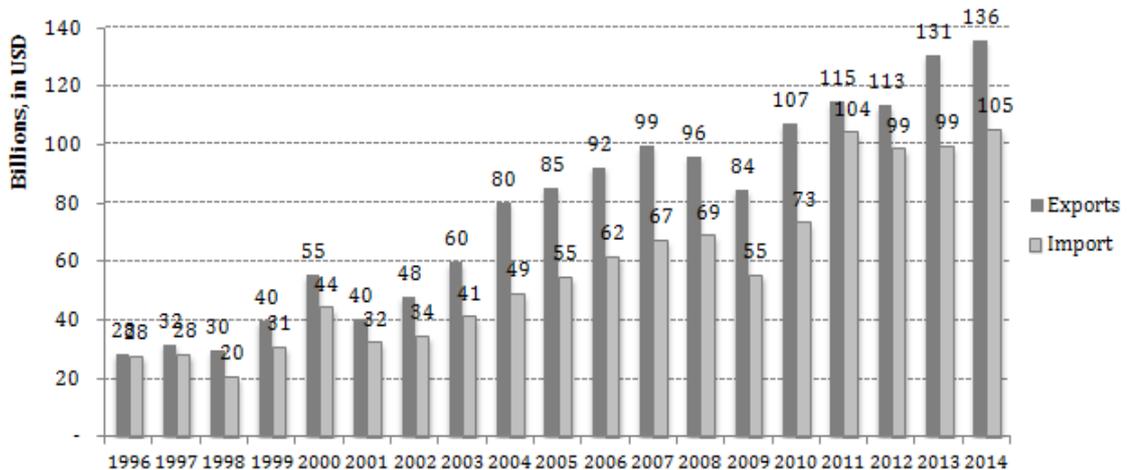
3.2 Korea's ITA trade

As one of the biggest IT powerhouses in the world, Korea's IT exports has flourished with the rapid development of IT industry over the years. In 2014, Korea was the fourth largest exporter and the seventh largest importer of ITA products. Korea's ITA exports take up roughly 23% of its total annual exports.⁷

Korea's ITA export to world increased from 28.4 billion USD in 1996 to 135.68 billion in 2014. In terms of ITA import, it has increased from 27.6 billion USD in 1996 to 105.2 billion USD in 2014 (see Figure 3). Looking at the figure below, Korea IT exports began to increase rapidly in the late 1990s until the run-up to the dot-com bubble in 2000. However, Korea's IT exports rebounded quickly and expanded throughout the 2000s, which again led to another bubble during the 2008 global financial crisis. Despite the short falls in 2001 and 2009, Korea's ITA trade has been escalating steadily over the years.

⁷ According to Korea International Trade Association, the percentage of Korea's IT trade relative to total annual export was 22.4 percent in 1997, 32 percent in 2000, 27.6 percent in 2010, and 23.4 percent in 2014.

Figure 3 Korea ITA Exports and Imports to World, 1996-2014



Source: UNCTAD COMTRADE, Author's Calculation

Based on nomenclature HS 1996; Chinese Taipei and ITA Appendix B have not been included in the calculations due to missing data.

3.3 Korea's ITA trade compared with China and Japan

Korea and Japan's ranking of import and export shares by country is remarkably similar. For both countries, China is the number one export and import destination for ITA goods. Interestingly, they are also ranked similarly as one another's import and export destination. Japan is Korea's sixth largest exporter and third largest importer. Korea, on the other hand, is Japan's sixth largest exporter and fourth largest importer. As for China, Japan is China's fourth largest export destination, closely followed by Korea. In terms of import destination for China, Japan is ranked third after Korea (see Table 7). All three countries record trade surpluses in the ITA market, with China having the greatest gap.

TABLE 7 Top 10 ITA Export and Import destination of Korea, China and Japan in 2014

(in USD, in Millions, % of country A's export/import of ITA to/from country B)

	Korea		China		Japan	
	Export	Import	Export	Import	Export	Import
1	China 52,718 (36)	China 29,186 (28)	Hong Kong 189,265 (30)	Taiwan 92,875 (25)	China 28,078 (25)	China 57,179 (53)
2	Hong Kong 16,858 (11)	Taiwan 11,311 (11)	US 120,561 (19)	Korea 82,742 (22)	US 15,885 (14)	Taiwan 11,944 (11)
3	US 15,183 (10)	Japan 11,294 (11)	EU 98,865 (15)	Japan 44,886 (12)	Taiwan 11,953 (11)	US 9,342 (9)
4	Vietnam 8,733 (6)	US 10,157 (10)	Japan 37,976 (6)	Malaysia 34,230 (9)	EU 11,613 (10)	Korea 6,782 (6)
5	EU 7,819 (5)	EU 8,266 (8)	Korea 37,045 (6)	US 26,847 (7)	Hong Kong 11,245 (10)	EU 5,624 (5)
6	Japan 5,805 (4)	Singapore 6,588 (6)	Netherlands 30,730 (5)	EU 26,394 (7)	Korea 9,545 (9)	Thailand 3,338 (3)
7	Taiwan 5,479 (4)	Germany 2,818 (3)	Taiwan 21,272 (3)	Philippines 13,556 (4)	Germany 5,006 (4)	Malaysia 3,252 (3)
8	Singapore 5,320 (4)	Netherlands 2,284 (2)	Germany 19,351 (3)	Germany 13,291 (4)	Thailand 4,667 (4)	Philippines 2,504 (2)
9	Philippines 3,782 (3)	Malaysia 2,239 (2)	Singapore 15,158 (2)	Thailand 12,504 (3)	Singapore 4,495 (4)	Singapore 2,482 (2)
10	Brazil 3,462 (2)	Philippines 1,372 (1)	UK 11,959 (2)	Singapore 11,571 (3)	Malaysia 3,341 (3)	Germany 2,259 (2)
Total	135,680 (100)	105,279 (100)	641,351 (100)	369,204 (100)	112,230 (100)	106,955 (100)

Source: UNCTAD COMTRADE, Author's Calculations

Based on nomenclature HS 1996

Compared to Korea and Japan, China’s ITA export was smaller in 1996, but outgrew both countries in 2014. Looking at the numbers, China’s ITA exports multiplied for each product groups. For Korea and Japan, exports for each ITA product group have increased, except for “data storage media and software provided on physical media”. Korea’s largest ITA export is “semiconductors”. Although total exports of semiconductors quadrupled from 14.7 billion USD to 56.4 billion USD since 1996, share of semiconductors exports relative to its total ITA exports dropped from 52 to 42 percent. In the case for China, exports of semiconductors increased the most from 1.2 billion USD to 142.9 billion USD, and its share of semiconductors exports relative to its total ITA exports jumped from 7 to 42 percent.

TABLE 8 Korea, China and Japan’s ITA Export in 1996 and 2014, by product group

(in USD, in millions)

ITA product group	Korea		China		Japan	
	1996	2014	1996	2014	1996	2014
Computers and Calculating Machines	4,707 (17)	5,438 (4)	1,358 (7)	20,230 (6)	5,418 (18)	17,240 (22)
Data storage media and software provided on physical media	1,100 (4)	1,020 (1)	382 (2)	3,819 (1)	1,273 (4)	1,250 (2)
Instruments and apparatus	154 (1)	1,853 (1)	493 (3)	7,677 (2)	973 (3)	1,572 (2)
Parts and accessories	4,602 (16)	45,070 (33)	9,965 (51)	122,858 (36)	12,662 (42)	20,445 (26)
Semiconductor manufacturing equipment	1,075 (4)	9,600 (7)	3,358 (17)	28,676 (8)	2,526 (8)	5,875 (8)

Semiconductors	14,659 (52)	56,378 (42)	1,267 (7)	142,891 (42)	4,910 (16)	14,061 (18)
Telecommunication equipment	2,139 (7)	16,321 (12)	2,616 (13)	17,432 (5)	2,698 (9)	16,827 (22)
Grand Total	28,427 (100)	135,680 (100)	19,439 (100)	343,583 (100)	30,463 (100)	77,270 (100)

Source: UNCTAD COMTRADE, Author's Calculations
Based on nomenclature HS 1996

Amongst the three countries, China imports roughly eight times more than Korea and Japan in 2014. Looking at imports, Korea and Japan mostly imports low-end manufacturing goods included in “parts and accessories”. As for China, it imports both high-end and low-end manufacturing ITA goods included in “telecommunication equipment”, “parts and accessories” and “computers and calculating machines”.

TABLE 9 Korea, China and Japan's ITA Import in 1996 and 2014, by product group

(in USD, in millions)

ITA product group	Korea		China		Japan	
	1996	2014	1996	2014	1996	2014
Computers and Calculating Machines	2,530 (9)	6,703 (6)	5,264 (21)	209,078 (25)	17,613 (20)	5,956 (4)
Data storage media and software provided on physical media	582 (2)	1,084 (1)	582 (2)	8,885 (1)	2,330 (3)	3,086 (2)
Instruments and apparatus	757 (3)	1,772 (2)	1,304 (5)	7,803 (1)	2,362 (3)	4,732 (3)
Parts and accessories	6,526 (24)	34,344 (33)	10,079 (40)	240,108 (29)	39,223 (44)	44,594 (33)

Semiconductor manufacturing equipment	6,219 (23)	21,535 (20)	256 (1)	20,702 (2)	9,702 (11)	26,600 (19)
Semiconductors	9,490 (34)	32,983 (31)	1,289 (5)	96,903 (12)	10,740 (12)	38,163 (28)
Telecommunication equipment	1,534 (6)	6,859 (7)	6,688 (26)	255,918 (30)	7,895 (9)	13,563 (10)
Grand Total	27,638 (100)	105,279 (100)	25,461 (100)	839,396 (100)	89,866 (100)	136,695 (100)

Source: UNCTAD COMTRADE, Author's Calculations
Based on nomenclature HS 1996

The trade value of top 10 most exported ITA1 products take up more than 50% of total ITA exports. Amongst the products, semiconductor (854230) is the most exported ITA good, which is also Korea and Japan's number one exported item. Other most exported ITA1 goods include telecommunication equipment (852520, 851780, 850440), computers and calculating machines (847130, 847170, 847160) and parts and accessories (851790, 847330). Another interesting fact is that some of Korea's most exported ITA1 goods are also included in China and Japan's top ten lists. China's four product codes (854230, 851790, 847330, 854140) and Japan's three product codes (854230, 854140, 852990) overlap with Korea's top ten exports.

TABLE 10 Top 10 ITA1 exports to world in 2014, by product code

(in USD, in Millions)

World		Korea		China		Japan	
Product code	Trade Value						
854230	453,244	854230	51,302	852520	115,926	854230	23,564
852520	201,626	851790	13,150	847130	108,658	901042	6,351
847130	143,293	852520	12,538	854230	60,865	847989	4,831

851790	119,536	852990	7,008	851790	45,113	852540	4,554
847330	111,547	847330	5,679	847330	30,452	854140	4,542
851780	104,117	853400	4,698	851780	29,352	847990	4,519
847170	69,493	853190	4,298	847160	26,081	853690	4,255
847160	58,649	854389	3,583	854140	19,389	845610	3,326
854140	53,501	854140	3,419	850440	18,244	852990	3,014
850440	51,415	847170	2,895	847150	17,583	851790	2,793
Top 10 ITA Products	1,366,425 (60%)		108,573 (78%)		471,667 (74%)		61,753 (55%)
Total ITA Exports	2,269,791 (100%)		138,612 (100%)		641,351 (100%)		112,341 (100%)

Source: UNCTAD COMTRADE, Author's Calculations
Based on nomenclature HS 1996

In view of this, even more items are overlapped in the list of top 10 ITA2 product list for each country. Looking at Korea's top 10 ITA2 world exports in 2014, six product codes correspond with China (854239, 854231, 851770, 854232, 852990, 847989) and Japan (854239, 854231, 851770, 854232, 850440, 852990). In fact, the top three most exported items for are all three countries (854239, 854231, 851770) are the most exported items in the world.

TABLE 11 Top 10 ITA2 exports to world in 2014, by product code

(in USD, in Millions)

World		Korea		China		Japan	
Product code	Trade Value						
854239	184,281	854239	12,261	854239	52,072	854239	7,525
854231	164,537	854231	8,231	854231	50,274	854231	4,113
851770	119,467	851770	7,604	851770	36,530	851770	3,729
851762	98,746	854232	6,531	854232	33,383	851762	3,5445
854232	94,491	900120	1,535	852990	12,798	854232	2,550
844399	51,908	850440	1,511	844399	7,773	850440	1,917

850440	50,243	848690	1,479	901390	7,591	844399	1,909
852990	49,212	852990	1,453	853690	6,984	901890	1,869
901890	43,507	851762	1,422	847989	6,745	852580	1,837
847989	37,756	847989	1,059	853190	4,574	852990	1,835
Top 10 ITA Products	894,152 (51%)		43,091 (62%)		218,730 (69%)		30,833 (47%)
Total ITA Exports	1,741,883 (100%)		69,141 (100%)		316,056 (100%)		65,463 (100%)

Source: UNCTAD COMTRADE, Author's Calculations
Based on nomenclature HS1996, product coverage in ITA1

4. Methodology

4.1 Empirical Analyses

Despite the significance of IT trade, ITA trade remains an under-researched field in the WTO. Aside from the research papers on ITA published by the WTO, there are very few research conducted on the subject.

The earliest empirical research on ITA was Bora and Liu's WTO working paper "Evaluating the Impact of the WTO Information Agreement" published in 2006. Bora and Liu used the gravity model approach to assess the effect of the ITA on bilateral trade flows based on the ITA membership of both exporter and importer. The results indicated that participation in the ITA will increase the value of the bilateral trade and that being a WTO member can avoid a large trade diversion effect.

Another notable research paper that was published recently and used the gravity model was Henn and Gnutzmann-Mkrtchyan's WTO working paper "the Layers of the IT Agreement's Trade Impact". The paper assessed the impact of ITA with a more rigid estimation strategy by "layering the effects" based on tariff reduction, tariff elimination, and non-tariff effects related to higher trade policy. Based on the results, Henn and Gnutzmann-Mkrtchyan argued that ITA has strong impacts on trade through layers, with effects varying across intermediate and final goods, and are heterogeneous across country groups. However, the authors noted that there is strong heterogeneity across products within country pairs in ITA trade. In this case, heterogeneity cannot be controlled in an aggregated data, which may lead to biased results.

Anderson and Moh's "The Information Technology Agreement: an assessment of World Trade in Informational Technology Products" provides a comprehensive understanding on the composition of ITA membership and product coverage. Although it lacks formal econometric evidence, the diverse economic profiles of ITA members presented in the paper provides an insight into understanding the size of the ITA market in terms of country and product coverage. Because there is no uniform data on ITA coverage, Anderson and Moh's estimation on the ITA trade value is a useful reference when calculating the size of ITA market and trade.

The author found two research papers that applied the partial equilibrium model to analyze the effects of ITA. One is a report published by Copenhagen Economics "Expanding the Information Technology Agreement (ITA)" in 2010 that analyzed ITA effects on the EU. The other paper is KIEP's "Analysis on the economic effect of WTO ITA2", which is a non-disclosure working paper

submitted to the Ministry of Trade, Industry and Energy in 2013 that analyzed the effect of ITA2 towards Korean IT exports. KIEP's research methodology was used as a benchmark for this research.

In the KIEP working paper, the effects of ITA2 was simulated by using the WTO World Integrated Solution (WITS) SMART program's partial equilibrium to analyze ITA's impact on Korea's IT industry. 21 signatory countries and 250 products have been taken into account in the analysis. These were countries that were negotiating on eliminating 250 ITA goods at the time of the research.

KIEP compared the ITA trade effects of Korea with China and Japan, and the results showed that Korea's ITA exports to world would increase by 17 billion USD based on exports to China and Japan, in which exports to China would increase by 16.4 billion USD, and exports to Japan by 6.88 million USD. Export change for China is significantly larger than Japan because most of China's ITA2 goods have high tariffs, whereas Japan has zero tariffs for most ITA2 goods. Looking at product groups, it is expected that Korea's exports on imaging devices would increase by 9.2 billion USD, IT materials by 1.8 billion USD, optical instruments by 1.6 billion USD and IT manufacturing equipment by 1 billion USD. This implies that China's tariff elimination on ITA products, especially on LCD panels, would lead to a large increase in Korea's IT exports.

The results presented in the KIEP paper concluded that ITA2 is beneficial to Korea's exports as a whole, with large trade creation coming from China due to big tariff changes and increase in trade volumes. However, KIEP has failed to provide a comprehensive overview of Korea's ITA export and import

composition in comparison with China and Japan's, and has not specified the challenges stemming from zero-tariff competition against these two countries in world trade.

4.2 Research Hypothesis

Despite Korea's current relative strength in IT, China is fast catching up with Korea's IT technology and manufacturing.⁸ As already seen in the ITA trade data, China's exports of ITA are significantly greater than Korea and Japan as a whole and also for each product group (see Table 8). Moreover, Korea lacks the capacity to compete against Japan's wide ranging IT goods. Korea's top IT exports is losing its competitive edge in the global market due to pressure being sandwiched between China and Japan.

There is no doubt that Korea will gain immense trade creation that comes along with the benefits of a zero-tariff regime. Korea has already been successful in exporting IT products covered in the ITA1, however, the author assumes that Korea will face increasing export competition with China and Japan in the products covered in ITA2.

Looking at Korea's top 10 ITA export products for ITA2 in 2014, at least six exports items are also enlisted in China and Japan's top 10 ITA export items. Although it is expected that there will be a large trade creation effect when tariffs are down to zero, Korea will face a high degree of trade diversion which could potentially hurt its IT industry.

⁸ *FTA with China brings challenges*, Joongang Daily, Nov 11 2014.

4.3 Research Methodology

The author analyzes Korea's exports and imports on ITA products by looking at trade competitiveness compared to China and Japan in the global ITA trade.

The author used World Integrated Trade Solution (WITS) SMART program – a partial equilibrium modeling tool – to analyze the effects of ITA2 towards Korea's IT products based on the changes in the relative prices of products traded amongst participating member countries.

The partial equilibrium model only considers the effects of a given policy action in the markets that are directly affected. Unlike the general equilibrium, the model overlooks interactions between various markets in a given economy.

Measuring trade gains and losses is used to simulate the impact of preferential trade agreements towards a non-member country, postulating that a non-member country joins the agreement. All member countries of ITA have enacted ITA1, and recently signed ITA2. However, they have not adopted the ITA2 yet. In this scenario, member countries of ITA have eliminated tariffs for all products enlisted in ITA2.

In the modeling, all 79 ITA member countries⁹ will cut tariffs to zero on 201 products covered in ITA2. Hypothetically, this will increase Korea's exports of

⁹ As mentioned before in the "ITA membership" chapter, there are 79 member countries participating in the ITA2 as of 2015. These countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Italy, Japan, South Korea, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Chinese Taipei, UK, US, Turkey, Indonesia, Czech Republic, Estonia, Israel, Macao, New Zealand, Slovakia, Costa Rica, Malaysia, Poland, Romania, El Salvador, India Philippines, Thailand, Panama, Croatia, Latvia, Lithuania,

ITA2 products in the global market, leading to trade creation and trade diversion effect. ITA2 data is based on nomenclature HS2007 of six digit product codes¹⁰, which is obtained from WITS that have databases from UNSD COMTRADE, UNCTAD TRAINS and WTO IDB/CTS. Trade data covers 201 products corresponding to 196 HS2007 subheadings of six digit product codes, and tariff data have been updated to the most recent 2014.

The rationale behind the SMART model is to assess the likely economic effects from the impact of trade policy options weighted by other importing countries in a given market, and measure the trade gains and losses for each product code and group at the industry level. Because trade gains and losses were calculated for one market each time, the author simulated the effects for Korea's top 10 ITA exporting countries, which accounts for more than 80 percent of its total ITA exports.

The core assumption of SMART Model is based on the Armington assumption that imports from different countries are imperfect substitutes.

$$U = \sum_j \mathbf{u}_j(\mathbf{c}_j) + \mathbf{c}_o \quad (1.1)$$

Here, \mathbf{c}_o stands for consumption of a composite goods used as numeraire and \mathbf{c}_j for consumption of good imported from other country(ies). Using the quasi-linear utility function, there is no substitution between \mathbf{c}_o and \mathbf{c}_j .

Mauritius, Albania, Georgia, Jordan, Kyrgyzstan, Cyprus, Oman, Slovenia, Bulgaria, Moldova, Bahrain, China, Egypt, Morocco, Hungary, Malta, Nicaragua, Saudi Arabia, Dominic Republic, Guatemala, Honduras, United Arab Emirates, Vietnam, Peru, Ukraine, Kuwait, Colombia, Montenegro and Russia.

¹⁰ The issue on data coverage was consulted with researchers at WTO and KIEP.

Consider representative good, an importer, and exporters. Subscript j indicates goods, subscript i indicate exporters. After calculating the maximum utility, the balanced equilibrium between consumption of numeraire goods and consumption of imported goods can be obtained as follows:

$$m_{j,i} = f(p_{j,i}^d, p_{j \neq i}^d), \forall_{j,i} j \neq i \quad (1.2)$$

$$c_o = y - \sum_i \sum_j (p_{j,i}^d \times m_{k,j}) \quad (1.3)$$

Here, $p_{j,i}^d$ and $p_{j \neq i}^d$ shows imported goods k from exporter i and other exporters.

Here, tariff is the difference between domestic price and world price. The relationship between domestic and world price can be summarized as equation 1.4, where P is the landed price of a representative good in a representative importer country,

$$p_{j,i}^d = p_{j,i}^w (1 + t_{j,i}) \quad (1.4)$$

and t is the applied tariff in which MFN tariff is reduced by the preference margin

$$t_{j,i} = t_j^{MFN} (1 + \theta_{j,i}) \quad (1.5)$$

Elasticity is applied to see the change in trade depending on the preference margin. Demand for imported goods is departed by price elasticity below

$$\epsilon = \frac{dm_{j,i}}{m_{j,i}} \bigg/ \frac{dp_{j,i}^d}{p_{j,i}^d} < 0 \quad (1.6)$$

SMART assumes that all countries face fixed world prices (also known as small country case). Hence, P is fixed, and the changes in domestic price are simply directly affected by tariff changes. When tariff is reduced, two kinds of trade effects happen: trade creation and trade diversion.

Trade creation is calculated based on the direct increase in imports determined by tariff reduction.

$$TC_{j,i} = p_{j,i}^w dm_{j,i} = p_{j,i}^w \epsilon_{j,i} m_{j,i} \frac{dp_{j,i}^d}{p_{j,i}^d} \quad (1.7)$$

When adding the tariff reduction into the model, we can see that trade creation is determined by price elasticity, import volume and tariff rate.

$$TC_{j,i} = p_{j,i}^w dm_{j,i} = p_{j,i}^w \epsilon_{j,i} m_{j,i} \frac{dt_{j,i}}{(1+t_{j,i})} = \epsilon_{j,i} m_{j,i} \frac{dt_{j,i}}{(1+t_{j,i})} \quad (1.8)$$

On the other hand, trade diversion occurs when a preferential tariff reduction granted by importer to exporter will induce substitution of imports away from other countries. The trade diversion is calculated using the elasticity of substitution, which is calculated as follows.

$$\sigma = \frac{d\left[\frac{m_{j,i}}{m_{j,\neq i}}\right]}{\frac{m_{j,i}}{m_{j,\neq i}}} \bigg/ \frac{d\left[\frac{p_{j,i}^d}{p_{j,\neq i}^d}\right]}{\frac{p_{j,i}^d}{p_{j,\neq i}^d}} < 0 \quad (1.9)$$

Adding the elasticity of substitution, we can obtain the equation for trade diversion below:

$$TD_{j,i} = dm_{j,i} = \left(\frac{m_{j,\neq i} m_{j,i}}{m_{j,\neq i} + m_{j,i}}\right) \left(\frac{dt_{j,i}}{(1+t_{j,i})}\right) \sigma \quad (1.10)$$

Based on equation 1.9, we can obtain two factors that affect elasticity of substitution: price substitution (equation 1.11) and import substitution (1.12).

$$\frac{d\left[\frac{p_{j,i}^d}{p_{j,\neq i}^d}\right]}{\frac{p_{j,i}^d}{p_{j,\neq i}^d}} = \frac{p_{j,i}^w dt_{j,i}}{p_{j,\neq i}^w (1+t_{j,\neq i})} = \frac{p_{j,i}^w dt_{j,i}}{p_{j,i}^w (1+t_{j,i})} = \frac{dt_{j,i}}{(1+t_{j,i})} \quad (1.11)$$

$$\frac{m_{j,i}}{m_{j,\neq i}} = \frac{dm_{j,i}}{m_{j,\neq i}} - \frac{m_{j,i} dm_{j,\neq i}}{(m_{j,\neq i})^2} = \frac{dm_{j,i} (m_{j,i} + m_{j,\neq i})}{(m_{j,\neq i})^2} \quad (1.12)$$

5. Results

According to the results of the SMART model, Korea will acquire a net gain of 11.2 billion USD in total export change. However, not all exporters will benefit from ITA2. Exporters of 56 ITA products will suffer net loss of 21 million USD (see Appendix C). Some of these products are in the industries that produce measuring instruments, optical instruments, audio equipment, telecommunication equipment and IT manufacturing equipment.

Looking at the simulated trade effects by product groups, China has the largest net gain in trade creation at 2.97 billion USD, followed by Japan at 2.7 billion USD. Out of the three countries, Korea has the lowest net gain of 1.27 billion, in which optical instruments, IT material and audio equipment contributes to the most. Surprisingly, in terms of trade diversion, Korea is the only country that suffers net loss of 149 million USD in trade diversion, whereas Japan has a higher net gain in trade diversion compared to China at 513 million USD. This indicates that Korea is at a disadvantage when competing with other countries in exporting ITA2 in the global market. The total trade effect combines the results of trade creation, trade diversion and price effects. Korea has the lowest total trade effect at 1.12 billion USD, followed by Japan at 3.22 billion USD, and then China at 3.46 billion USD.

TABLE 12 Trade effects by product group

(in USD)

Trade creation

	Korea	China	Japan
Audio equipment	216,227,291	649,206,556	385,986,917

Electromechanical equipment	75,109,701	323,753,695	151,831,666
Imaging devices	78,138,422	1,017,199,525	213,251,242
IT manufacturing equipment	71,249,456	142,734,821	358,122,126
IT material	255,836,416	185,597,228	971,564,227
Measuring instrument	40,962,178	64,747,160	172,380,301
Medical equipment	8,673,863	18,972,340	58,090,373
Optical instruments	306,079,137	28,690,238	132,054,980
Other	76,844,654	239,399,003	94,310,488
Other machineries	10,980,683	81,529,912	130,873,720
Semiconductor	13,359,498	2,760,055	1,686,400
Telecommunication equipment	117,952,958	215,981,576	24,908,011
Grand Total	1,271,414,257	2,970,572,108	2,704,694,337

Trade diversion

	Korea	China	Japan
Audio equipment	-32,011,153	78,855,966	60,002,280
Electromechanical equipment	1,762,469	65,979,487	29,709,050
Imaging devices	-10,647,177	105,147,866	24,939,274
IT manufacturing equipment	-2,828,426	52,014,297	147,410,810
IT material	-6,520,511	-706,957	38,337,632
Measuring instrument	-6,848,461	27,751,453	59,652,604
Medical equipment	-1,628,370	8,041,987	21,384,710
Optical instruments	16,274,282	12,973,964	40,012,515
Other	-75,624,231	92,803,778	37,846,871
Other machineries	-1,189,615	18,400,374	45,556,846
Semiconductor	-11,556,866	-2,229,078	284,850
Telecommunication equipment	-18,645,608	32,752,767	7,494,834
Grand Total	-149,572,321	491,785,904	513,106,562

Total trade effects

	Korea	China	Japan
Audio equipment	184,216,142	728,062,529	445,989,210
Electromechanical	76,872,170	389,733,177	181,540,717

equipment			
Imaging devices	67,491,245	1,122,347,406	238,190,519
IT manufacturing equipment	68,421,030	194,749,119	505,532,930
IT material	249,315,911	184,890,269	1,009,901,894
Measuring instrument	34,113,717	92,498,612	232,032,905
Medical equipment	7,045,493	27,014,327	79,475,083
Optical instruments	322,353,422	41,664,202	172,067,495
Other	1,220,425	332,202,773	132,157,358
Other machineries	9,791,068	99,930,285	176,430,564
Semiconductor	1,802,633	530,976	1,971,250
Telecommunication equipment	99,307,347	248,734,345	32,402,845
Grand Total	1,121,841,948	3,462,358,021	3,217,800,942

In terms of the trade effects of Korea's top 10 ITA exports in 2014, the simulation results were also not too optimistic. Looking at Korea, nine out of ten ITA2 products faced net loss in trade diversion. Unexpectedly, the simulation churned out better results for Japan compared to China, as all of Japan's ITA products have produced net gains in trade diversion. In total trade effects, Japan has the largest net gains in terms of trade volume, surpassing China by far (see Table 13).

TABLE 13 Trade effects in terms of Korea's top 10 ITA exports in 2014

(in USD)

Trade creation

	Korea	China	Japan
847989	4,127,071	44,529,702	61,396,739
848690	5,437,693	2,190,057	1,694,904,426
850440	12,069,000	162,379,033	1,864,178,465
851762	1,535,275	75,318,727	154,306,783
851770	115,764,618	121,847,397	47,807,098

852990	64,814,616	153,793,730	789,328,836
854231	0	0	30,885,277
854232	12,975,805	2,531,146	565,533
900120	30,048,390	7,846,131	71,216,481

Trade diversion

	Korea	China	Japan
847989	-1,136,265	23,088,971	32,276,216
848690	-1,998,327	1,130,035	14,912,056
850440	-2,626,518	23,755,413	12,288,689
851762	261,535	11,337,278	392,941
851770	-18,542,209	17,081,166	6,338,880
852990	-67,343,093	72,895,196	17,484,553
854231	-9,165,619	-2,145,988	210,082
854232	-2,613,146	-172,270	112,236
900120	-2,341,030	1,023,738	8,524,663

Total trade effects

	Korea	China	Japan
847989	2,990,806	67,618,675	93,672,956
848690	3,439,367	3,320,091	2,610,455,978
850440	9,442,481	186,134,442	2,203,417,282
851762	1,796,810	86,656,007	180,841,499
851770	97,222,407	138,928,561	62,291,814
852990	-2,528,475	226,688,919	1,155,133,683
854231	-9,165,619	-2,145,988	38,811,243
854232	10,362,659	2,358,876	657,414
900120	27,707,361	8,869,869	77,105,556

Looking at Korea's market, Korea's total import has increased by 1.177 billion USD. However, due to the elimination of tariffs, revenue in tariff dropped by 956 million USD, with consumer surplus increasing by 25 million USD.

Overall, the simulation did not draw optimistic conclusions; hence, Korea seems to benefit much less compared to China and Japan in the ITA2.

6. Conclusion

ITA trade has grown immensely over the years since the inception of ITA in 1997. In 2014, the value of ITA world exports was 2.27 trillion USD and world import was 2.40 trillion USD. As one of the leading ICT powerhouses in the world, Korea is an active participant and supporter of the ITA. Korea's total ITA export to world is valued at 136 billion USD, and import to world is 105 billion USD.

As many papers have emphasized, ITA will bring large benefits to all IT export countries and increase total trade value. However, we must not neglect the fact that Korea will be exposed to more competition with IT developed countries, such as its neighboring countries China and Japan, across the same product items. In recent years, China has already caught up by producing high-end manufacturing IT goods such as semiconductors, which was spurred by the Chinese government's effort to strengthen the capabilities of mainland semiconductor companies.¹¹ Korea's ITA export volume is much smaller than China and Japan, and Korea still has to withstand the uneven price competition against Chinese IT goods (unlike Japan and Korea, China still applies high tariffs for certain import products). Adding to the problem, Korea's ITA exports are heavily dependent on China's imports, and exports of ITA are heavily concentrated on certain products. To ensure the sustainability of Korean IT economy and make sure that it doesn't get "squeezed" out by China and Japan, the government needs to be strategic with Korea's participation in the ITA.

¹¹ *Semiconductors in China: Brave new world or same old story?*, McKinsey Insights & Publications, August 2014.

There is still much add to this research to get a fully comprehensive understanding. The partial equilibrium model approach partially looks at the economy, and tends to neglect the important inter-sectoral input and output linkages that are the basis of general equilibrium analyses. It also misses the existing constraints that apply to the various factors of production and their movement across sectors. Not to mention, value-added chains and multinational corporations are not incorporated in the analysis, which is important to understanding today's global economy.

More research needs to be conducted on the ITA, and the ITA system needs to be constantly renewed to ensure clearer understanding of the trend in ITA trade. The author hopes that this preliminary research can contribute to the research on ITA.

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Appendix A – Product coverage of Information Technology Agreement 1

Item	Product code	Type	Product description	Product group	Others
1	381800	AttachA, Section 1	Chemical elements doped for use in electronics, in form of discs, wafers or similar forms; chemical compounds doped for use in electronics	Parts and accessories	
2	846911	AttachA, Section 1	Word processing machines	Computers and Calculating Machines	
3	847010	AttachA, Section 1	Electronic calculators capable of operating without an external source of electric power and pocket size data recording, reproducing and displaying machines with calculating functions	Instruments and apparatus	
4	847021	AttachA, Section 1	Other electronic calculating machines incorporating a printing device	Computers and Calculating Machines	
5	847029	AttachA, Section 1	Other	Computers and Calculating Machines	
6	847030	AttachA, Section 1	Other calculating machines	Computers and Calculating Machines	
7	847040	AttachA, Section 1	Accounting machines	Computers and Calculating Machines	
8	847050	AttachA, Section 1	Cash registers	Instruments and apparatus	
9	847090	AttachA, Section 1	Other	Instruments and apparatus	
10	847110	AttachA, Section 1	Analogue or hybrid automatic data processing machines	Computers and Calculating Machines	
11	847130	AttachA, Section 1	Portable digital automatic data processing machines, weighing no more than 10 kg, consisting of at least a central processing unit, a keyboard and a display	Computers and Calculating Machines	
12	847141	AttachA, Section 1	Other digital automatic data processing machines comprising in the same housing at least a central processing unit and an input and output unit, whether or not combined	Computers and Calculating	

				Machines	
13	847149	AttachA, Section 1	Other digital automatic data processing machines presented in the form of systems	Computers and Calculating Machines	
14	847150	AttachA, Section 1	Digital processing units other than those of subheading 8471 41 and 8471 49, whether or not in the same housing one or two of the following types of units : storage units, input units, output units	Computers and Calculating Machines	
15	847160	AttachA, Section 1	Input or output units, whether or not containing storage units in the same housing	Computers and Calculating Machines	
16	847170	AttachA, Section 1	Storage units, including central storage units, optical disk storage units, hard disk drives and magnetic tape storage units	Computers and Calculating Machines	
17	847180	AttachA, Section 1	Other units of automatic data processing machines	Computers and Calculating Machines	
18	847190	AttachA, Section 1	Other	Computers and Calculating Machines	
19	847290	AttachA, Section 1	Automatic teller machines	Instruments and apparatus	
20	847321	AttachA, Section 1	Parts and accessories of the machines of heading No 8470 of the electronic calculating machines of subheading 8470 10, 8470 21 and 8470 29	Parts and accessories	
21	847329	AttachA, Section 1	Parts and accessories of the machines of heading No 8470 other than the electronic calculating machines of subheading 8470 10, 8470 21 and 8470 29	Parts and accessories	
22	847330	AttachA, Section 1	Parts and accessories of the machines of heading No 8471	Parts and accessories	
23	847350	AttachA, Section 1	Parts and accessories equally suitable for use with machines of two or more of the headings Nos. 8469 to 8472	Parts and accessories	
24	850440	AttachA, Section 1	Static converters for automatic data processing machines and units thereof, and telecommunication apparatus	Telecommunicatio n equipment	
25	850450	AttachA, Section 1	Other inductors for power supplies for automatic data processing machines and units thereof, and telecommunication apparatus	Telecommunicatio n equipment	
26	851711	AttachA, Section 1	Line telephone sets with cordless handsets	Telecommunicatio n equipment	
27	851719	AttachA,	Other telephone sets and videophones	Telecommunicatio	

		Section 1		n equipment	
28	851721	AttachA, Section 1	Facsimile machines	Telecommunicatio n equipment	
29	851722	AttachA, Section 1	Teleprinters	Telecommunicatio n equipment	
30	851730	AttachA, Section 1	Telephonic or telegraphic switching apparatus	Telecommunicatio n equipment	
31	851750	AttachA, Section 1	Other apparatus, for carriercurrent line systems or for digital line systems	Telecommunicatio n equipment	
32	851780	AttachA, Section 1	Other apparatus including entryphone systems	Telecommunicatio n equipment	
33	851790	AttachA, Section 1	Parts of apparatus of heading 8517	Parts and accessories	
34	851810	AttachA, Section 1	Microphones having a frequency range of 300 Hz to 3,4 KHz with a diameter of not exceeding 10 mm and a height not exceeding 3 mm, for telecommunication use	Parts and accessories	
35	851830	AttachA, Section 1	Line telephone handsets	Telecommunicatio n equipment	
36	851829	AttachA, Section 1	Loudspeakers, without housing, having a frequency range of 300 Hz to 3,4 KHz with a diameter of not exceeding 50 mm, for telecommunication use	Parts and accessories	
37	852020	AttachA, Section 1	Telephone answering machines	Telecommunicatio n equipment	
38	852311	AttachA, Section 1	Magnetic tapes of a width not exceeding 4 mm	Data storage media and software provided on physical media	
39	852312	AttachA, Section 1	Magnetic tapes of a width exceeding 4 mm but not exceeding 6,5 mm	Data storage media and software provided on physical media	
40	852313	AttachA, Section 1	Magnetic tapes of a width exceeding 6,5 mm	Data storage media and software provided on physical media	
41	852320	AttachA, Section 1	Magnetic discs	Data storage media and software provided on physical media	

42	852390	AttachA, Section 1	Other	Data storage media and software provided on physical media	
43	852431	AttachA, Section 1	Discs for laser reading systems for reproducing phenomena other than sound or image	Data storage media and software provided on physical media	
44	852439	AttachA, Section 1	Other: for reproducing representations of instructions, data, sound, and image, recorded in a machine readable binary form, and capable of being manipulated or providing interactivity to a user, by means of an automatic data processing machine	Data storage media and software provided on physical media	
45	852440	AttachA, Section 1	Magnetic tapes for reproducing phenomena other than sound or image	Data storage media and software provided on physical media	
46	852491	AttachA, Section 1	Media for reproducing phenomena other than sound or image	Data storage media and software provided on physical media	
47	852499	AttachA, Section 1	Other: for reproducing representations of instructions, data, sound, and image, recorded in a machine readable binary form, and capable of being manipulated or providing interactivity to a user, by means of an automatic data processing machine	Data storage media and software provided on physical media	
48	852510	AttachA, Section 1	Transmission apparatus other than apparatus for radiobroadcasting or television	Telecommunicatio n equipment	
49	852520	AttachA, Section 1	Transmission apparatus incorporating reception apparatus	Telecommunicatio n equipment	
50	852540	AttachA, Section 1	Digital still image video cameras	Telecommunicatio n equipment	
51	852790	AttachA, Section 1	Portable receivers for calling, alerting or paging	Telecommunicatio n equipment	
52	852910	AttachA, Section 1	Aerials or antennae of a kind used with apparatus for radiotelephony and radiotelegraphy	Telecommunicatio n equipment	
53	852990	AttachA, Section 1	Parts of:transmission aparatus other than apparatus for radio-broadcasting or television transmission apparatus incorporating reception apparatus digital still image video cameras, portable receivers for calling, alerting or paging	Parts and accessories	

54	853120	AttachA, Section 1	Indicator panels incorporating liquid crystal devices (LCD) or light emitting diodes (LED)	Parts and accessories	
55	853190	AttachA, Section 1	Parts of apparatus of subheading 8531 20	Parts and accessories	
56	853210	AttachA, Section 1	Fixed capacitors designed for use in 50/60 Hz circuits and having a reactive power handling capacity of not less than 0,5 kvar (power capacitors)	Parts and accessories	
57	853221	AttachA, Section 1	Tantalum fixed capacitors	Parts and accessories	
58	853222	AttachA, Section 1	Aluminium electrolytic fixed capacitors	Parts and accessories	
59	853223	AttachA, Section 1	Ceramic dielectric, single layer fixed capacitors	Parts and accessories	
60	853224	AttachA, Section 1	Ceramic dielectric, multilayer fixed capacitors	Parts and accessories	
61	853225	AttachA, Section 1	Dielectric fixed capacitors of paper or plastics	Parts and accessories	
62	853229	AttachA, Section 1	Other fixed capacitors	Parts and accessories	
63	853230	AttachA, Section 1	Variable or adjustable (preset) capacitors	Parts and accessories	
64	853290	AttachA, Section 1	Parts	Parts and accessories	
65	853310	AttachA, Section 1	Fixed carbon resistors, composition or film types	Parts and accessories	
66	853321	AttachA, Section 1	Other fixed resistors for a power handling capacity not exceeding 20 W	Parts and accessories	
67	853329	AttachA, Section 1	Other fixed resistors for a power handling capacity of 20 W or more	Parts and accessories	
68	853331	AttachA, Section 1	Wirewound variable resistors, including rheostats and potentiometers, for a power handling capacity not exceeding 20 W	Parts and accessories	
69	853339	AttachA, Section 1	Wirewound variable resistors, including rheostats and potentiometers, for a power handling capacity of 20 W or more	Parts and accessories	
70	853340	AttachA, Section 1	Other variable resistors, including rheostats and potentiometers	Parts and accessories	
71	853390	AttachA, Section 1	Parts	Parts and accessories	

72	853400	AttachA, Section 1	Printed circuits	Parts and accessories	
73	853650	AttachA, Section 1	Electronic AC switches consisting of optically coupled input and output circuits (Insulated thyristor AC switches)	Parts and accessories	
74	853650	AttachA, Section 1	Electronic switches, including temperature protected electronic switches, consisting of a transistor and a logic chip (chiponchip technology) for a voltage not exceeding 1000 volts	Parts and accessories	
75	853650	AttachA, Section 1	Electromechanical snapaction switches for a current not exceeding 11 amps	Parts and accessories	
76	853669	AttachA, Section 1	Plugs and sockets for coaxial cables and printed circuits	Parts and accessories	
77	853690	AttachA, Section 1	Connection and contact elements for wires and cables	Parts and accessories	
78	854110	AttachA, Section 1	Diodes, other than photosensitive or lightemitting diodes	Semiconductors	
79	854121	AttachA, Section 1	Transistors, other than photosensitive transistors, with a dissipation rate of less than 1 W	Semiconductors	
80	854129	AttachA, Section 1	Transistors, other than photosensitive transistors, with a dissipation rate of 1 W or more	Semiconductors	
81	854130	AttachA, Section 1	Thyristors, diacs and triacs, other than photosensitive devices	Semiconductors	
82	854140	AttachA, Section 1	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	Semiconductors	
83	854150	AttachA, Section 1	Other semiconductor devices	Semiconductors	
84	854160	AttachA, Section 1	Mounted piezoelectric crystals	Semiconductors	
85	854190	AttachA, Section 1	Parts	Parts and accessories	
86	854212	AttachA, Section 1	Cards incorporating an electronic integrated circuit ('smart' cards)	Semiconductors	
87	854213	AttachA, Section 1	Metal oxide Semiconductors (MOS technology)	Semiconductors	
88	854214	AttachA, Section 1	Circuits obtained by bipolar technology	Semiconductors	
89	854219	AttachA, Section 1	Other monolithic digital integrated circuits, including circuits obtained by a combination of bipolar and MOS technologies (BIMOS technology)	Semiconductors	

90	854230	AttachA, Section 1	Other monolithic integrated circuits	Semiconductors	
91	854240	AttachA, Section 1	Hybrid integrated circuits	Semiconductors	
92	854250	AttachA, Section 1	Electronic microassemblies	Semiconductors	
93	854290	AttachA, Section 1	Part	Semiconductors	
94	854381	AttachA, Section 1	Proximity cards and tags	Parts and accessories	
95	854389	AttachA, Section 1	Electrical machines with translation or dictionary functions	Instruments and apparatus	
96	854441	AttachA, Section 1	Other electric conductors, for a voltage not exceeding 80 V, fitted with connectors, of a kind used for telecommunications	Parts and accessories	
97	854449	AttachA, Section 1	Other electric conductors, for a voltage not exceeding 80 V, not fitted with connectors, of a kind used for telecommunications	Parts and accessories	
98	854451	AttachA, Section 1	Other electric conductors, for a voltage exceeding 80 V but not exceeding 1000 V, fitted with connectors, of a kind used for telecommunications	Parts and accessories	
99	854470	AttachA, Section 1	Optical fibre cables	Parts and accessories	
100	900911	AttachA, Section 1	Electrostatic photocopying apparatus, operating by reproducing the original image directly onto the copy (direct process)]	Instruments and apparatus	
101	900921	AttachA, Section 1	Other photocopying apparatus, incorporating an optical system	Instruments and apparatus	
102	900990	AttachA, Section 1	Parts and accessories	Parts and accessories	
103	902610	AttachA, Section 1	Instruments for measuring or checking the flow or level of liquids	Instruments and apparatus	
104	902620	AttachA, Section 1	Instruments and apparatus for measuring or checking pressure	Instruments and apparatus	
105	902680	AttachA, Section 1	Other instruments and apparatus for measuring or checking of heading 9026	Instruments and apparatus	
106	902690	AttachA, Section 1	Parts and accessories of instruments and apparatus of heading 9026	Parts and accessories	
107	902720	AttachA, Section 1	Chromatographs and electrophoresis instruments	Instruments and apparatus	

108	902730	AttachA, Section 1	Spectrometers, spectrophotometers and spectrographs using optical radiations (UV, visible, IR)	Instruments and apparatus	
109	902750	AttachA, Section 1	Other instruments and apparatus using optical radiations (UV, visible, IR) of heading No 9027	Instruments and apparatus	
110	902780	AttachA, Section 1	Other instruments and apparatus of heading No 9027 (other than those of heading No 9027 10)	Instruments and apparatus	
111	902790	AttachA, Section 1	Parts and accessories of products of heading 9027, other than for gas or smoke analysis apparatus and microtomes	Parts and accessories	
112	903040	AttachA, Section 1	Instruments and apparatus for measuring and checking, specially designed for telecommunications (for example, crosstalk meters, gain measuring instruments, distortion factor meters, psophometers)	Instruments and apparatus	
113	701710	AttachA, Section 1	Quartz reactor tubes and holders designed for insertion into diffusion and oxidation furnaces for production of semiconductor wafers	Semiconductor manufacturing equipment	
114	841989	AttachA, Section 1	Chemical vapor deposition apparatus for semiconductor production	Semiconductor manufacturing equipment	
115	841990	AttachA, Section 1	Parts of chemical vapor deposition apparatus for semiconductor production	Parts and accessories	
116	842119	AttachA, Section 1	Spin dryers for semiconductor wafer processing	Semiconductor manufacturing equipment	
117	842191	AttachA, Section 1	Parts of spin dryers for semiconductor wafer processing	Parts and accessories	
118	842489	AttachA, Section 1	Deflash machines for cleaning and removing contaminants from the metal leads of semiconductor packages prior to the electroplating process	Semiconductor manufacturing equipment	
119	842489	AttachA, Section 1	Spraying appliances for etching, stripping or cleaning semiconductor wafers	Semiconductor manufacturing equipment	
120	842490	AttachA, Section 1	Parts of spraying appliances for etching, stripping or cleaning semiconductor wafers	Parts and accessories	For Attachment B
121	845610	AttachA, Section 1	Machines for working any material by removal of material, by laser or other light or photo beam in the production of semiconductor wafers	Semiconductor manufacturing equipment	For Attachment B
122	845691	AttachA, Section 1	Apparatus for stripping or cleaning semiconductor wafers	Semiconductor manufacturing equipment	For Attachment B

123	845691	AttachA, Section 1	Machines for dryetching patterns on semiconductor materials	Semiconductor manufacturing equipment	
124	845699	AttachA, Section 1	Focused ion beam milling machines to produce or repair masks and reticles for patterns on semiconductor devices	Semiconductor manufacturing equipment	
125	845699	AttachA, Section 1	Lasercutters for cutting contacting tracks in semiconductor production by laser beam	Semiconductor manufacturing equipment	
126	846410	AttachA, Section 1	Machines for sawing monocrystal semiconductor boules into slices, or wafers into chips	Semiconductor manufacturing equipment	
127	846420	AttachA, Section 1	Grinding, polishing and lapping machines for processing of semiconductor wafers	Semiconductor manufacturing equipment	
128	846490	AttachA, Section 1	Dicing machines for scribing or scoring semiconductor wafers	Semiconductor manufacturing equipment	
129	846691	AttachA, Section 1	Parts for machines for sawing monocrystal semiconductor boules into slices, or wafers into chips	Parts and accessories	For Attachment B
130	846691	AttachA, Section 1	Parts of dicing machines for scribing or scoring semiconductor wafers	Parts and accessories	
131	846691	AttachA, Section 1	Parts of grinding, polishing and lapping machines for processing of semiconductor wafers	Parts and accessories	
132	846693	AttachA, Section 1	Parts of focused ion beam milling machines to produce or repair masks and reticles for patterns on semiconductor devices	Parts and accessories	For Attachment B
133	846693	AttachA, Section 1	Parts of lasercutters for cutting contacting tracks in semiconductor production by laser beam	Parts and accessories	For Attachment B
134	846693	AttachA, Section 1	Parts of machines for working any material by removal of material, by laser or other light or photo beam in the production of semiconductor wafers	Parts and accessories	
135	846693	AttachA, Section 1	Parts of apparatus for stripping or cleaning semiconductor wafers	Parts and accessories	
136	846693	AttachA, Section 1	Parts of machines for dryetching patterns on semiconductor materials	Parts and accessories	For Attachment B
137	847710	AttachA, Section 1	Encapsulation equipment for assembly of semiconductors	Semiconductor manufacturing equipment	For Attachment B

138	847790	AttachA, Section 1	Parts of encapsulation equipment	Parts and accessories	
139	847950	AttachA, Section 1	Automated machines for transport, handling and storage of semiconductor wafers, wafer cassettes, wafer boxes and other material for semiconductor devices	Semiconductor manufacturing equipment	
140	847989	AttachA, Section 1	Apparatus for growing or pulling monocrystal semiconductor boules	Semiconductor manufacturing equipment	For Attachment B
141	847989	AttachA, Section 1	Apparatus for physical deposition by sputtering on semiconductor wafers	Semiconductor manufacturing equipment	
142	847989	AttachA, Section 1	Apparatus for wet etching, developing, stripping or cleaning semiconductor wafers and flat panel displays	Semiconductor manufacturing equipment	For Attachment B
143	847989	AttachA, Section 1	Die attach apparatus, tape automated bonders, and wire bonders for assembly of semiconductors	Semiconductor manufacturing equipment	
144	847989	AttachA, Section 1	Encapsulation equipment for assembly of semiconductors	Semiconductor manufacturing equipment	For Attachment B
145	847989	AttachA, Section 1	Epitaxial deposition machines for semiconductor wafers	Semiconductor manufacturing equipment	For Attachment B
146	847989	AttachA, Section 1	Machines for bending, folding and straightening semiconductor leads	Semiconductor manufacturing equipment	For Attachment B
147	847989	AttachA, Section 1	Physical deposition apparatus for for semiconductor production	Semiconductor manufacturing equipment	
148	847989	AttachA, Section 1	Spinners for coating photographic emulsions on semiconductor wafers	Semiconductor manufacturing equipment	For Attachment B
149	847990	AttachA, Section 1	Part of apparatus for physical deposition by sputtering on semiconductor wafers	Parts and accessories	For Attachment B
150	847990	AttachA, Section 1	Parts for die attach apparatus, tape automated bonders, and wire bonders for assembly of semiconductors	Parts and accessories	For Attachment B
151	847990	AttachA,	Parts for spinners for coating photographic emulsions on semiconductor wafers	Parts and	For Attachment B

		Section 1		accessories	
152	847990	AttachA, Section 1	Parts of apparatus for growing or pulling monocrystal semiconductor boules	Parts and accessories	
153	847990	AttachA, Section 1	Parts of apparatus for wet etching, developing, stripping or cleaning semiconductor wafers and flat panel displays	Parts and accessories	For Attachment B
154	847990	AttachA, Section 1	Parts of automated machines for transport, handling and storage of semiconductor wafers, wafer cassettes, wafer boxes and other material for semiconductor devices	Parts and accessories	For Attachment B
155	847990	AttachA, Section 1	Parts of encapsulation equipment for assembly of semiconductors	Parts and accessories	For Attachment B
156	847990	AttachA, Section 1	Parts of epitaxial deposition machines for semiconductor wafers	Parts and accessories	For Attachment B
157	847990		Parts of machines for bending, folding and straightening semiconductor leads	Parts and accessories	For Attachment B
158	847990		Parts of physical deposition apparatus for for semiconductor production	Parts and accessories	For Attachment B
159	848071		Injection and compression moulds for the manufacture of semiconductor devices	Semiconductor manufacturing equipment	
160	851410		Resistance heated furnaces and ovens for the manufacture of semiconductor devices on semiconductor wafers	Semiconductor manufacturing equipment	For Attachment B
161	851420		Inductance or dielectric furnaces and ovens for the manufacture of semiconductor devices on Semiconductors wafers	Semiconductor manufacturing equipment	For Attachment B
162	851430		Apparatus for rapid heating of semiconductor wafers	Semiconductor manufacturing equipment	For Attachment B
163	851430		Parts of resistance heated furnaces and ovens for the manufacture of semiconductor devices on semiconductor wafers	Parts and accessories	
164	851490		Parts of apparatus for rapid heating of wafers	Parts and accessories	For Attachment B
165	851490		Parts of furnaces and ovens of Headings No 8514 10 to No 8514 30	Parts and accessories	For Attachment B
166	853690		Wafer probers	Semiconductor manufacturing equipment	

167	854311		Ion implanters for doping semiconductor materials	Semiconductor manufacturing equipment	
168	854330		Apparatus for wet etching, developing, stripping or cleaning semiconductor wafers and flat panel displays	Semiconductor manufacturing equipment	
169	854390		Parts of apparatus for wet etching, developing, stripping or cleaning semiconductor wafers and flat panel displays	Parts and accessories	For Attachment B
170	854390		Parts of ion implanters for doping semiconductor materials	Parts and accessories	
171	901041		Apparatus for projection, drawing or plating circuit patterns on sensitized semiconductor materials and flat panel displays	Semiconductor manufacturing equipment	
172	901042		Apparatus for projection, drawing or plating circuit patterns on sensitized semiconductor materials and flat panel displays	Semiconductor manufacturing equipment	
173	901049		Apparatus for projection, drawing or plating circuit patterns on sensitized semiconductor materials and flat panel displays	Semiconductor manufacturing equipment	
174	901090		Parts and accessories of the apparatus of Headings No 9010 41 to 9010 49	Parts and accessories	
175	901110		Optical stereoscopic microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles	Semiconductor manufacturing equipment	For Attachment B
176	901120		Photomicrographic microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles	Semiconductor manufacturing equipment	
177	901190		Parts and accessories of optical stereoscopic microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles	Parts and accessories	For Attachment B
178	901190		Parts and accessories of photomicrographic microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles	Parts and accessories	For Attachment B
179	901210		Electron beam microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles	Semiconductor manufacturing equipment	
180	901290		Parts and accessories of electron beam microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles	Parts and accessories	
181	901720		Pattern generating apparatus of a kind used for producing masks or reticles from photoresist coated	Semiconductor	

			substrates	manufacturing equipment	
182	901790		Parts and accessories for pattern generating apparatus of a kind used for producing masks or reticles from photoresist coated substrates	Parts and accessories	For Attachment B
183	901790		Parts of such pattern generating apparatus	Parts and accessories	For Attachment B
184	903082		Instruments and apparatus for measuring or checking semiconductor wafers or devices	Semiconductor manufacturing equipment	For Attachment B
185	903090		Parts and accessories of instruments and apparatus for measuring or checking semiconductor wafers or devices	Parts and accessories	For Attachment B
186	903090		Parts of instruments and appliances for measuring or checking semiconductor wafers or devices	Parts and accessories	For Attachment B
187	903141		Optical instruments and appliances for inspecting semiconductor wafers or devices or for inspecting masks, photomasks or reticles used in manufacturing semiconductor devices	Semiconductor manufacturing equipment	For Attachment B
188	903149		Optical instruments and appliances for measuring surface particulate contamination on semiconductor wafers	Semiconductor manufacturing equipment	For Attachment B
189	903190		Parts and accessories of optical instruments and appliances for inspecting semiconductor wafers or devices or for inspecting masks, photomasks or reticles used in manufacturing semiconductor devices	Parts and accessories	For Attachment B
190	903190		Parts and accessories of optical instruments and appliances for measuring surface particulate contamination on semiconductor wafers	Parts and accessories	For Attachment B
191	Attach B		Computers: automatic data processing machines capable of 1) storing the processing program or programs and at least the data immediately necessary for the execution of the program; 2) being freely programmed in accordance with the requirements of the user	Computers and Calculating Machines	
192	Attach B		Electric amplifiers when used as repeaterse in line telephony products falling within this agreement, and parts thereof	-	
193	Attach B		Flat panel displays (including LCD, Electro Luminescence, Plasma and other technologies) for products falling within this agreement, and parts thereof	-	
194	Attach B		Network equipment: Local Area Network (LAN) and Wide Area Network (WAN) apparatus, including those products dedicated for use solely or principally to permit the inter-connection of automatic data processing machines and units thereof for a network that is	-	
195	Attach B		Monitors: display units of automatic data processing machines with a cathode ray tube with a dot screen pitch smaller than 0.4 mm not capable of receiving and processing television signals or other analogue or digitally processed audio or video signals w	-	

196	Attach B		Optical disc storage units, for automatic data processing machines (including CD drives and DVD-drives), whether or not having the capability of writing/recording as well as reading, whether or not in their own housings	-	
197	Attach B		Paging alert devices, and parts thereof	-	
198	Attach B		Plotters whether input or output units of HS heading No. 8471 or drawing or drafting machines of HS heading No. 9017	-	
199	Attach B		Printed Circuit Assemblies for products falling within this agreement, including such assemblies for external connections such as cards that conform to the PCMCIA standard. Such printed circuit assemblies consist of one or more printed circuits of heading (8534, 8541, 8542)	-	
200	Attach B		Projection type flat panel display units used with automatic data processing machines which can display digital information generated by the central processing unit	-	
201	Attach B		Proprietary format storage devices including media therefore for automatic data processing machines, with or without removable media and whether magnetic, optical or other technology, including Bernoulli Box, Syquest, or Zipdrive cartridge storage units	-	
202	Attach B		Multimedia upgrade kits for automatic data processing machines, and units thereof, put up for retail sale, consisting or, at least, speakers and/or microphones as well as a printed circuit assembly that enables the ADP machines and units thereof to process	-	
203	Attach B		Set top boxes which have a communication function: a microprocessor-based device incorporating a modem for gaining access to the Internet, and having a function of interactive information exchange	-	

Appendix B– Product coverage of Information Technology Agreement 2

Item	Product code	Product Description	Product group	2014 MFN tariff rate					
				Korea	US	EU	Japan	China	Others
1	350691	Optically clear free-film adhesives and optically clear curable liquid adhesives of a kind used solely or principally for the manufacture of flat panel displays or touch-sensitive screen panels	IT material	6.5	2.1	6.5	3.9	10	0.9
2	370130	Other plates and film, with any side exceeding 255 mm	IT material	6	3.7	6.5	0	20	2.6
3	370199	Other	IT material	5.9	4.3	6.5	0	17.5	0.2
4	370590	Other	IT material	0.3	0	4.6	0	5.5	1.2
5	370790	Other	IT material	6.5	2.7	6	0	9.7	1.6
6	390799	Thermoplastic liquid crystal aromatic polyester copolymers	IT material	6.5	3.3	5.8	3.1	6.5	0.5
7	841459	Fans of a kind used solely or principally for cooling microprocessors, telecommunication apparatus, automatic data processing machines or units of automatic data processing machines	IT manufacturing equipment	8	0.9	1.4	0	8.5	1
8	841950	Heat exchange units made of fluoropolymers and with inlet and outlet tube bores with inside diameters measuring 3 cm or less	IT manufacturing equipment	8	1.4	0.9	0	10	3.6
9	842010	Roll laminators of a kind used solely or principally for the manufacture of printed circuit substrates or printed circuits	IT manufacturing equipment	8	1.2	1.7	0	8.4	0.5
10	842129	Liquid filtering or purifying machinery and apparatus made of fluoropolymers and with filter or purifier membrane thickness not exceeding 140 microns	IT manufacturing equipment	6.4	0	0.9	0	5	3.9
11	842139	Filtering or purifying machinery and apparatus for gases, with stainless steel housing, and with inlet and outlet tube bores with inside diameters not exceeding 1.3 cm	IT manufacturing equipment	6.7	0	0.9	0	5.3	3.1
12	842199	Parts of filtering or purifying machinery and apparatus for liquids, made of fluoropolymers and with filter or purifier membrane thickness not exceeding 140 microns; parts of filtering or purifying machinery and apparatus for gases, with stainless steel housing, and with inlet and outlet tube bores with inside diameters not exceeding 1.3 cm	IT manufacturing equipment	6.4	0	1.7	0	5.5	2.6
13	842320	Scales for continuous weighing of goods on conveyors using electronic means for gauging weights	Measuring instrument	8	2.9	1.7	0	10	1.1
14	842330	Constant weight scales and scales for discharging a predetermined weight of material into a bag or container, including hopper scales, using electronic means for gauging weight	Measuring instrument	8	0	1.7	0	10.5	4.4
15	842381	Other weighing machinery, having a maximum weighing capacity not	Measuring	8	0	1.7	0	10.5	4.1

		exceeding 30 kg using electronic means for gauging weight	instrument						
16	842382	Other weighing machinery, having a maximum weighing capacity exceeding 30 kg but not exceeding 5,000 kg using electronic means for gauging weight, excluding machines for weighing motor vehicles	Measuring instrument	8	0	1.7	0	10.5	4.1
17	842389	Other weighing machinery, having a maximum weighing capacity exceeding 5,000 kg using electronic means for gauging weight	Measuring instrument	8	2.9	1.7	0	10	3.2
18	842390	Parts of weighing machinery using electronic means for gauging weight, excluding parts of machines for weighing motor vehicles	Measuring instrument	8	2.8	1.7	0	10	1.5
19	842489	Mechanical appliances for projecting, dispersing, or spraying of a kind used solely or principally for the manufacture of printed circuits or printed circuit assemblies	IT manufacturing equipment	4	0.9	1.7	0	0	2.3
20	842490	Parts of mechanical appliances for projecting, dispersing, or spraying of a kind used solely or principally for the manufacture of printed circuits or printed circuit assemblies	IT manufacturing equipment	6.4	0.6	1.7	0	0	2.2
21	844230	Machinery, apparatus, and equipment	Other machineries	8	0	1.1	0	7.5	0.2
22	844240	Parts of the foregoing machinery, apparatus or equipment	Other machineries	8	0	1.7	0	7	0
23	844250	Plates, cylinders and other printing components; plates, cylinders and lithographic stones, prepared for printing purposes (for example, planed, grained or polished)	Other machineries	8	2	1.7	0	7	0
24	844331	Machines which perform two or more of the functions of printing, copying or facsimile transmission, capable of connecting to an automatic data processing machine or to a network	Other machineries	2	0	1.1	0	1.5	0
25	844332	Other, capable of connecting to an automatic data processing machine or to a network	Other machineries	1.6	0	1.4	0	2.7	0
26	844339	Other	Other machineries	5	1	2.8	0	9.4	0.2
27	844391	Parts and accessories of printing machinery used for printing by means of plates, cylinders and other printing components of heading 84.42	Other machineries	8	0.9	1.1	0	8	1
28	844399	Other	Other machineries	1.8	0	0	0	6	0
29	845610	Machine tools operated by laser or other light or photon beam processes of a kind used solely or principally for the manufacture of printed circuits, printed circuit assemblies, parts of heading 8517, or parts of automatic data processing machines	IT manufacturing equipment	8	3	4.5	0	0	0

30	846693	Parts and accessories of machine tools operated by laser or other light or photon beam processes of a kind used solely or principally for the manufacture of printed circuits, printed circuit assemblies, parts of heading 8517, or parts of automatic data processing machines; Parts and accessories of machine-tools operated by ultrasonic processes of a kind used solely or principally for the manufacture of printed circuits, printed circuit assemblies, parts of heading 8517, or parts of automatic data processing machines; Parts and accessories of machining centers of a kind used solely or principally for the manufacture of parts of heading 8517, or parts of automatic data processing machines; Parts and accessories of numerically controlled (other lathes) of a kind used solely or principally the manufacture of parts of heading 8517, or parts of automatic data processing machines; Parts and accessories of numerically controlled (other drilling) of a kind used solely or principally for the manufacture of parts of heading 8517, or parts of automatic data processing machines; Parts and accessories of numerically controlled (other milling machines) of a kind used solely or principally for the manufacture of parts of heading 8517, or parts of automatic data processing machines; Parts and accessories of sawing or cutting-off machines of a kind used solely or principally for the manufacture of parts of heading 8517, or parts of automatic data processing machines; Parts and accessories of machine-tools operated by electro-discharge processes of a kind used solely or principally for the manufacture of printed circuits, printed circuit assemblies, parts of heading 8517, or parts of automatic data processing machines	IT manufacturing equipment	8	3.5	1.2	0	0	0.1
31	847210	Duplicating machines	Other machineries	8	1.6	2	0	14	0.5
32	847290	Other	Other machineries	5.8	1.3	1.5	0	2	0.4
33	847310	Parts and accessories of the machines of heading 8469	Other machineries	2.7	1.5	1	0	8	0.6
34	847340	Parts and accessories of the machines of heading 8472	Other machineries	2.7	1	1	0	5.8	0
35	847521	Machines for making optical fibers and preforms thereof	Other machineries	8	0	1.7	0	10	0.1
36	847590	Parts of machines of subheading 847521	Other machineries	8	0	1.7	0	8	3.5
37	847689	Money-changing machines	Other machineries	8	0	1.7	0	15	2.9
38	847690	Parts of money-changing machines	Other machineries	8	0	1.7	0	10	0.4
39	847989	Automated electronic component placement machines of a kind used solely or principally for the manufacture of printed circuit assemblies	IT manufacturing equipment	8	0.9	1.5	0	0	0.9

40	847990	Parts of automated electronic component placement machines of a kind used solely or principally for the manufacture of printed circuit assemblies	IT manufacturing equipment	8	0	1	0	0	1.2
41	848610	Machines and apparatus for the manufacture of boules or wafers	IT manufacturing equipment	2.5	0	0	0	0	0
42	848620	Machines and apparatus for the manufacture of semiconductor devices or of electronic integrated circuits	IT manufacturing equipment	1.7	0	1.8	0	0	0.2
43	848630	Machines and apparatus for the manufacture of flat panel displays	IT manufacturing equipment	7.1	0	0	0	0	0
44	848640	Machines and apparatus specified in Note 9(C) to this Chapter	IT manufacturing equipment	3.2	0	0	0	3	0.1
45	848690	Parts and accessories	IT manufacturing equipment	4.4	0	0.3	0	3.7	0
46	850440	Static converters	Electromechanical equipment	3.5	0.4	1.9	0	4.1	0.3
47	850450	Other Inductors	Electromechanical equipment	4	1	2.1	0	0	0.1
48	850490	Parts	Electromechanical equipment	4	0.7	1.7	0	7.3	0.1
49	850590	Electromagnets of a kind used solely or principally for magnetic resonance imaging apparatus other than electromagnets of heading 90.18	Electromechanical equipment	8	0.3	1.9	0	8	0.1
50	851430	Other furnaces and ovens of a kind used solely or principally for the manufacture of printed circuits or printed circuit assemblies	IT manufacturing equipment	8	1.3	2.2	0	0	2
51	851490	Parts of other furnaces and ovens of a kind used solely or principally for the manufacture of printed circuits or printed circuit assemblies	IT manufacturing equipment	4	2	2.2	0	4	3.5
52	851519	Other wave soldering machines of a kind used solely or principally for the manufacture of printed circuit assemblies	IT manufacturing equipment	8	0	2.7	0	10	0.2
53	851590	Parts of other wave soldering machines of a kind used solely or principally for the manufacture of printed circuit assemblies	IT manufacturing equipment	8	0.8	2.7	0	3	0.6
54	851761	Base stations	Telecommunication equipment	0	0	0	0	0	0
55	851762	Machines for the reception, conversion and transmission or regeneration of voice, images or other data, including switching and routing apparatus	Telecommunication equipment	0	0	0	0	0	0
56	851769	Other	Telecommunication equipment	4.6	0	1.2	0	4.5	0.9
57	851770	Parts	Telecommunication equipment	0.7	0	1.2	0	1.4	0.1

58	851810	Microphones and stands therefor	Audio equipment	4	1.6	0.6	0	10	0.3
59	851821	Single loudspeakers, mounted in their enclosures	Audio equipment	8	2.5	2.3	0	6	0.6
60	851822	Multiple loudspeakers, mounted in the same enclosure	Audio equipment	8	2.5	2.3	0	6	1.1
61	851829	Other	Audio equipment	4	1.6	0.8	0	0	0.2
62	851830	Headphones and earphones, whether or not combined with a microphone, and sets consisting of a microphone and one or more loudspeakers	Audio equipment	4	1.6	1	0	0	0.3
63	851840	Audio-frequency electric amplifiers	Audio equipment	8	1.6	3.3	0	12	0.5
64	851850	Electric sound amplifier sets	Audio equipment	8	2.5	1	0	10	1
65	851890	Parts	Audio equipment	4	2.2	2	0	10.5	0
66	851981	Using magnetic, optical or semiconductor media	Audio equipment	8	1.1	4.2	0	20.1	0.2
67	851989	Other	Audio equipment	8	1	3	0	21	0.4
68	852110	Magnetic tape-type	Imaging devices	8	0	5.5	0	25	0.1
69	852190	Other	Imaging devices	8	0	13.9	0	20	0
70	852290	Other	Audio equipment	5.7	1	3.1	0	21.1	0
71	852321	Cards incorporating a magnetic stripe	Others	8	0	3.5	0	16.3	1.1
72	852329	Other	Others	3	0	1.4	0	0.8	0
73	852340	Optical media	Others	2.9	0.5	1.5	0	1.5	0
74	852351	Solid-state non-volatile storage devices	Others	2.7	0	0.9	0	0	0
75	852352	"Smart cards"	Others	4	0	2.5	0	0	0
76	852359	Other	Others	2.3	0	0.9	0	0	0
77	852380	Other	Others	3.4	0.9	0.9	0	2.5	0
78	852550	Transmission apparatus	Telecommunication equipment	8	1	3.6	0	0	1.4
79	852560	Transmission apparatus incorporating reception apparatus	Telecommunication equipment	0	0	0	0	0	0
80	852580	Television cameras, digital cameras and video camera recorders	Audio equipment	4	1.7	5.2	0	13.3	0.4
81	852610	Radar apparatus	Others	8	0	1.9	0	3.5	2.7
82	852691	Radio navigational aid apparatus	Others	8	0	2.5	0	2	2.2
83	852692	Radio remote control apparatus	Others	8	2.5	1.9	0	5	1.3
84	852712	Pocket-size radio cassette-players	Audio equipment	8	0	12	0	20	0.9
85	852713	Other apparatus combined with sound recording or reproducing apparatus	Audio equipment	8	0	12	0	15	0
86	852719	Other	Audio equipment	8	1.5	0	0	15	0.8
87	852721	Radio-broadcast receivers not capable of operating without an external source of power, of a kind used in motor vehicles, combined with sound recording or reproducing apparatus capable of receiving and decoding digital radio data system signals	Audio equipment	8	0.7	12.7	0	8	1.6

88	852729	Other	Audio equipment	8	2.2	12	0	8	0.6
89	852791	Combined with sound recording or reproducing apparatus	Audio equipment	8	2.1	11.7	0	8	2.3
90	852792	Not combined with sound recording or reproducing apparatus but combined with a clock	Audio equipment	8	1.5	4.5	0	15	0
91	852799	Other	Audio equipment	8	1.8	9	0	8	2.3
92	852849	Other	Imaging devices	8	2.4	14	0	24.5	0.7
93	852871	Not designed to incorporate a video display or screen	Imaging devices	8	2	5.6	0	25	0.8
94	852910	Aerials and aerial reflectors of all kinds; parts suitable for use therewith	Others	6.7	1	2.8	0	1.2	0.8
95	852990	Other, excluding organic light emitting diode modules and organic light emitting diode panels for the apparatus of subheadings 8528.72 or 8528.73	Others	6.9	1.6	3.4	0	4.2	0
96	853180	Other apparatus excluding doorbells, chimes, buzzers and similar	Electromechanical equipment	8	0.7	0.9	0	12.5	0
97	853190	Parts	Electromechanical equipment	5.3	0.4	1.5	0	0	0.3
98	853630	Other apparatus for protecting electrical circuits	Electromechanical equipment	8	1.4	2.3	0	9	1.9
99	853650	Other switches	Electromechanical equipment	5	1.1	2	0	0	0.6
100	853690	Other apparatus, excluding battery clamp of a kind used for motor vehicles of heading 8702, 8703, 8704, or (8711)	Electromechanical equipment	2.7	0.9	1.8	0	0	0.1
101	853810	Boards, panels, consoles, desks, cabinets and other bases for the goods of heading 8537, not equipped with their apparatus	Electromechanical equipment	8	1.9	2.2	0	7.7	1.8
102	853939	Cold-cathode fluorescent lamps(CCFLs) for backlighting of flat panel displays	Imaging devices	8	2.4	2.7	0	8	1.4
103	854231	Processors and controllers, whether or not combined with memories, converters, logic circuits, amplifiers, clock and timing circuits, or other circuits	Semiconductor	0	0	0	0	0	0
104	854232	Memories	Semiconductor	0	0	0	0	0	0
105	854233	Amplifiers	Semiconductor	0	0	0	0	0	0
106	854239	Other	Semiconductor	0	0	0	0	0	0
107	854290	Parts	Semiconductor	0	0	0	0	0	0
108	854320	Signal generators	Electromechanical equipment	8	2.6	3.7	0	11.5	1.4
109	854330	Electroplating and electrolysis machines of a kind used solely or principally for the manufacture of printed circuits	Electromechanical equipment	8	2.6	3.7	0	0	1
110	854370	Articles specifically designed for connection to telegraphic or telephonic	Imaging devices	-	-	-	-	-	-

		apparatus or instruments or to telegraphic or telephonic networks							
111	854370	Microwave amplifiers	Semiconductor	-	-	-	-	-	-
112	854370	Cordless infrared remote control devices for video game consoles	IT manufacturing equipment	-	-	-	-	-	-
113	854370	Digital flight-data recorders	Audio equipment	-	-	-	-	-	-
114	854370	Portable battery operated electronic reader for recording and reproducing text, still image or audio file	Others	-	-	-	-	-	-
115	854370	Digital signal processing apparatus capable of connecting to a wired or wireless network for the mixing of sound	IT manufacturing equipment	-	-	-	-	-	-
116	854390	Parts	Electromechanical equipment	1.6	1	3	0	0	0.1
117	880260	Telecommunications satellites	Others	0	0	4.2	0	2	0
118	880390	Parts of telecommunication satellites	Others	0	0	1.3	0	0	0.4
119	880521	Air combat simulators and parts thereof	Others	2.5	0	1.7	0	1.5	0
120	880529	Other	Others	2.5	0	0.9	0	1.5	0
121	900120	Sheets and plates of polarizing material	Audio equipment	8	3.5	2.9	0	8	0
122	900190	Other	Optical instruments	8	1.3	2.6	0	8	0.1
123	900219	Other	Optical instruments	8	2.3	6.7	0	15	0
124	900220	Filters	Optical instruments	8	2.5	6.7	0	15	0
125	900290	Other	Optical instruments	6.3	1.2	5	0	15	0
126	901050	Other apparatus and equipment for photographic (including cinematographic) laboratories; negatoscopes	Optical instruments	4	1.4	2.7	0	13.4	0.1
127	901060	Projection screens	Others	8	2.6	2.7	0	14	1.7
128	901090	Parts and accessories of articles of subheadings 901050 and 901060	Optical instruments	2.7	3.2	2.7	0	0	0.6
129	901110	Stereoscopic microscopes	Optical instruments	4	5.6	3.4	0	0	0
130	901180	Other microscopes	Optical instruments	8	6.4	6.7	0	7	0
131	901190	Parts and accessories	Optical instruments	4	5.7	3.4	0	0	0
132	901210	Microscopes other than optical microscopes; diffraction apparatus	Optical	5.3	3.5	1.9	0	0	0

			instruments						
133	901290	Parts and accessories	Optical instruments	4	4.9	1.9	0	0	0
134	901310	Telescopes designed to form parts of machines, appliances, instruments or apparatus of this Chapter or Section XVI	Optical instruments	8	7.2	4.7	0	8	0
135	901320	Lasers, other than laser diodes	Others	8	3.1	4.7	0	6	0.1
136	901390	Parts and accessories, other than for telescopic sights for fitting to arms or for periscopes	Imaging devices	4	6.8	2.4	0	7.3	0
137	901410	Direction finding compasses	Others	8	1.2	1.4	0	2	0
138	901420	Instruments and appliances for aeronautical or space navigation (other than compasses)	Others	8	1	1.9	0	1.5	0
139	901480	Other instruments and appliances	Others	8	1.5	3.7	0	2	0
140	901490	Parts and accessories	Others	8	0	1.4	0	1.3	0
141	901510	Rangefinders	Measuring instrument	8	1.4	3.2	0	9	0
142	901520	Theodolites and tachymeters (tacheometers)	Measuring instrument	8	1.4	3.2	0	9	0
143	901540	Photogrammetrical surveying instruments and appliances	Measuring instrument	8	1.5	3.2	0	9	0
144	901580	Other instruments and appliances	Measuring instrument	8	0.9	3.1	0	5	0.1
145	901590	Parts and accessories	Measuring instrument	8	1	2.7	0	5	0
146	901811	Electro-cardiographs	Medical equipment	8	0	0	0	5	0.1
147	901812	Ultrasonic scanning apparatus	Medical equipment	8	0	0	0	5.7	0.1
148	901813	Magnetic resonance imaging apparatus	Medical equipment	8	0	0	0	4	0.1
149	901819	Other	Medical equipment	8	0	0	0	4	0
150	901820	Ultra-violet or infra-red ray apparatus	Medical equipment	8	0	0	0	4	0
151	901850	Other ophthalmic instruments and appliances	Medical equipment	8	0	0	0	4	0
152	901890	Electro-surgical or electro-medical instruments and appliances, and parts	Medical	8	0	0	0	3.6	0.1

		and accessories thereof	equipment						
153	902150	Pacemakers for stimulating heart muscles, excluding parts and accessories	Medical equipment	0	0	0	0	4	0
154	902190	Other	Medical equipment	0	0	0	0	4	0
155	902212	Computed tomography apparatus	Medical equipment	8	0	0	0	4	0
156	902213	Other, for dental uses	Medical equipment	8	0	0	0	4	0
157	902214	Other, for medical, surgical or veterinary uses	Medical equipment	8	0	0	0	4	0
158	902219	For other uses	Medical equipment	8	0	0	0	4	0
159	902221	For medical, surgical, dental or veterinary uses	Medical equipment	8	0	0	0	4	0
160	902229	For other uses	Medical equipment	8	0.8	2.1	0	6	0
161	902230	X-ray tubes	Medical equipment	8	0.9	2.1	0	2	0
162	902290	Parts and accessories of apparatus based on the use of X-rays	Medical equipment	8	0.9	2.1	0	6	0.2
163	902300	Instruments, apparatus and models, designed for demonstrational purposes (for example, in education or exhibitions), unsuitable for other uses	Other	8	0	0.9	0	7	0.5
164	902410	Machines and appliances for testing metals	Measuring instrument	8	1.7	2.9	0	7	0
165	902480	Other machines and appliances	Measuring instrument	8	1.7	2.8	0	5	0
166	902490	Parts and accessories	Measuring instrument	8	1.7	2.1	0	6	0
167	902519	Other	Measuring instrument	8	0.8	1.3	0	8.4	0.1
168	902590	Parts and accessories	Measuring instrument	8	0	1.6	0	8	0.3
169	902710	Gas or smoke analysis apparatus	Measuring instrument	8	2.5	2.5	0	7	0
170	902780	Other instruments and apparatus	Measuring instrument	1.1	0	0.4	0	3.5	0

			instrument						
171	902790	Microtomes; parts and accessories	Measuring instrument	3.6	1.2	1.7	0	0	0
172	902830	Electricity meters	Measuring instrument	8	3	2.1	0	10	2.4
173	902890	Parts and accessories	Measuring instrument	8	3.2	2.1	0	8.4	0
174	903010	Instruments and apparatus for measuring or detecting ionising radiations	Measuring instrument	0	0.8	2.8	0	5	0
175	903020	Oscilloscopes and oscillographs	Measuring instrument	8	0.6	0.8	0	6.5	0
176	903031	Multimeters without a recording device	Measuring instrument	8	0.9	2.1	0	10	0
177	903032	Multimeters with a recording device	Measuring instrument	8	0.9	0	0	8	0
178	903033	Other, without a recording device, excluding resistance measuring instruments	Measuring instrument	8	0.9	1.4	0	12.7	0
179	903039	Other, with a recording device	Measuring instrument	8	0.9	0	0	8	0.1
180	903084	Other, with a recording device	Measuring instrument	8	0.9	0	0	9	0
181	903089	Other	Measuring instrument	8	0.9	0.5	0	11	0
182	903090	Parts and Accessories	Measuring instrument	6.4	0.7	0.8	0	7	0
183	903110	Machines for balancing mechanical parts	Measuring instrument	8	1.7	2.8	0	7	1.3
184	903149	Other	Measuring instrument	5.7	2.4	1.4	0	3.3	0
185	903180	Other instruments, appliances and machines	Measuring instrument	7.3	0.6	1.9	0	4.7	0
186	903190	Parts and accessories	Measuring instrument	2.7	1.6	1.1	0	0	0
187	903220	Manostats	Measuring instrument	8	0.9	1.4	0	7	0.3
188	903281	Hydraulic or pneumatic	Measuring instrument	6	0.8	1.4	0	7	0.1

			instrument						
189	950410	Video games of a kind used with a television receiver	Other	0	0	0	0	0	0
190	950430	Other games, operated by coins, banknotes, bank cards, token, or by any other means of payment, other than automatic bowling equipment and games of chance that immediately return a monetary award	Other	0	0	0	0	0	1.7
191	950490	Video game consoles and machines, other than those of subheading 950430	Other	0	0	0	0	0	0.1
192	B	Multi-component integrated circuits (MCOs): a combination of one or more monolithic, hybrid, or multi-chip integrated circuits with at least one of the following components: silicon-based sensors, actuators, oscillators, resonators or combinations thereof, or components performing the functions of articles classifiable under heading 8532, 8533, 8541, or inductors classifiable under heading 8504, formed to all intents and purposes indivisibly into a single body like an integrated circuit, as a component of a kind used for assembly onto a printed circuit board (PCB) or other carrier, through the connecting of pins, leads, balls, lands, bumps, or pads.	-	-	-	-	-	-	-
		For the purpose of this definition the following expressions mean:	-	-	-	-	-	-	-
		1. "Components" may be discrete, manufactured independently then assembled onto the rest of the MCO, or integrated into other components.	-	-	-	-	-	-	-
		2. "Silicon based" means built on a silicon substrate, or made of silicon materials, or manufactured onto integrated circuit die.	-	-	-	-	-	-	-
		3(a). "Silicon based sensors" consist of microelectronic or mechanical structures that are created in the mass or on the surface of a semiconductor and that have the function of detecting physical or chemical quantities and transducing these into electric signals, caused by resulting variations in electric properties or displacement of a mechanical structure.	-	-	-	-	-	-	-
		"Physical or chemical quantities" relates to real world phenomena, such as pressure, acoustic waves, acceleration, vibration, movement, orientation, strain, magnetic field strength, electric field strength, light, radioactivity, humidity, flow, chemicals concentration, etc.	-	-	-	-	-	-	-
		3(b). "Silicon based actuators" consist of microelectronic and mechanical structures that are created in the mass or on the surface of a semiconductor and that have the function of converting electrical signals into physical movement.	-	-	-	-	-	-	-
		3(c). "Silicon based resonators" are components that consist of microelectronic or mechanical structures that are created in the mass or on	-	-	-	-	-	-	-

		the surface of a semiconductor and have the function of generating a mechanical or electrical oscillation of a predefined frequency that depends on the physical geometry of these structures in response to an external input.							
		3(d). "Silicon based oscillators" are active components that consist of microelectronic or mechanical structures that are created in the mass or on the surface of a semiconductor and that have the function of generating a mechanical or electrical oscillation of a predefined frequency that depends on the physical geometry of these structures.	-	-	-	-	-	-	-
193	B	Light-Emitting Diode (LED) Backlights modules , which are lighting sources that consist of one or more LEDs, and one or more connectors and are mounted on a printed circuit or other similar substrate, and other passive components, whether or not combined with optical components or protective diodes, and used as backlights illumination for liquid crystal displays (LCDs)	-	-	-	-	-	-	-
194	B	Touch-Sensitive Data Input Devices (so-called touch screens) without display capabilities, for incorporation into apparatus having a display, which function by detecting the presence and location of a touch within the display area. The sensing of touch may be obtained by means of resistance, electrostatic capacity, acoustic pulse recognition, infra-red lights, or other touch-sensitive technology	-	-	-	-	-	-	-
195	B	Ink cartridges (with or without an integrated print head) for insertion into apparatus of HS subheadings 844331, 844332 or 844339, and incorporating mechanical or electrical components; thermoplastic or electrostatic toner cartridges (with or without moving parts) for insertion into apparatus of HS subheadings 844331, 844332 or 844339; solid ink in engineered shapes for insertion into apparatus of HS subheadings 844331, 844332 or 844339	-	-	-	-	-	-	-
196	B	Printed matter which grants the right to access, install, reproduce or otherwise use software (including games), data, internet content (including in-game or in-application content) or services, or telecommunications services (including mobile services)**	-	-	-	-	-	-	-
197	B	Self-adhesive circular polishing pads of a kind used for the manufacture of semiconductor wafers	-	-	-	-	-	-	-
198	B	Boxes, cases, crates and similar articles , of plastic, specially shaped or fitted for the conveyance or packing of semiconductor wafers, masks, or reticles, of subheading 392310 or 848690	-	-	-	-	-	-	-

199	B	Vacuum pumps of a kind used solely or principally for the manufacture of semiconductors or flat panel displays	-	-	-	-	-	-	-
200	B	Plasma cleaner machines that remove organic contaminants from electron microscopy specimens and specimen holders	-	-	-	-	-	-	-
201	B	Portable interactive electronic education devices primarily designed for children	-	-	-	-	-	-	-

Appendix C – Korea’s ITA2 Trade Effect by Product Code

Product Code	Trade Creation Effect	Trade Diversion Effect	Total Trade Effect	Exporters' change	Import Change	Tariff Change in Revenue	Consumer Surplus
350691	805,871,686	19,092,497	824,964,217	239,345,184	171,262,906	-9,624,387	4,507,966
370130	13,521,098	1,829,507	15,350,605	59,642	6,292,725	-6,357,553	127,952
370199	12,524,656	-40,352	12,484,304	403,748	4,797,852	-5,217,623	139,397
370590	2,191,697	143,314	2,335,012	302,398	524,683	-529,779	837
370790	116,055,339	8,199,351	124,254,689	6,441,179	25,366,867	-28,080,983	751,043
390799	21,399,752	9,113,315	30,513,067	2,655,087	8,373,236	-9,871,122	145,501
841459	6,935,963	1,928,607	8,864,570	5,353,833	9,285,513	-10,219,936	237,823
841950	15,558,971	3,829,753	19,388,724	9,542,278	7,479,228	-7,552,308	83,185
842010	2,616,240	1,365,927	3,982,167	4,222,792	185,547	-257,967	2,587
842129	11,082,973	4,484,876	15,567,849	732,590	3,471,484	-4,100,979	29,953
842139	16,758,005	7,317,843	24,075,847	7,996,693	5,446,185	-5,363,933	62,927
842199	27,209,017	5,461,106	32,670,123	9,821,897	11,171,391	-9,174,556	169,860
842320	1,133,150	254,355	1,387,505	108,577	182,866	-183,905	1,533
842330	2,613,376	375,997	2,989,374	253,461	363,263	-375,806	10,634
842381	365,853	124,863	490,716	118,242	121,561	-382,177	4,023
842382	391,242	51,754	442,996	124,384	266,863	-234,705	11,704
842389	302,204	89,145	391,349	8,886	163,866	-171,782	4,539
842390	1,013,330	423,291	1,436,622	17,454	522,427	-643,320	13,128
842489	2,517,726	219,581	2,737,307	886,366	1,390,723	-1,189,003	16,508
842490	1,966,288	1,080,852	3,047,141	-98,806	3,109,286	-3,339,175	55,695
844230	1,538,795	384,552	1,923,348	104,331	907,547	-690,745	20,158
844240	297,974	103,548	401,522	1,541	58,132	-62,267	1,075
844250	558,296	288,025	846,321	71,502	46,884	-59,276	666

844331	2,864,833	479,077	3,343,910	-595,523	4,367,691	-6,199,452	40,035
844332	6,957,727	3,475,146	10,432,873	-361,420	1,637,083	-2,315,590	10,342
844339	3,033,070	638,707	3,671,777	475,475	1,142,222	-1,097,349	14,586
844391	2,175,000	407,127	2,582,128	49,352	508,775	-445,246	14,911
844399	92,501,139	35,091,376	127,592,513	9,169,978	8,323,587	-10,910,310	58,679
845610	15,046,068	8,337,840	23,383,908	223,535	10,920,078	-12,737,810	259,692
846693	12,221,996	5,029,521	17,251,518	-573,213	8,871,324	-9,576,270	201,062
847210	34,280	790	35,070	-325	1,433	-3,582	57
847290	4,196,581	503,617	4,700,199	-1,138,223	1,355,621	-1,500,591	29,811
847310	62,967	1,008	63,975	-2,091	6,154	-7,178	64
847340	6,519,507	1,545,887	8,065,393	100,050	421,030	-524,609	3,896
847521	5,102,891	1,430	5,104,320	1,236,948	99	-63	-
847590	4,052,039	2,286,586	6,338,625	580,031	2,479,494	-3,120,175	47,721
847689	18,994	10,497	29,491	-3,027	2,063	-7,182	30
847690	959,626	339,473	1,299,100	102,101	186,219	-201,519	5,962
847989	61,396,739	32,276,216	93,672,956	2,990,806	65,168,074	-66,980,017	974,117
847990	24,323,236	24,537,140	48,860,375	101,069	29,010,279	-42,171,635	589,327
848610	506,546	185,963	692,510	-	780,725	-592,595	5,988
848620	36,124,966	16,263,625	52,388,591	-363,472	25,091,912	-19,635,452	64,891
848630	56,064,770	7,368,522	63,433,289	-	58,103,199	-47,980,475	1,793,486
848640	23,273,647	9,892,869	33,166,514	19,613,471	13,872,885	-10,672,075	129,374
848690	27,605,773	14,912,056	42,517,828	3,439,367	26,082,408	-30,067,385	318,951
850440	67,528,574	12,288,689	79,817,265	9,442,451	20,061,521	-20,399,538	144,274
850450	9,589,003	1,646,345	11,235,348	2,027,545	9,639,180	-10,037,662	147,600
850490	15,768,341	3,144,552	18,912,893	12,094,550	6,722,599	-6,964,535	83,721
850590	6,216,213	1,631,535	7,847,748	1,407,462	1,541,691	-1,888,045	42,541
851430	350,724	194,079	544,803	-8,880	516,209	-626,788	14,133

851490	4,032,395	848,776	4,881,171	280,342	2,153,594	-1,753,993	30,772
851519	5,344,267	213,343	5,557,610	3,422,570	341,130	-179,759	5,981
851590	7,185,815	1,662,315	8,848,130	837,473	3,010,155	-2,287,207	63,094
851761	21,170	5,983	27,153	44,188	-	-	-
851762	2,285,059	392,941	2,678,000	1,796,810	-	-	-
851769	1,247,575	356,672	1,604,248	614,686	744,509	-585,915	9,863
851770	20,921,602	6,338,880	27,260,482	97,222,406	10,960,754	-14,942,957	28,813
851810	1,957,400	831,912	2,789,312	2,472,952	2,462,746	-2,932,991	29,878
851821	149,718	27,064	176,782	825,533	878,946	-1,619,959	16,311
851822	441,911	74,346	516,257	3,726,453	4,536,478	-2,239,708	140,273
851829	435,905	36,297	472,201	3,995,856	14,473,394	-10,707,604	213,767
851830	318,312	58,076	376,388	854,643	5,608,479	-6,131,999	82,195
851840	534,202	145,168	679,369	26,646	3,432,459	-3,456,587	124,315
851850	244,545	32,002	276,546	113,868	1,628,195	-1,400,437	47,109
851890	1,482,900	596,063	2,078,962	12,225,270	1,895,419	-2,109,048	26,643
851981	794,739	108,962	903,702	-116,693	2,274,207	-2,057,084	53,960
851989	204,670	8,370	213,040	-15,954	160,851	-137,066	3,689
852110	2,669,413	25,991	2,695,405	-5,271	212,950	-197,672	8,253
852190	3,253,684	531,347	3,785,031	-193,772	2,106,289	-2,120,268	58,598
852290	12,493,596	4,539,087	17,032,683	2,729,400	2,029,730	-2,264,449	25,452
852321	102,668	19,193	121,861	116,079	2,562	-2,806	2
852329	5,219,232	4,295,044	9,514,276	-11	524,569	-1,010,806	2,131
852351	8,222,806	350,881	8,573,687	1,874,210	6,158,252	-6,411,544	67,035
852352	563,131	531,471	1,094,603	110,196	1,359,600	-1,494,391	10,418
852359	2,614,485	116,762	2,731,248	125,719	2,452,392	-1,202,155	24,865
852380	318,875	91,956	410,831	-9,193	166,498	-174,826	1,023
852550	377,195	399,163	776,358	-380,420	38,090	-572,535	671

852560	55,409	1,195	56,604	9,676	-	-	-
852580	246,766,826	39,542,612	286,309,448	108,297,078	17,352,533	-15,181,499	236,045
852610	1,222,866	1,642,925	2,865,791	-11,232	869,508	-2,037,032	8,012
852691	9,322,055	2,901,813	12,223,868	-509,452	5,439,249	-5,529,927	141,987
852692	2,904,098	622,504	3,526,601	3,675,041	1,316,676	-1,057,266	27,591
852712	332	152	485	-7,234	2,239	-25,581	79
852713	17,181	753	17,934	-58,610	67,537	-760,073	2,121
852719	46,443	10,225	56,668	-101	226,444	-147,089	7,927
852721	11,036,424	5,041,584	16,078,009	6,514,726	11,981,334	-11,053,837	376,782
852729	4,384,815	193,837	4,578,652	14,758,336	1,026,181	-143,965	26,922
852791	638,291	41,923	680,214	30,555	1,005,401	-1,006,888	23,904
852792	88,559	33,627	122,186	-749	39,626	-13,489	1,554
852799	861,529	155,557	1,017,086	136,810	353,177	-211,707	10,868
852849	9,390,280	144,407	9,534,687	92,766	53,037	-46,485	657
852871	2,710,854	394,087	3,104,941	1,013,792	282,453	-244,744	221
852910	1,857,240	917,530	2,774,770	-594,284	1,563,223	-3,468,900	19,964
852990	37,727,935	17,484,553	55,212,487	-2,528,654	13,856,770	-20,538,210	273,303
853180	1,945,570	552,108	2,497,678	902,630	1,078,963	-867,789	26,853
853190	1,071,176	308,356	1,379,532	-143,752	5,132,346	-3,358,659	54,825
853630	3,536,178	1,071,730	4,607,908	20,214,575	2,760,079	-3,316,902	69,116
853650	15,939,849	7,068,151	23,008,002	399,902	9,423,090	-10,436,643	154,312
853690	16,142,920	-3,242,636	12,900,284	28,565,784	2,119,196	-2,743,545	10,833
853810	2,231,577	1,191,829	3,423,406	-28,969	509,119	-747,946	1,373
853939	4,141,740	2,270,136	6,411,876	6,026,809	569,520	-662,513	10,336
854231	818,632	210,082	1,028,714	-9,165,619	-	-	-
854232	690,828	112,236	803,064	10,362,659	-	-	-
854233	176,941	-37,469	139,472	605,592	-	-	-

854290	-	-	-	-	-	-	-
854320	2,582,026	1,332,438	3,914,464	1,864,182	571,491	-620,520	3,871
854330	2,817,106	855,750	3,672,856	-50,167	2,908,267	-1,687,778	45,029
854370	119,377,499	7,822,087	127,199,585	10,671,907	249,204,313	-87,057,393	6,376,788
854390	6,463,131	1,860,201	8,323,332	-128,614	3,379,874	-3,109,155	14,571
880260	-	-	-	-968,362	#N/A	#N/A	#N/A
880390	65,426	80,718	146,144	-5,228	-	-	-
880521	5,850	9,053	14,902	#N/A	5,869	-6,257	1
880529	7,208	4,639	11,846	-4,277	66,601	-71,002	93
900120	103,088,619	8,524,663	111,613,284	27,707,361	69,011,391	-129,822,227	2,639,097
900190	40,528,524	10,464,122	50,992,646	22,187,811	19,566,098	-23,844,057	543,248
900219	14,093,643	7,310,614	21,404,256	39,013,532	773,702	-1,111,805	22,631
900220	33,213,802	1,431,274	34,645,077	248,263,453	7,731,705	-4,998,868	247,608
900290	6,797,098	8,438,295	15,235,392	11,694,696	1,996,951	-4,204,399	24,436
901050	15,365,349	2,183,106	17,548,454	1,606,818	3,022,616	-3,158,363	39,578
901060	80,999	13,904	94,903	152,125	89,745	-99,456	952
901090	693,969	177,234	871,203	-9,761	320,211	-366,072	3,951
901110	624,446	87,729	712,175	-47,328	231,260	-215,989	3,962
901180	6,943,911	1,566,351	8,510,262	187,445	1,845,414	-2,015,302	34,164
901190	3,316,367	1,270,326	4,586,693	-31,808	544,921	-750,020	8,551
901210	8,456,892	5,078,055	13,534,947	-68,492	6,043,369	-6,443,533	105,649
901290	1,429,382	381,677	1,811,059	-78,493	312,753	-310,983	1,926
901310	591,599	1,623,731	2,215,331	-364,449	2,776	-4,248	3
901320	18,316,741	5,490,426	23,807,167	180,705	3,611,515	-3,725,428	18,056
901390	71,707,773	13,751,218	85,458,995	49,884,302	8,148,860	-9,169,333	115,516
901410	679,862	676,166	1,356,028	-8,889	651,192	-767,118	9,948
901420	118,112	27,492	145,604	-178,192	5,157	-19,818	1

901480	3,616,346	1,801,469	5,417,814	-141,707	1,201,018	-1,240,744	7,553
901490	487,355	379,502	866,857	-159,968	315,424	-353,230	3,278
901510	494,809	407,203	902,012	3	131,620	-308,826	2,302
901520	912,978	578,049	1,491,027	-403	292,758	-344,853	9,438
901540	60,153	13,779	73,932	-	149,623	-80,397	2,235
901580	965,802	501,065	1,466,867	-24,119	348,467	-553,592	3,065
901590	1,645,129	369,352	2,014,481	-25,165	324,310	-201,917	1,543
901811	321,287	37,804	359,091	151,172	501,041	-492,775	13,360
901812	6,196,679	790,939	6,987,618	5,434,646	1,568,530	-2,078,361	46,698
901813	962,281	66,843	1,029,125	859	2,994,730	-3,923,143	75,703
901819	3,671,813	1,371,907	5,043,719	292,129	3,832,198	-5,046,548	69,883
901820	19,634	2,345	21,979	117,509	42,772	-76,075	738
901850	2,920,340	675,736	3,596,076	155,435	1,953,123	-1,880,334	30,808
901890	16,138,553	9,406,676	25,545,229	287,470	19,105,172	-24,025,854	487,283
902150	-	-	-	-	-	-	-
902190	115,036	-8,520	106,515	61,652	-	-	-
902212	8,961,898	1,672,686	10,634,583	-744	2,352,951	-2,482,522	45,547
902213	70,810	39,956	110,766	318,857	150,628	-155,217	2,121
902214	3,022,434	447,114	3,469,548	209,488	2,069,121	-2,127,209	30,967
902219	5,605,252	2,341,592	7,946,844	214,603	3,015,620	-3,010,005	47,630
902221	-	-	-	-	50,487	-60,920	165
902229	310,284	78,944	389,228	45,607	138,543	-115,570	578
902230	1,677,390	1,030,844	2,708,234	-4,507	995,231	-1,091,718	13,540
902290	8,096,683	3,429,844	11,526,527	-238,684	1,840,563	-4,502,159	34,595
902300	666,979	357,324	1,024,302	153,567	614,883	-1,159,756	9,814
902410	1,046,547	699,767	1,746,314	-125,054	461,857	-657,759	3,194
902480	1,335,590	583,526	1,919,117	90,301	517,549	-584,555	3,226

902490	393,792	196,232	590,024	7,564	179,550	-176,746	737
902519	2,295,906	908,965	3,204,871	209,498	814,339	-992,137	16,944
902590	1,685,528	1,434,138	3,119,666	176,035	1,501,650	-2,072,593	22,219
902710	28,366,530	3,564,371	31,930,901	4,307,653	-	-	-
902780	9,176,427	1,229,487	10,405,913	339,287	-	-	-
902790	8,463,489	5,413,163	13,876,652	-307,964	3,651,856	-4,643,839	36,331
902830	80,536	15,556	96,092	2,037	262,909	-156,464	5,562
902890	303,477	156,546	460,023	-33,515	714,931	-1,093,402	17,126
903010	607,415	88,708	696,123	-42,874	-	-	-
903020	474,434	346,363	820,797	38,230	991,434	-1,133,766	15,762
903031	468,977	285,667	754,643	-130,496	430,761	-473,034	8,194
903032	80,877	59,634	140,512	21,008	99,707	-101,362	1,117
903033	3,423,063	1,091,514	4,514,577	2,004,389	670,979	-765,880	8,135
903039	5,522,072	1,948,443	7,470,515	1,344,812	3,377,003	-3,633,362	68,529
903084	4,397,504	1,978,469	6,375,973	1,153,873	742,735	-755,075	4,236
903089	2,750,302	1,303,253	4,053,555	2,150,414	1,065,368	-1,230,505	8,556
903090	4,917,740	4,948,088	9,865,828	1,725,450	4,354,962	-7,205,556	38,597
903110	3,460,969	224,669	3,685,638	209,963	236,815	-234,995	2,121
903149	14,568,416	4,641,024	19,209,441	7,536,322	5,068,075	-5,557,970	87,422
903180	56,981,913	21,747,847	78,729,759	10,277,150	19,365,953	-20,589,558	227,398
903190	8,730,299	2,670,311	11,400,610	1,701,330	3,841,958	-2,916,974	17,448
903220	364,545	140,872	505,417	74,426	8,691	-17,830	36
903281	2,585,922	787,141	3,373,063	802,497	387,065	-394,745	1,544
950430	125,832	54,474	180,305	-1,754	-	-	-
950490	64,391	-22,928	41,463	-77,850	-	-	-
Grand Total	2,704,694,337	513,106,562	3,217,800,942	1,121,504,046	1,177,025,550	-956,219,826	25,747,549

국문요약

한국은 IT 확대 협상에 포함된 IT 품목의 수출 세계 4 위, 수입 세계 7 위를 자랑하는 작지만 중요한 IT 국가다. IT 확대 협상은 글로벌 IT 무역의 영역 확장 및 전세계 소비자들의 이득 증진에 기여해왔지만, 몇몇 산업들은 오히려 점점 더 IT 강국들과 치열한 경쟁에 돌입하고 있다. 특히 한국의 경우, 글로벌 IT 시장에서 중국과 일본 사이의 샌드위치 신세가 되고 있다.

이 연구의 목적은, WTO 의 World Integrated Trade Solution SMART 시뮬레이션 프로그램을 통한 부분 균형 분석으로 ITA2(ITA 확대협상)가 한국 산업에 적용되는 효과를 봤을 때, 중국과 일본에 대한 한국의 무역 경쟁력을 분석한다.

주요어: ITA, ITA 확대협상, 부분균형분석

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