

WORKING PAPER NO: 547

Indian IT Industry in Factory Asia

Subhashish Gupta

*Associate Professor
Economics & Social Sciences
Indian Institute of Management Bangalore
Bannerghatta Road, Bangalore – 5600 76
Ph: 080-2699 3030
sgupta@iimb.ernet.in*

Mandar Oak

*Associate Professor
Department of Economics
University of Adelaide, Australia
mandar.oak@adelaide.edu.au*

Deeparghya Mukherjee

*Visiting Research Fellow
Institute of South Asian Studies
National University of Singapore
isasdm@nus.edu.sg*

Year of Publication – April 2017

Subhashish Gupta is Associate Professor at the Indian Institute of Management Bangalore. Mandar Oak is Associate Professor at the Department of Economics at the University of Adelaide, Australia. Deeparghya Mukherjee is Visiting Research Fellow at the Institute of South Asian Studies, National University of Singapore. We thank Radhika Bharadwaj for assistance with research and Mr. Girija Pande, Avalon Consulting for discussions. The standard disclaimer applies.

Indian IT Industry in Factory Asia

Abstract

The Indian IT sector has recorded impressive growth in the post-reforms period of the Indian economy and has come to attain global prominence in terms of exports. The conventional trade and services data shows that North America and Europe are the primary destinations for Indian IT exports whereas the burgeoning economies of East Asia (the “Factory Asia”) feature less prominently in the Indian IT story. We shed new light on this seemingly puzzling phenomenon by looking at the Trade in Value Added (TiVA) statistics related to the Indian IT sector.

Keywords: Indian Economy, Information and Communications Technology, Factory Asia, Global Value Chains

JEL classification: F6, F61, F23, L86

1. Introduction

Since its very modest beginnings in the 1980s, the Indian Information Technology (hereafter, IT¹) sector has come to be hailed as a great success story of the post-reforms India. According to the industry body NASSCOM, for the financial year 2016, this sector's revenue was USD 143 billion, of which USD 108 billion came from exports, and it employed 3.7 million people, making it the largest private sector in terms of employment.² The United States of America (USA) accounted for 67% of the sector's exports, followed by UK (17%), Europe (11%), APEC (8%) and the rest of the world (2%). The Reserve Bank of India reports similar, though somewhat smaller, numbers. If one were to consider only software services exports, then according to UNCTAD (UNCTAD, Information Economy Report, 2012), the world's largest software services exporter in 2010 was Ireland (USD millions 37,251), followed by India (USD millions 33,807). This, however, may underestimate the global presence of India software since sales of wholly owned subsidiaries of foreign companies such as IBM and Accenture, who have very large operations in India, are not considered as exports.

The growing prominence of India, still a developing country, in the global IT market may seem at first a puzzling phenomenon. However, in light of the evolution of the global value chain brought about by the advances in the information and communications technologies, such a phenomenon makes a lot of sense. Lower costs of communication and improved connectivity has allowed Indian IT professionals to work in India for multinational companies who have opened big operations in India to serve their own establishments abroad.

As Baldwin (2011) notes, earlier it was necessary to build the entire supply chain domestically to participate in international trade. That was the route chosen by South Korea for the development of its automobile industry. Obviously, developing the entire supply chain can be both time consuming and difficult. These days, however, it is possible to build and trade in sophisticated products by using supply chains that reside in foreign countries. Trade has moved beyond the trade in goods to trade in tasks and activities in the supply chain.

The lowering of barriers to trade and communication costs has had another effect. It is now easier for manufacturing to become more concentrated because of lower costs and the effects of clustering. As Baldwin emphasizes, regional manufacturing hubs are emerging which are transnational in character. Manufacturing in Asia was initially concentrated around Japan. Rising labour costs forced Japanese firms to shift manufacturing out of Japan into other Asian countries. Since then manufacturing in Asia has become increasingly complex with supply chains involving many different countries (Baldwin, 2007, Baldwin, Ito and Sato, 2014). Baldwin names this 'Factory Asia'. Likewise, Germany lies in the heart of Factory Europe with links with Poland and Turkey and, the USA lies at the heart of Factory North America.

India is situated very close to Factory Asia and it has been writing up trade agreements with its South East and East Asian neighbors at a fast pace (Mukherjee and Goyal, 2015, Taneja, Nagpal and Ray, 2014, Tewari, Veermani and Singh, 2015). However, as its exports of IT and

¹ While IT is the prevalent acronym for the sector as a whole, it is comprised of two sub-sectors, Information technology (IT) and Business Process Management (BPM).

² National Association of Software and Services Companies (NASSCOM) is the industry body for the IT-BPM sector, (www.nasscom.in/indian-itbpo-industry).

BPM services to these regions are negligible suggesting low involvement of these services in the value chains. Gravity models of trade suggest that trade is more likely among neighboring countries and between larger economies (Tharakan and Van Beveren, 2005). Recent trade statistics suggest that software services exports to USA and Canada at 54.3 billion dollars in 2015-16, followed by Europe at 20.7 billion dollars. East Asia follows far behind at 7.2 billion dollars and Australia and New Zealand brings up the rear with 3.4 billion dollars (RBI surveys). Thus USA and Canada comprise 61.7% of software services exports from India, Europe 23.5% and while East Asia contributes 8.4% and Australia and New Zealand 3.4%.

The combined Gross Domestic Product (GDP) of Asia and Pacific is 21.281 trillion dollars at current exchange rates according to the World Bank. In contrast the GDP of North America is 19.503 trillion dollars and that of Europe is 16.229 trillion dollars. It is therefore surprising that the Indian IT industry has such a small presence in Southeast Asia given the proximity of these countries. Of course, the Southeast Asian economy is much smaller in size at 2.345 trillion dollars but after adding China, Japan, South Korea and Australia, the numbers are still surprising.

Besides size of the economy, growth rates should explain differences in export levels. Currently, the combined growth rate of North America is 2.3% while that in Europe is 1.9%. The growth rate in East Asia and Pacific is higher at 3.9%. The countries of Indonesia, Malaysia and Philippines are all growing at around 5%. Thailand, because of its political problems is underperforming, but could be expected to return to 5% growth in the near future. It would be expected that exports should be attracted by higher growth rates but that does not seem to be the case. Even though the trend is upwards exports to this region is very volatile.

Part of the puzzle might be explained by poverty. Even though parts of Asia are very rich most of it is still quite poor. The GDP per capita for North America stands at 54,580 dollars and that of Europe at 31,843 dollars. In contrast the GDP per capita for East Asia and Pacific stands at 9337.2 dollars. However, there are countries such as Singapore (52888.7 dollars), Hong Kong (42,422.9 dollars), Japan (37447.2 dollars) and South Korea (27225.5) which have fairly high standards of living. However, India exports 10.4 billion dollars' worth of software services to the United Kingdom which has a GDP per capita of 43,734 while exporting negligible amounts to Germany and Japan, countries with similar standards of living.

It is likely that that language among other cultural factors plays a role. It is also possible that the industrial structure of an economy plays a role. It could be argued that services typically consume a higher amount of computer services rather than manufacturing. Countries specializing in manufacturing, such as Germany and Japan need less computer services than the United Kingdom. Again, this is only partially true. For the UK, value-added in services as a percentage of GDP amounts to 78.4%, while in Germany and Japan its amounts to 72% and 69%, respectively. The suspicion, grows that the trade statistics are misleading. What if, the UK imported software services from India and then re-exported them to Germany? Also, UK firms could use Indian software services as inputs to export other services to Germany.

Finally, since exports could comprise large amounts of intermediate goods which are imported, traditional statistics which only counts the final value of trade can be misleading. It would be much better if we could measure trade in value added terms. Traditional trade data

are also susceptible to multiple counting of exports, a problem that can be avoided using value added data (OECD, Gereffi, and Fernandez Stark (2011), Javorsek and Camacho, (2015)). This paper will therefore use the OECD Trade in Value Added data to investigate the export performance of the Indian IT services industry around the world and particularly in Asia (Timmer, Dietzenbacher, Los, Stehrer and de Vries, 2015).

Another interesting facet of this research is that it concentrates on services, an area that has been relatively neglected in the trade literature in the past (Mirodout, 2016). The increased role that services, particularly specialized services, play in manufacturing is another cause for increased interest in services (Lanz and Maurer, 2015).

2. Evolution and Spread of the Indian IT industry

A simple story³ which describes the evolution of the Indian IT industry in terms of its presence in different parts of the world is as follows. IT services firms gravitate towards IT expenditure. Typically, US and European firms have the highest levels of IT expenditures, so Indian firms gravitate towards them. The Indian IT firms initially got their break in Y2K problem and are by now well established in the US. Second tier firms find it easier to operate in the US and Europe.

The APEC region can be divided into 4 parts: (i) Australia and New Zealand, (ii) Greater China (China, Hong Kong and Taiwan), (iii) Japan and South Korea and (iv) ASEAN. Indian IT firms already have a presence in Australia and New Zealand. There are two reasons. One, as Indian firms tried to go global they had to move to jurisdictions other than their comfort zones. Global firms were also interested in consolidating their service providers and would be more comfortable dealing with a single vendor for their operations around the world. Australia and New Zealand were the easiest to penetrate as there is no language barrier and were culturally similar to US and the Europe.

Indian IT firms have a presence in greater China. This is mostly because it is imperative that they be there if they wished to be global firms. It is not easy to operate in China because of language, culture and regulatory issues.

Japan and South Korea are hard to enter, particularly, given the language and cultural barrier. The markets are lucrative but not as big as US, EU or China. The other problem is that these are largely manufacturing economies. Typically, manufacturing requires less IT services than other services such as banking. They also have access to domestically trained IT professionals and firms.

The ASEAN market also exhibits the same challenges as that of China and South Korea. A further issue that makes the problem worse is the fragmented nature of the market and the variety of languages spoken and the political and regulatory uncertainty in this area. So, Indian IT firms have largely concentrated in Singapore since it has a large service sector.

³ Private conversation with Girija Pande, Avalon Consulting

It is likely, that Indian IT firms will continue to expand into China and ASEAN since these areas will grow at around 6% in the medium term. Growth in the US will mean more emphasis there as well.

3. Traditional Statistics

To investigate some of the concerns we will start by looking at the data on exports of IT services and products as provided by the Reserve Bank of India (RBI). For 2015-16 it reported that total export of Computer Services and ITES/BPO services stood at Rs. 5,763.1 billion (US\$ 88 billion). Exports of computer services contributed 71.2% while ITES/BPO contributed the rest. Within computer services Rs. 3,862.8 billion came from IT services and Rs. 241.6 billion came from software product development. Within ITES/BPO services Rs. 1,336.8 came from BPO services and Rs. 321.9 billion from engineering services. Public and Private limited companies fairly evenly shared the market for software services exports. On-site services accounted for 19.9%, while off-site services accounted for 80.1%. The predominant mode for export was cross-border supply (64.8%), followed by commercial presence (18.9%) and presence of natural person (16.1%).

Table 1. Indian Software Exports by Destination (Rs. Billion)

Country	2002-2003	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
USA & Canada	196.8	897.0	1027.0	1137.8	1410.4	1597.4	2181.6	2712.2	3004.9	3554.7
Europe	73.2	372.9	451.3	487.1	508.4	578.8	689.6	1054.0	1235.9	1352.0
<i>of which</i> UK		196.1	232.1	228.6	325.4	355.3	389.8	544.0	611.7	684.1
Asia		56.7	82.4	89.7	111.9	129.2	162.9	245.1	451.8	487.0
<i>of which</i> East Asia										
West Asia	18.2	42.8	68.6	70.0	87.4	99.4	61.2	157.0	356.0	412.6
South Asia	5.9	7.0	12.6	14.6	20.2	24.8	23.4	69.2	91.3	65.7
Australia & New Zealand	2.9	6.9	1.2	5.1	4.3	5.0	78.3	18.8	4.5	8.6
Other countries	4.5	21.4	22.9	42.2	59.3	87.0	118.0	168.5	169.0	198.2
Total	7.5	54.0	88.8	80.2	80.1	91.9	253.1	143.1	152.4	171.2
	308.8	1402.0	1672.4	1836.9	2170.1	2484.3	3405.2	4322.8	5014.0	5763.1

Table 1 shows total software services exports by region and over the period 2002-03 till 2015-16. The table reflects the importance of USA/Canada and Europe in terms of destinations. The UK accounts for half of all European imports. Asia, as a whole, accounts for Rs. 487.0 billion in 2015-16, of which Rs. 412.6 billion comes from East Asia. Australia and New Zealand account for Rs. 198.2 billion. It is interesting to note that the whole of Asia counts for less than UK alone. The same trend can be observed in Figure 1. If we look at the share of exports to different regions around the world over time, we notice that the share of USA and Canada

has decreased slightly (Table 2, Figure 2) and East Asia’s share has increased slightly. Growth seems to have slowed down in recent years (Table 3) in all regions. It has recorded the sharpest falls in the USA and Canada, while it is on an upward trend in Europe and Australia and New Zealand. East Asia has been volatile (Figure 3).

Figure 1. Software Exports Rs. billions

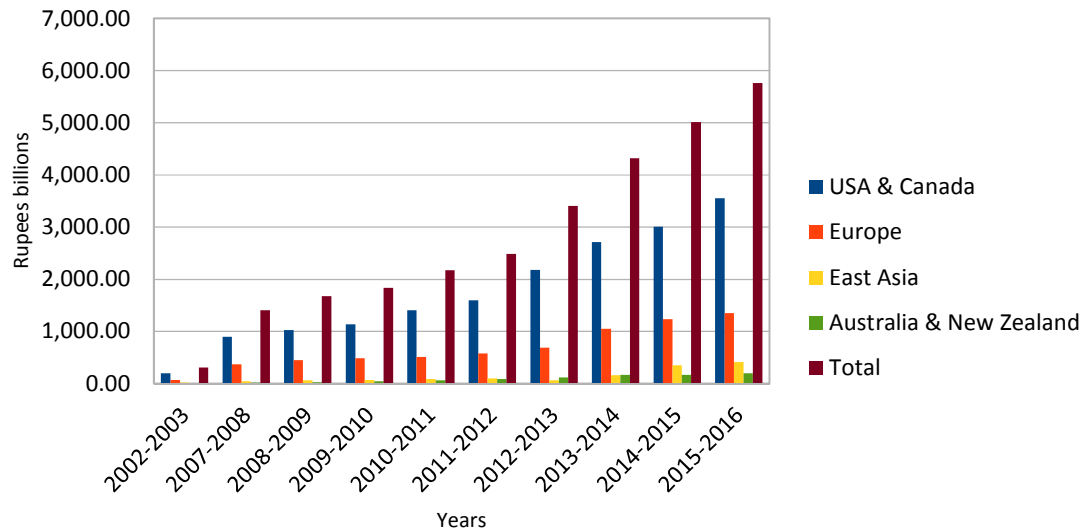


Table 2. Shares of different countries in total Indian Software Exports

Country	2002-2003	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
USA & Canada	63.71	64.00	61.50	61.90	65.00	64.30	64.10	62.70	59.90	61.70
Europe	23.70	26.60	27.00	26.50	23.50	23.30	20.20	24.40	24.60	23.50
of which UK		14.00	13.90	12.40	15.00	14.30	11.40	12.60	12.20	11.90
Asia		4.00	5.00	4.90	5.10	5.20	4.80	5.70	9.00	8.40
of which East Asia	5.89	3.00	4.10	3.80	4.00	4.00	1.80	3.60	7.10	7.20
West Asia	1.89	0.50	0.80	0.80	0.90	1.00	0.70	1.60	1.80	1.10
South Asia	0.94	0.50	0.10	0.30	0.20	0.20	2.30	0.40	0.10	0.20
Australia & New Zealand	1.45	1.50	1.40	2.30	2.70	3.50	3.50	3.90	3.40	3.40
Other countries	2.41	3.80	5.30	4.40	3.70	3.70	7.40	3.30	3.10	3.00

Figure 2. Share % Software Exports

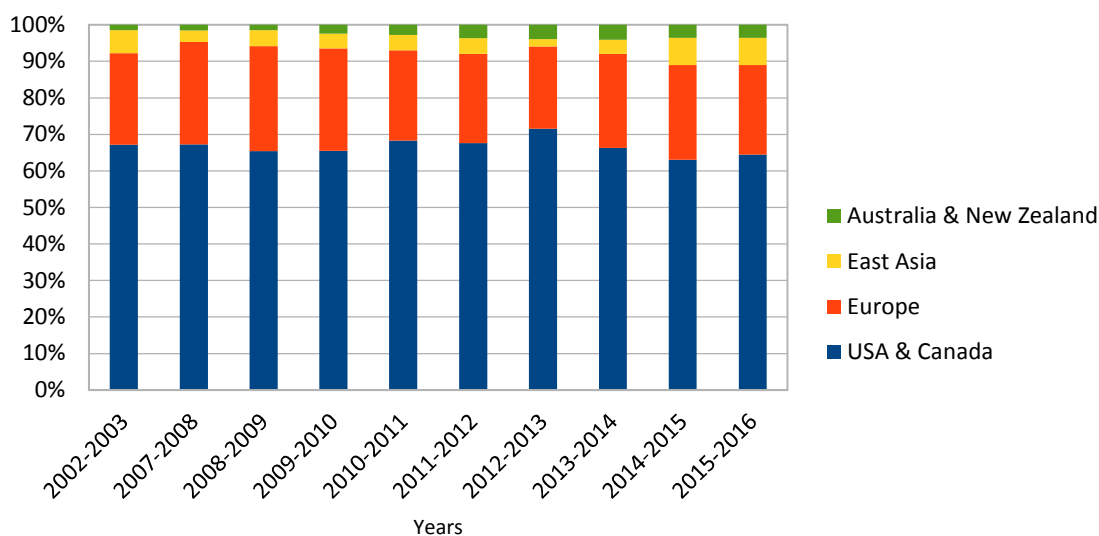
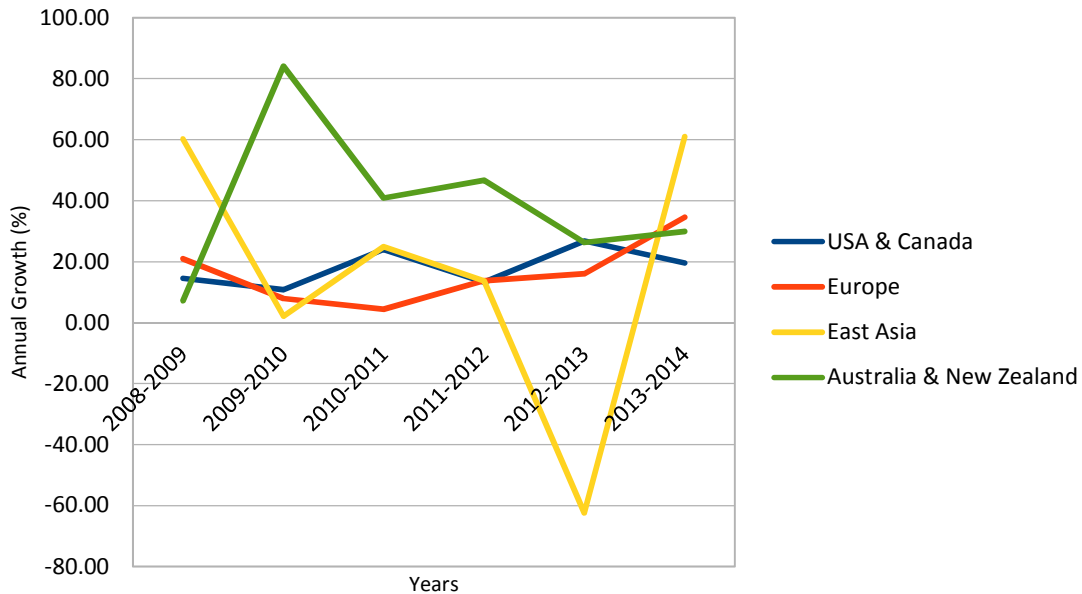


Table 3. Growth rates (y-on-y) Of Indian Software Exports to different destinations

Country	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
USA & Canada	14.50	10.80	24.00	13.30	36.57	24.32	10.79	18.30
Europe	21.00	7.90	4.40	13.80	19.14	52.84	17.26	9.39
<i>of which UK</i>	18.30	-1.50	42.30	9.20	9.71	39.56	12.44	11.84
Asia	45.30	8.80	24.70	15.50	26.08	50.46	84.33	7.79
<i>of which East Asia</i>	60.20	2.10	24.90	13.70	-38.43	156.54	126.75	15.90
West Asia	79.60	15.90	38.40	22.80	-5.65	195.73	31.94	-28.04
South Asia	-82.20	310.60	-15.70	16.30	1,466.00	-75.99	-76.06	91.11
Australia & New Zealand	7.20	84.10	40.90	46.70	35.63	42.80	0.30	17.28
Other countries	64.40	-9.70	-0.10	14.70	175.41	-43.46	6.50	12.34
Total	19.30	9.80	8.10	14.50	37.07	26.95	15.99	14.94

Figure 3. Annual Growth



4. Trade in Value Added

We will now look at the export performance using the trade in value added data. To facilitate comparison, we have shown the total exports as computed by the RBI in USD. The TiVA data is only available till 2011 and is shown in Table 4. Imports of IT services from India can be consumed within the country or can be used as intermediate inputs for export. Table 5 shows the value added in final demand, the amount that is consumed within the country.

Table 4. Software Services exports by region (RBI, US\$ billions)

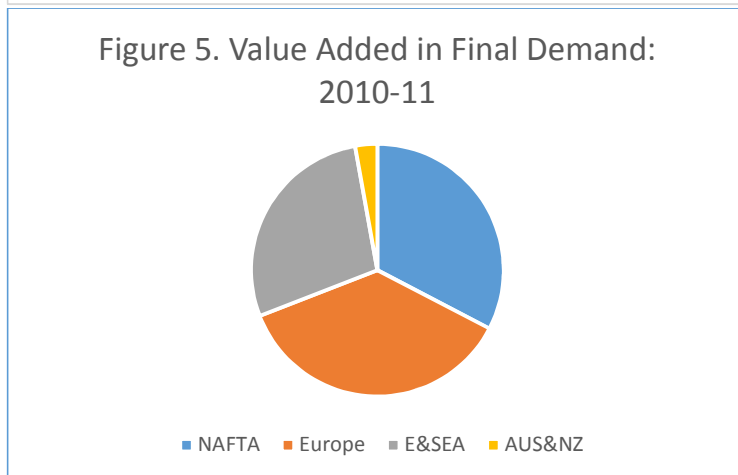
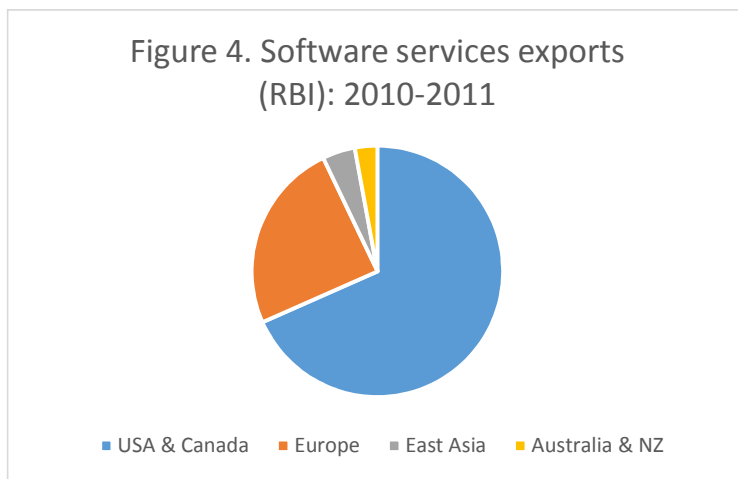
Country	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
USA & Canada	22.29	22.30	24.00	30.90	33.30	40.10	44.80	49.10	54.30
Europe	9.27	9.80	10.30	11.10	12.10	12.70	17.40	20.20	20.70
East Asia	1.06	1.50	1.50	1.90	2.10	1.10	2.60	5.80	6.30
Australia & NZ	0.53	0.50	0.90	1.30	1.80	2.20	2.80	2.80	3.00
Total	34.84	36.40	38.70	47.60	51.80	62.60	71.40	82.00	88.00

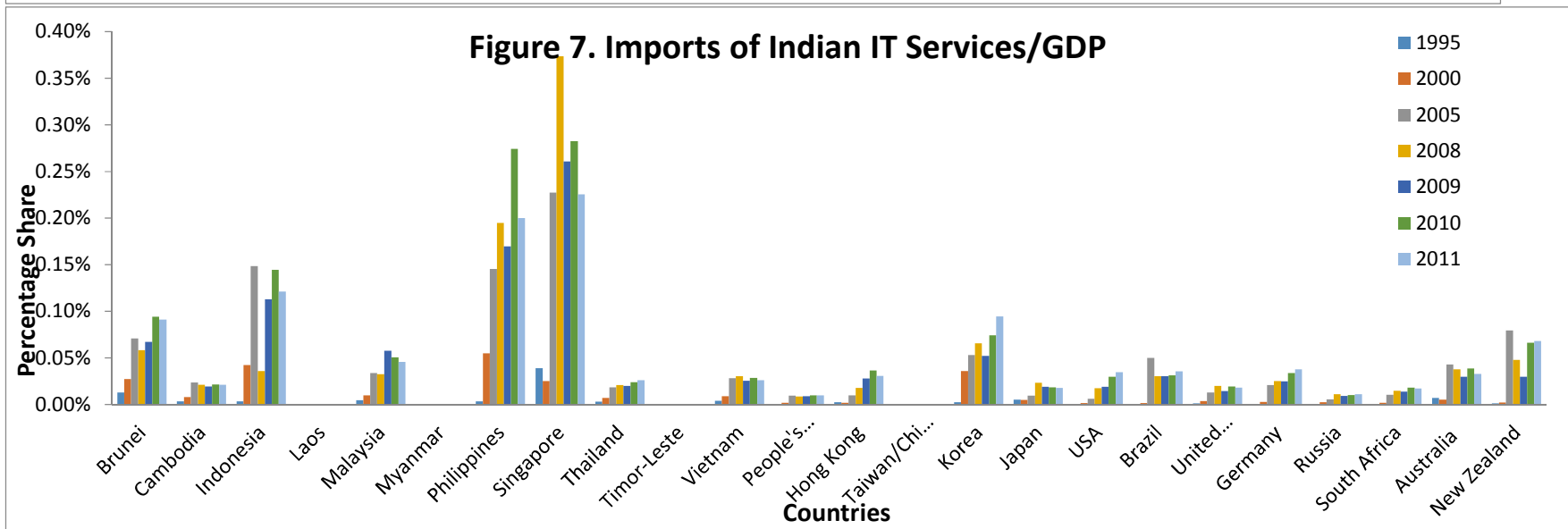
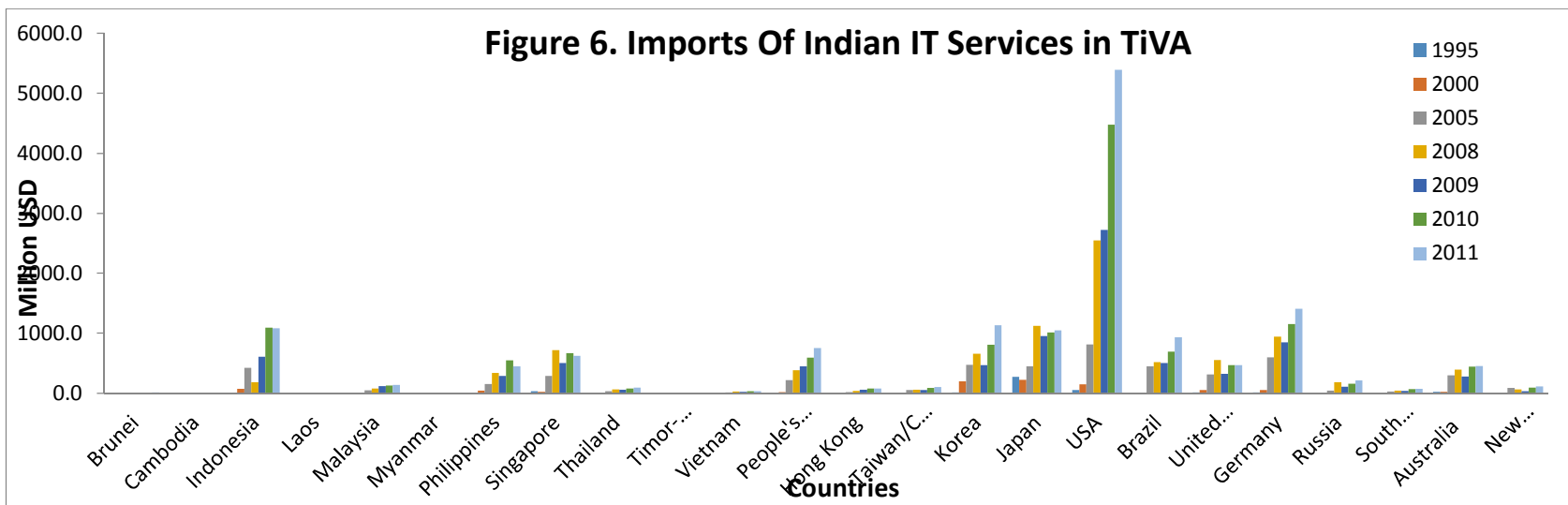
Table 5. Value Added in Final Demand by Regions (US \$ billions)

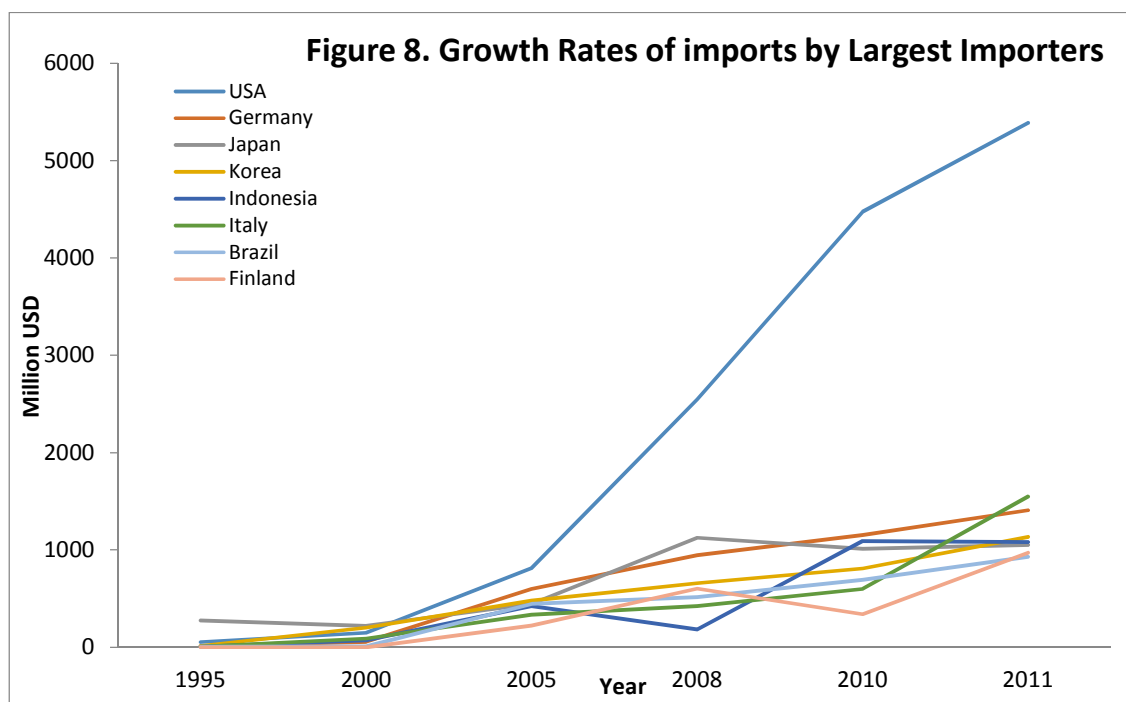
Regions/years	1995	2000	2005	2008	2009	2010	2011
NAFTA	0.06	0.17	1.54	3.78	3.57	5.56	6.47
Europe	0.07	0.29	2.86	5.56	4.44	5.44	7.23
E&SEA	0.36	0.62	2.18	3.68	3.59	5.16	5.56
AUS&NZ	0.03	0.02	0.39	0.46	0.31	0.54	0.57
Total	0.51	1.10	6.97	13.49	11.92	16.70	19.82

It is immediately apparent that the numbers in value added terms are very small compared to traditional statistics. In the years 2008, 2009, 2010 and 2011 the RBI figures show total exports of 36.40, 38.70, 47.60 and 51.80 billion USD while in terms of value added in final demand the numbers are 13.49, 11.92, 16.70 and 19.82 billion USD. The corresponding numbers in 2011 for motor vehicles is 3.02, for electrical and optical equipment 4.69 and 8 billion USD for refined petroleum. The most obvious reason is that these exports require expensive intermediate inputs such as hardware and software. So, in terms of value added the amount is less. Also, the numbers are clear of double counting. The other interesting facet is that in value added terms North America, Europe and Southeast and East Asia contribute about a third each. Consequently, the Indian IT industry is not absent in Factory Asia. (Figure 4 and 5).

It is also interesting to note that East and South East Asia was the predominant destination of our exports till 2005, when it was replaced by Europe. In 2010 NAFTA briefly replaced Europe as the top destination. Thereafter Europe has regained its top position in 2011 with NAFTA and East and Southeast Asia following it.







If we look at individual countries, then USA remains the predominant destination (Figure 6). It is followed by Germany, Korea and Japan. Indonesia, Singapore, Philippines, China and Brazil follow. The United Kingdom (UK) and Australia bring up the rear. It is interesting to look at Figure 7, which shows imports as a percentage of GDP. Here we see Singapore and Philippines come out on top, followed by Indonesia. Other prominent countries are Korea, New Zealand and Malaysia. In terms of growth the USA has outpaced all other countries but growth has slowed in recent times (Figure 8). All the other countries are bunched up together and some have witnessed sharp upswings in growth.

If we consider the use of Indian IT services as intermediate inputs for exports, East and South East Asia emerges as the largest user, followed by Europe. North America and Australia and New Zealand are much smaller. This suggests that Indian IT services are more entwined with production networks in Europe and Asia (Table 6 and Figure 9). In fact, value added in gross exports from NAFTA is about the same size as Australia and New Zealand, even though NAFTA far outweighs Australia and New Zealand in terms of size. We may conclude that NAFTA mainly uses Indian IT imports for consumption, while East and South East Asia uses a substantial amount for exports.

Table 6. Value added in gross exports by regions (USD millions)

Years	1995	2000	2005	2008	2009	2010	2011
NAFTA	4.186	8.081	61.124	192.819	171.935	295.529	376.629
Europe	5.407	28.609	253.02	584.598	506.303	599.757	915.404
E & SEA	50.175	92.853	546.486	817.388	690.722	1022.158	1110.225
AUS&NZ	172.125	149.621	267.057	288.586	225.304	289.446	338.715
Total	231.893	279.164	1127.687	1883.391	1594.264	2206.89	2740.973

Figure 9. Value Added in Gross Exports: 2010-11

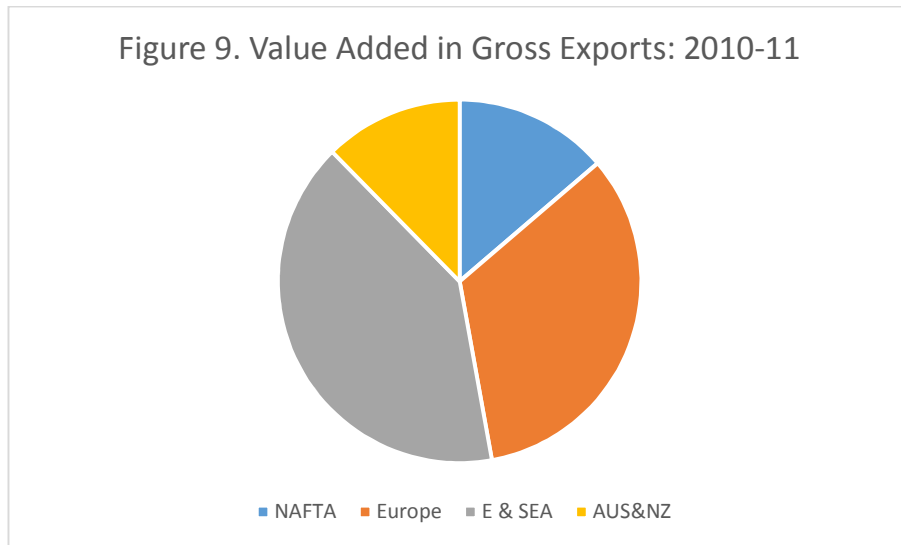


Table 7. Value Added in Final Demand in Southeast Asia (US\$ millions)

Country	1995	2000	2005	2008	2009	2010	2011
Brunei	0.608	1.639	6.758	8.39	7.22	11.652	15.238
Cambodia	0.109	0.292	1.472	2.203	1.992	2.416	2.719
Indonesia	6.843	69.796	423.691	182.364	609.061	1092.008	1082.329
Malaysia	4.028	9.205	48.206	74.929	116.842	128.769	135.808
Philippines	2.414	44.399	149.826	339.25	285.846	547.844	447.9
Singapore	34.434	24.267	289.579	718.023	501.916	668.025	620.847
Thailand	4.854	8.969	34.458	61.034	56.522	81.877	96.281
Vietnam	0.782	2.944	16.238	30.243	26.88	32.996	35.296
Total	54.072	161.511	970.228	1416.436	1606.279	2565.587	2436.418

As we mentioned earlier it would make sense to divide East and South Asia into its constituent parts. One part is ASEAN and another is China, Taiwan and Hong Kong, since they are economically very strongly interlinked. Japan and Korea form separate parts and we can include Australia and New Zealand together even though they are not strictly Asian countries. Table 7 shows us the TiVA in final demand numbers for the region. We can see that the largest consumer of Indian IT services is Indonesia, followed by Singapore and the Philippines. The other large economies Malaysia, Thailand and Vietnam lag behind.

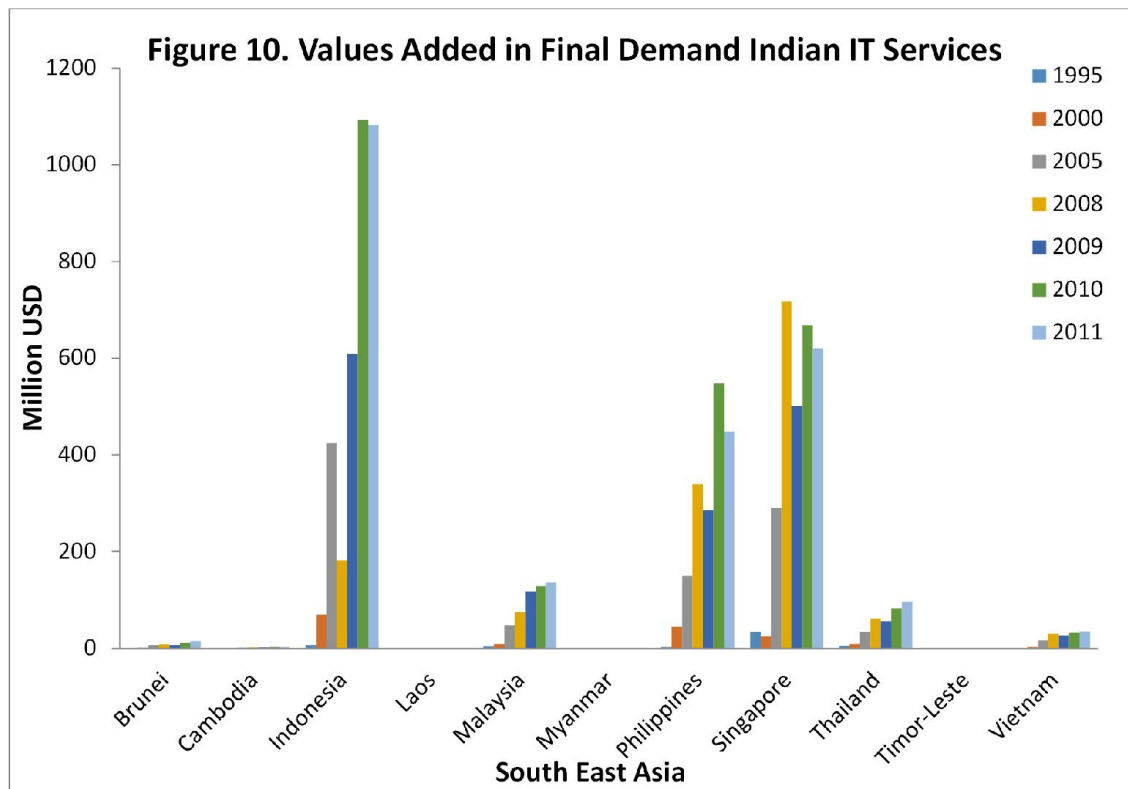
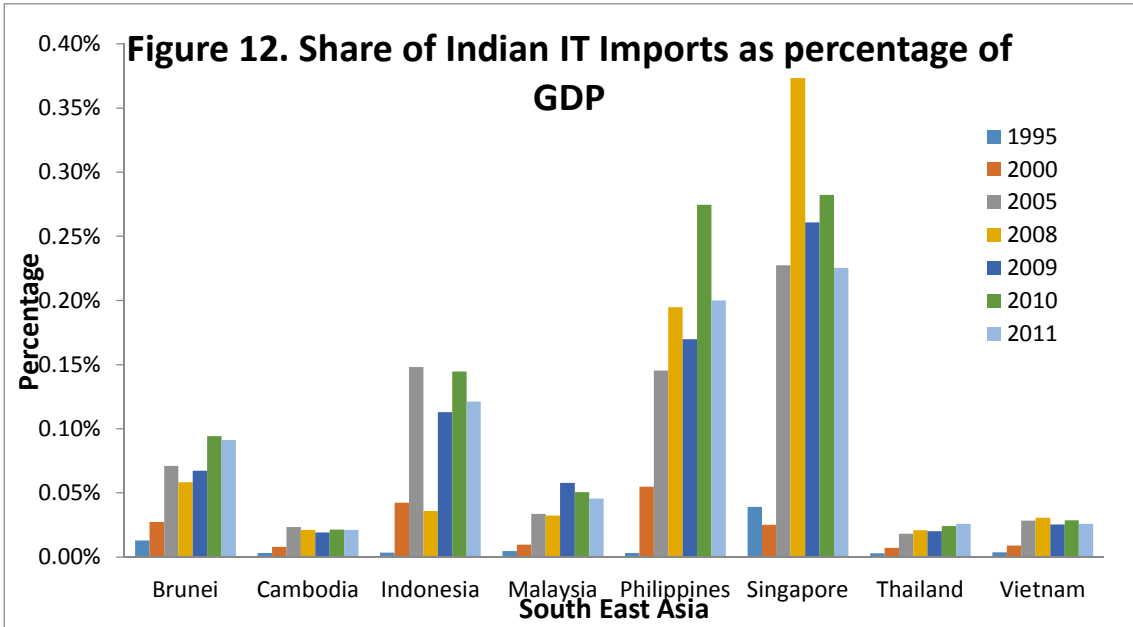
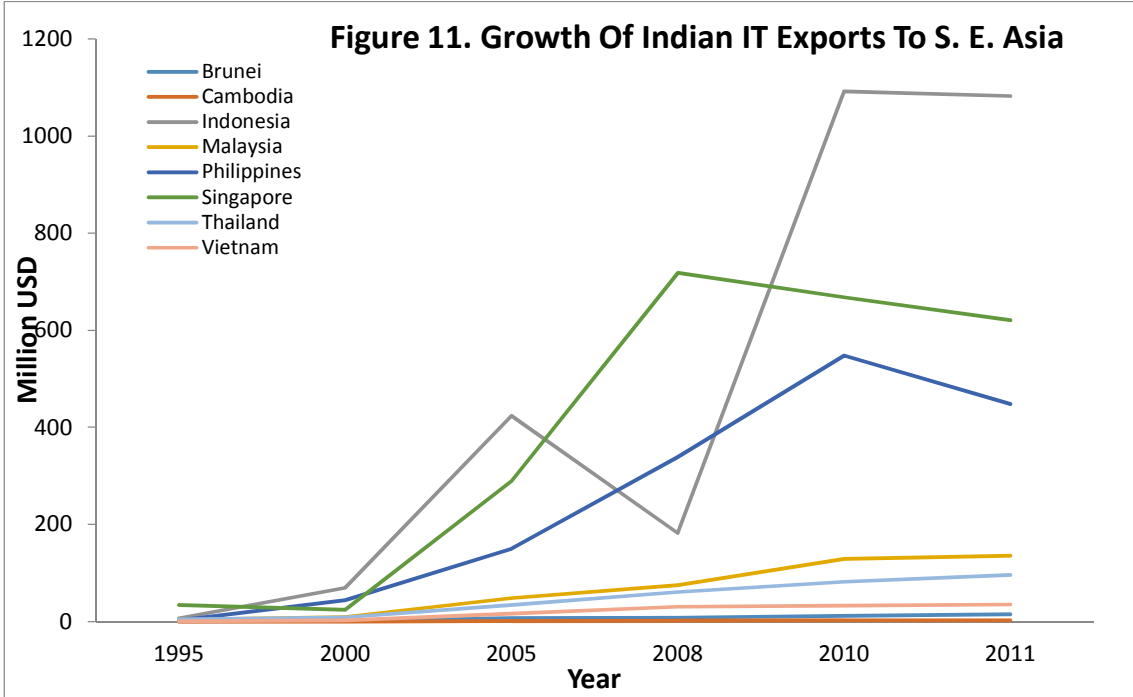
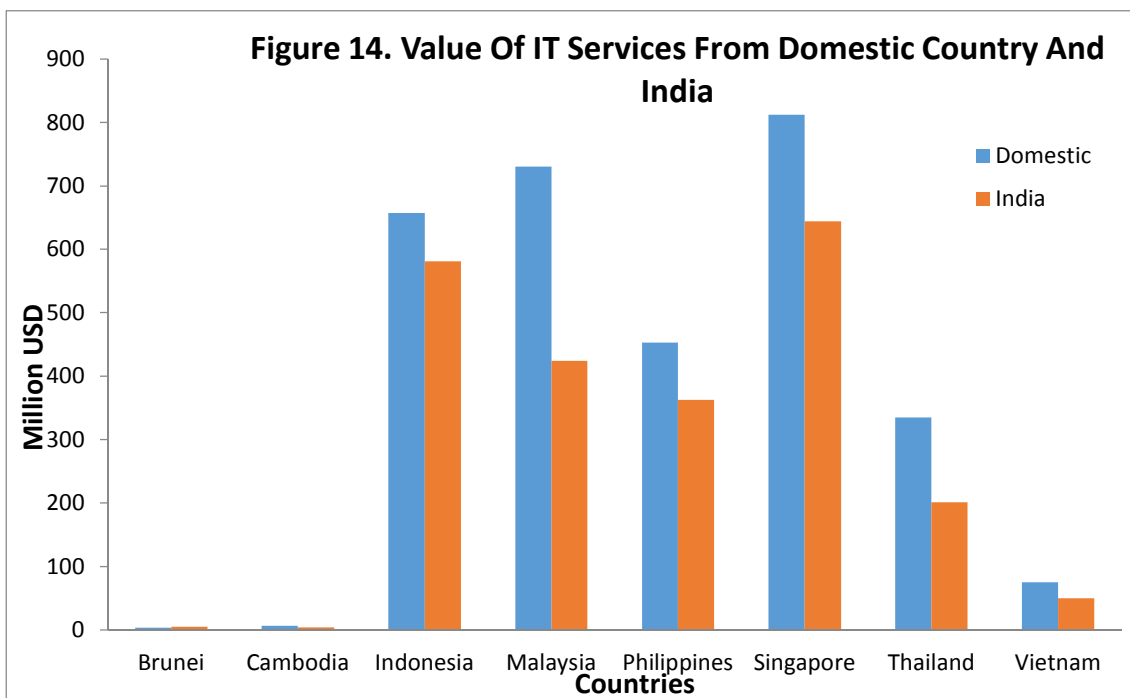
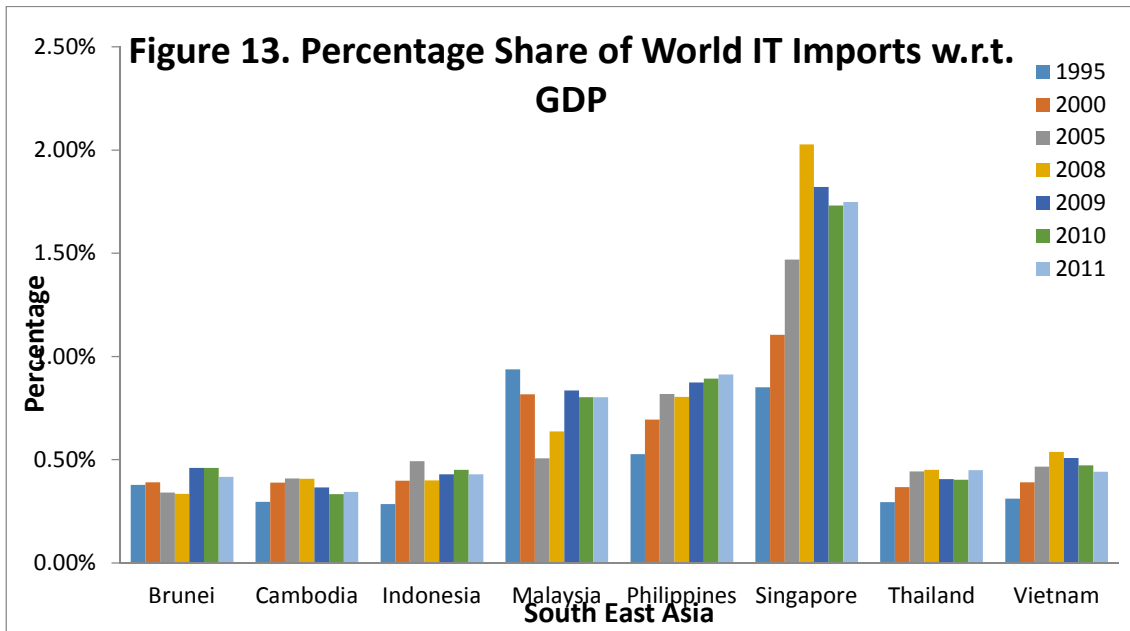


Figure 10 shows this pattern quite starkly. Indonesia, Philippines and Singapore are in one group who have high IT imports from India and Malaysia, Thailand and Vietnam in another exhibiting low imports. Their growth patterns are also different Singapore has been somewhat volatile, with a jump in 2005, followed by an even larger expansion in 2008, followed by a slump in 2009, a growth in 2010 and a small drop in 2011. This may be because Singapore is a relatively small economy and doesn't have a large domestic market. Philippines seems to mirror Singapore but at lower levels of imports. Indonesia is in a different category by itself, exhibiting high growth and relative stability. Malaysia, Thailand and Vietnam exhibit slow but steady growth as shown in Figure 11.

We might think about the effect of size of the economy on IT imports. In Figure 12 we have drawn Indian IT imports as a fraction of Gross Domestic Product (GDP). Singapore comes out on top, followed by Philippines. Indonesia slips to the third place. Malaysia, Thailand and Vietnam bring up the rear. Figure 13 shows percentage share of world IT imports with respect to GDP. We can now see that Malaysia, Thailand and Vietnam do import IT services, but not that much from India. Indonesia does not import much IT, but what it does it gets from India. The Philippines is similar but not as much as Indonesia. Singapore's graph is not markedly different between Figure 12 and 13.



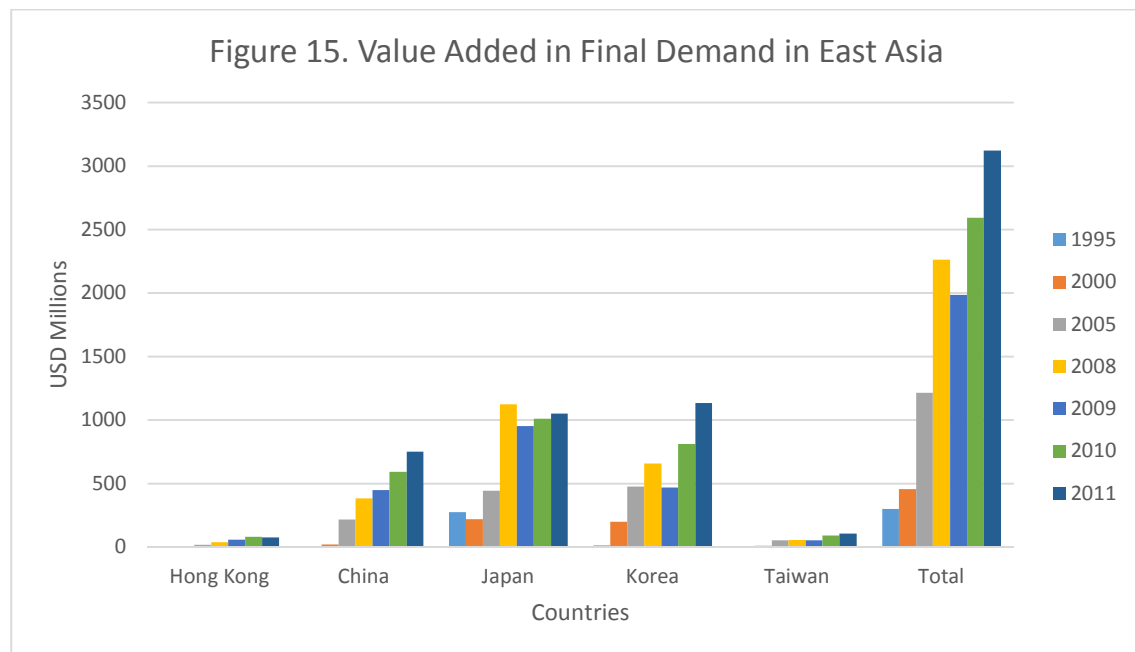


For most countries, their main source of IT services is the domestic industry. However, the extent to which they are dependent on imports depends on the strength of the domestic industry. By looking at Figure 14 we see that Malaysia and Thailand seem to rely more on domestic IT services. Whether, that is because they are less open to trade or have the necessary skills needs to be discovered. Indonesia is particularly reliant on Indian IT services, with it eclipsing the domestic industry in some years. On this front Vietnam seems to be different from Malaysia and Thailand. If we compare with east Asia we see that Japan has

been holding fairly steady at one billion USD. Korea has overtaken Japan in 2011 and that China has been rising steadily. Australia and New Zealand don't throw up any surprises.

Table 8. Value added in final demand East Asia, Australia and New Zealand (US \$ millions)

Country/years	1995	2000	2005	2008	2009	2010	2011
Hong Kong	3.686	2.95	18.012	38.753	59.645	83.134	76.537
China	4.717	20.585	217.391	383.556	449.261	594.087	753.777
Japan	275.608	220.622	445.856	1125.276	952.931	1010.762	1050.486
Korea	13.736	200.81	477.957	658.474	469.456	810.974	1134.431
Taiwan	3.235	12.465	54.688	56.685	54.473	92.712	106.292
Total	300.982	457.432	1213.904	2262.744	1985.766	2591.669	3121.523
Australia	26.013	22.454	296.185	397.915	277.369	444.242	452.966
New Zealand	0.888	1.054	91.462	62.835	35.813	96.32	113.316
Total	26.901	23.508	387.647	460.75	313.182	540.562	566.282



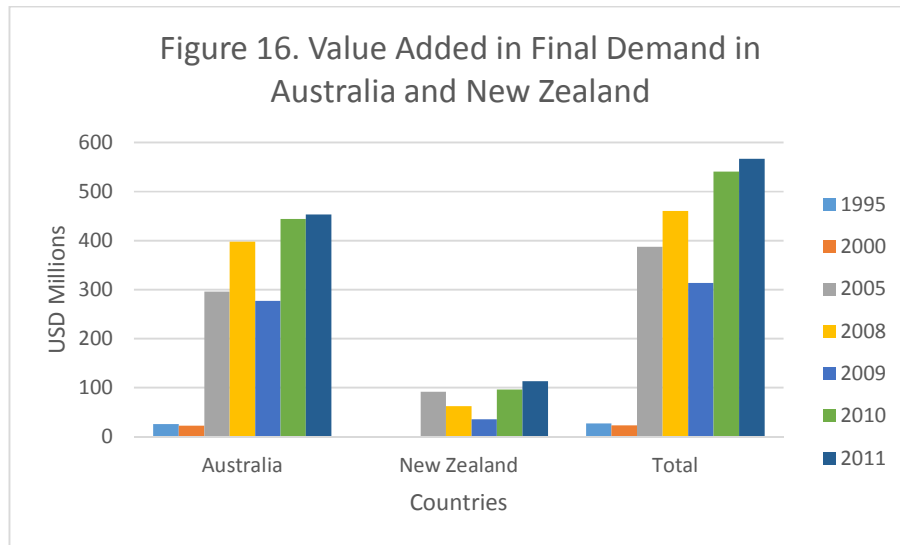


Table 9. Value added in final demand in Europe (US \$ millions)

Country/years	1995	2000	2005	2008	2009	2010	2011
Denmark	1.142	2.339	169.71	343.434	307.18	335.559	351.046
Finland	0.551	1.122	223.315	602.657	840.618	339.711	972.076
Germany	13.43	54.374	599.779	946.556	847.352	1153.297	1407.853
United Kingdom	15.319	54.435	310.882	556.573	326.584	464	469.423
France	5.482	16.954	230.615	635.716	273.5	344.06	491.633
Italy	6.015	89.785	332.333	424.753	376.337	600.277	1549.558
Spain	4.254	24.987	346.22	189.948	155.899	152.662	231.479
Netherlands	2.351	5.22	53.713	747.571	512.601	626.077	137.171
Sweden	6.598	4.364	128.158	248.287	230.797	308.662	569.471
Belgium	1.882	3.786	32.31	81.04	106.469	253.683	266.097
Czech Republic	1.249	0.767	8.955	21.097	15.889	74.087	77.163
Ireland	0.84	4.197	19.39	38.334	35.864	41.675	48.748
Total	59.113	262.33	2455.38	4835.966	4029.09	4693.75	6571.718

It is instructive to compare the Asian experience with Europe (Table 9), though we won't go too deeply into it. As we mentioned earlier European imports of Indian IT services are roughly the same as Asian imports in value added in final demand. The major surprise is the emergence of Italy on the top. That Germany should be second would be expected. The third largest is Finland followed by the Sweden and France. The UK comes in at number six, which is a surprise. Denmark comes in at number seven. So the Scandinavian countries together consume a fair amount of Indian IT services.

We will now move to value added in gross exports Table 10. The numbers are much smaller than value added in final demand, except in the case of Singapore. One surprise is that Malaysia uses Indian IT services for exports almost as much as it consumes domestically. Table 11 shows value added in gross exports in East Asia and Australia and New Zealand. It is

interesting to note that Korea comes out on top and that New Zealand eclipses Australia. The second should not be too much of a surprise since New Zealand probably does not have a large domestic IT industry.

Table 10. Value added in gross exports in South East Asia

Country/years	1995	2000	2005	2008	2009	2010	2011
Brunei	0.025	0.032	0.149	0.358	0.348	0.552	0.529
Cambodia	0.014	0.111	0.749	1.199	0.876	1.246	1.313
Indonesia	107.659	111.908	164.046	211.447	194.666	239.82	289.321
Malaysia	1.808	9.68	58.194	72.851	98.409	110.543	114.564
Philippines	0.651	6.021	46.502	107.117	88.23	176.929	145.216
Singapore	66.272	38.77	430.798	576.586	430.684	608.478	574.798
Thailand	1.388	4.168	18.273	36.837	32.234	47.016	53.434
Vietnam	0.197	0.974	6.071	10.977	9.969	14.631	17.762
Total	178.014	171.664	724.782	1017.372	855.416	1199.215	1196.937

Table 11. Value added in gross exports East Asia, Australia & New Zealand

Country/years	1995	2000	2005	2008	2009	2010	2011
Hong Kong	0.668	0.704	5.059	15.406	14.759	21.366	21.758
China	1.942	12.106	126.987	217.84	202.273	297.538	361.142
Japan	13.853	14.073	42.273	115.494	72.761	96.243	101.208
Korea	3.112	48.938	149.597	275.088	198.067	335.929	478.151
Taiwan	1.704	5.789	25.281	37.461	31.867	57.743	61.122
Total	21.279	81.61	349.197	661.289	519.727	808.819	1023.381
Australia	3.088	3.31	35.163	44.508	24.642	41.568	41.806
New Zealand	169.037	146.311	231.894	244.078	200.662	247.878	296.909
Total	172.125	149.621	267.057	288.586	225.304	289.446	338.715

Table 12. Value added in gross exports in Europe

Country/years	1995	2000	2005	2008	2009	2010	2011
Denmark	0.359	1.452	35.533	71.007	60.448	92.264	100.997
Finland	0.17	0.512	73.745	277.223	350.647	136.794	382.323
Germany	2.098	12.466	171.623	363.461	296.77	429.95	554.727
United Kingdom	3.24	11.515	57.181	123.551	69.847	111.001	127.142
France	1.189	4.282	51.257	135.352	55.827	78.689	115.071
Italy	1.463	21.79	84.679	121.137	80.621	140.387	377.849
Spain	0.485	5.137	53.486	38.932	29.043	36.375	55.976
Netherlands	0.731	1.612	17.362	143.155	95.833	125.312	37.462
Sweden	1112.3	1884.195	3878.915	6790.68	5284.73	5670.363	6674.138
Belgium	0.72	1.86	13.197	34.377	31.412	97.778	106.064
Czech Republic	0.411	0.44	6.864	15.46	12.36	44.582	52.378

Ireland	0.926	6.243	27.571	63.95	54.11	62.52	86.825
Total	1124.092	1951.504	4471.413	8178.285	6421.648	7026.015	8670.952

Finally, for comparison we have looked at the same figures for Europe (Table 12). What catches attention is the figure for Sweden, at 6674.138 million USD is way larger than its domestic consumption, at 569.471 million USD. The predominance of Germany is not surprising but the absence of Italy, the largest importer of Indian IT services for domestic consumption, is surprising. In this sense Italy is somewhat like the USA. The Scandinavian countries use Indian IT services for their exports quite a bit. The UK and France are not big users. In fact, tiny Belgium, uses almost as much as either of them.

In our analysis, we have progressed from broad variables to more granular data over the course of this paper. We will now go even deeper to look at how Indian IT services entered certain countries and how they have progressed over time. We will also look at the main competitors.

5. Evolution of Indian IT services over time

As before we will divide the countries of Southeast Asia into two groups. The first group would comprise Singapore, Indonesia and Philippines. These countries are significant users of Indian IT services in value added terms. Singapore, of course, is very different from Indonesia in terms of its economic development. Table 13 through Table 20, in Appendix 1, show the top six sources of IT services imports by each country in terms value added in final demand as well as value added in gross exports. This allows us to trace the entry, rank and size of imports of different countries across time.

We see that India entered the Indonesian market quite early from Table 13. It was ranked second by the year 2000. It has maintained this rank since then and once, in 2010, came first. Most countries over time source most of their IT service needs domestically. So the domestic component is often very large compared to that which is sourced from other countries and always has first rank. Indonesia with respect to Indian IT imports is an exception. Indonesia's domestic production of IT services is marginally bigger than its Indian imports. The story is somewhat similar for the Philippines except that there is significant competition from Korea. In Singapore, India was a much later entrant. Its presence is first felt in 2005 and at the 3rd rank. The domestic industry overwhelms imports. The most important competitors are Israel and USA. It is also interesting to note that Malaysia and China are significant exporters.

In Malaysia India first made its appearance in 2005 at the fifth spot. Since then it has managed to climb one spot. The second and third spots have been consistently occupied by Japan and the USA. India also faces significant competition from Germany and the UK. Thailand is a smaller market and Indian performance is very similar to that of Malaysia. In fact, all the features we described for Malaysia are found in Thailand. Vietnam is still smaller and here India is in the sixth position. Japan and the USA are in the second and third position, followed, interestingly, by Korea and China.

Value added in gross exports are typically smaller than value added in final demand and Indonesia is no exception. The picture is very similar to value added in final demand. The same

is true for the Philippines. Singapore is one of the few countries where the value added in gross exports from IT is much higher than value added in final demand, otherwise the story remains the same for Malaysia, Thailand and Vietnam.

Lets now turn to East Asia. We will start with China, Hong Kong and Taiwan since they are assumed to be closely connected. China's domestic industry is huge and all exporters pale in comparison. In 2011, India ranked fifth, behind Japan, USA and Germany. Hong Kong is similar to China, with the exception that it has relations with UK. India stands fourth in Taiwan in competition with Germany. These three countries have strong relationships with the USA and Japan. The trends are repeated in value added in gross exports. India does not typically feature among the top six exporters of IT services to Taiwan.

In 2011 India stood fourth in Australia and in New Zealand. Trade ties seem to be stronger with the UK in Australia but not so in New Zealand. Also, New Zealand imports a significant amount of IT services from Australia. The USA and Israel are at second and third ranks before India, in Japan. However, India is in the second rank in Korea and has been there since 2008. It might seem that India made its presence felt in Korea ahead of Japan. The truth is a bit more nuanced. India had a presence in Japan as far back as 1995, but lost market share. It then resurfaced around 2005 and has been a steady performer at rank three or four. The Korean experience has been more volatile. These trends are repeated with data for value added in gross exports.

If we look at the sources of demand it throws up some interesting observations (Table 21 through 24, in Appendix 2). The industry that consumes a bulk of Indian IT services in Indonesia is construction. However, manufactures, business services and personal services are also quite big. In Philippines the primary sources of demand are personal and business services. It comes as no surprise that business services generate the most demand in Singapore, followed by personal services. Malaysia also leads with business services though manufactures are also important. Thailand's main source of demand is manufacturing, followed by business services as is the case in Vietnam.

In terms of value added in gross exports the top two ranks in Indonesia are occupied by manufactures and business services. Construction comes a lowly sixth, hardly surprising since construction is largely not exported. In Philippines personal services are replaced by manufactures. This trend is visible across all the large economies of Southeast Asia. The top two sources of demand for Indian IT services are manufacturing and business services. This finding provides more support for the idea of Factory Asia and that Indian IT services are strongly connected to it.

6. Conclusion

Looking at trade in value added statistics gives us a very different view of Indian IT exports than one gets from traditional statistics. India has a much larger presence in Asia than otherwise thought. We would like to explore this further through surveys in India and Singapore. An interesting addition would be to complement this with a gravity model using value added data.

Appendix 1.

Sources Country for Value Added in Final Demand in Asia

Table 13. Value Added in Final Demand

	1995	2000	2005	2008	2009	2010	2011
Indonesia	1. D (273.722) 2. JAP (58.863) 3. USA (42.084) 4. AUS (31.101) 5. GER (22.63) 6. SIN (20.999)	1. D (253.145) 2. IN (69.796) 3. JAP (58.029) 4. USA (53.57) 5. ISR (30.742) 6. AUS (28.65)	1. IN (423.691) 2. D (361.927) 3. USA (91.57) 4. JAP (88.33) 5. UK(68.848) 6. SIN (56.947)	1. D (680.447) 2. IN (182.364) 3. ISR (175.536) 4. JAP (168.116) 5. USA (123.374) 6. AUS (68.154)	1. D (769.655) 2. IN (609.061) 3. USA (130.906) 4. JAP (130.293) 5. GER (64.594) 6. SIN (59.363)	1. IN(1092.008) 2. D (1033.954) 3. JAP(175.426) 4. USA (171.812) 5. ISR (95.076) 6. KOR (91.234)	1. D (1225.452) 2. IN (1082.329) 3. JA (209.191) 4. USA (188.175) 5. KOR (120.661) 6 CHI (95.269)
Malaysia	1. D (530.811) 2. JAP (61.029) 3. USA (44.803) 4. FRA (27.851) 5. SIN (26.035) 6. UK(23.217)	1. D (442.835) 2. JAP (77.432) 3. USA (56.412) 4. UK(31.065) 5. SIN (19.943) 6. AUS (15.89)	1. D (163.858) 2. JAP (89.994) 3. USA (79.282) 4. UK(61.636) 5. IN (48.206) 6. GER (34.432)	1. D (685.608) 2. JAP (106.838) 3. USA (96.141) 4. IN (74.929) 5. UK(65.638) 6. GER (55.826)	1. D (899.22) 2. IN (116.842) 3. USA (100.782) 4. JAP (95.87) 5. GER (58.055) 6. UK(55.852)	1. D (1,132.073) 2. IN (128.769) 3. USA (116.964) 4. JAP (112.342) 5. GER (58.909) 6. UK(54.983)	1. D (1,260.821) 2. USA (146.076) 3. IN (135.808) 4. JAP (129.226) 5. GER (76.247) 6. UK(71.485)
Philippines	1. D (222.087) 2. USA (52.551) 3. JAP (28.327) 4. GER (9.853) 5. AUS (9.016) 6. SIN (8.7)	1. D (270.2) 2. IN (44.399) 3. JAP (44.239) 4. ISR (42.021) 5. USA (40.837) 6. AUS (19.567)	1. D (318.141) 2. IN (149.826) 3. ISR (114.126) 4. JAP (49.879) 5. USA (49.311) 6. NET (21.573)	1. D (529.644) 2. IN (339.25) 3. ISR (94.106) 4. USA (74.279) 5. MAL (61.899) 6. JAP (57.512)	1. D (523.061) 2. IN (285.846) 3. ISR (217.163) 4. MAL (75.815) 5. USA (68.141) 6. JAP (51.785)	1. D (613.007) 2. IN (547.844) 3. ISR (114.115) 4. KOR (94.26) 5. USA (77.856) 6. JAP (59.291)	1. D (694.41) 2. IN (447.9) 3. KOR (298.798) 4. ISR (128.46) 5. USA (89.266) 6. CHI (81.76)

Table 14. Value Added in Final Demand

	1995	2000	2005	2008	2009	2010	2011
Singapore	1. D (343.039) 2. USA (142.414) 3. JAP (56.982) 4. UK (43.45) 5. IN (34.434) 6. AUS (23.823)	1. D (375.384) 2. USA (244.276) 3. JAP (136.152) 4. AUS (52.802) 5. UK (48.828) 6. NET (32.153)	1. D (481.4) 2. UK (336.174) 3. IN (289.579) 4. USA (241.599) 5. ISR (87.023) 6. JAPAN (71.84)	1. D (937.914) 2. IN (718.023) 3. ISR (453.535) 4. UK (429.628) 5. USA (314.435) 6. JAP (180.204)	1. D (966.217) 2. IN (501.916) 3. ISR (374.482) 4. USA (324.872) 5. UK (228.084) 6. MAL (180.834)	1. D (1,150.245) 2. IN (668.025) 3. USA (382.978) 4. ISR (325.007) 5. MAL (258.086) 6. KOR (203.204)	1. D (1,430.918) 2. IN (620.847) 3. ISR (441.36) 4. USA (390.462) 5. MAL (272.601) 6. KOR (238.821)
Thailand	1. DO (144.828) 2. JAP (82.838) 3. USA (49.169) 4. FRA (32.561) 5. GER (26.568) 6. SIN (22.854)	1. D (171.574) 2. JAP (79.531) 3. USA (44.992) 4. UK (23.759) 5. GER (14.014) 6. FRA (12.914)	1. D (288.761) 2. JAP (138.546) 3. USA (69.341) 4. UK (42.972) 5. IN (34.458) 6. FRA (29.975)	1. D (422.067) 2. JAP (193.666) 3. USA (106.183) 4. IN (61.034) 5. UK (60.776) 6. GER (52.202)	1. D (377.529) 2. JAP (139.141) 3. USA (91.103) 4. IN (56.522) 5. UK (50.502) 6. GER (49.172)	1. D (452.367) 2. JAP (168.468) 3. USA (109.279) 4. IN (81.877) 5. AUS (55.569) 6. GER (53.192)	1. D (485) 2. JAP (214.36) 3. USA (130.488) 4. IN (96.281) 5. GER (72.951) 6. UK (71.02)
Vietnam	1. D (25.995) 2. JAP (6.417) 3. SIN (4.664) 4. FRA (4.401) 5. USA (4.084) 6. KOR (3.31)	1. D (32.503) 2. JAP (19.481) 3. USA (11.642) 4. KOR (11.226) 5. SIN (6.431) 6. FRA (6.422)	1. D (60.094) 2. JAP (34.018) 3. KOR (22.334) 4. USA (19.371) 5. UK (16.585) 6. IN (16.238)	1. D (98.083) 2. JAP (75.45) 3. KOR (46.503) 4. USA (39.3) 5. CHI (32.361) 6. IN (30.243)	1. D (101.311) 2. JAP (67.885) 3. KOR (50.495) 4. USA (46.44) 5. CHI (33.525) 6. GER (28.313)	1. D (99.393) 2. JAP (67.742) 3. USA (52.804) 4. KOR (41.129) 5. CHI (34.61) 6. IND (32.996)	1. D (105.135) 2. JAP (66.509) 3. USA (58.839) 4. KOR (45.205) 5. CHI (36.508) 6. IND (35.296)

Table 15. Value Added in Gross Exports

	1995	2000	2005	2008	2009	2010	2011
INDONESIA	1. D (107.659) 2. JAP (9.02) 3. USA (6.777) 4. GER (4.651) 5. AUS (4.301) 6. SIN (3.561)	1. D (111.908) 2. IN (25.275) 3. JAP (19.396) 4. USA (17.104) 5. ISR (11.104) 6. SIN (8.595)	1. D (164.046) 2. IN (114.948) 3. USA (20.23) 4. JAP (17.345) 5. UK (14.91) 6. SIN (12.8)	1. D (211.447) 2. ISRAEL (35.603) 3. IN (34.291) 4. JAP (25.015) 5. USA (20.24) 6. GER (12.339)	1. D (194.666) 2. IND (93.102) 3. USA (16.237) 4. JAP (16.06) 5. GER (9.227) 6. SIN (7.797)	1. D (239.82) 2. IND (161.164) 3. JAP (21.072) 4. USA (20.922) 5. ISR (13.763) 6. KOR (12.821)	1. D (289.321) 2. IN (165.998) 3. JAP (26.12) 4. USA (24.812) 5. KO (17.474) 6. ISR (13.059)
MALAYSIA	1. D (157.13) 2. JAP (25.501) 3. USA (19.535) 4. SIN (12.128) 5. UK (10.62) 6. AUS (8.449)	1. D (249.903) 2. JAP (151.768) 3. USA (104.881) 4. UK (44.601) 5. SIN (34.821) 6. GER (28.341)	1. DOM (715.02) 2. JAP (139.024) 3. USA (112.194) 4. UK (70.492) 5. IN (58.194) 6. GER (51.679)	1. D (1242.779) 2. JAP (152.46) 3. USA (115.162) 4. IND (72.851) 5. GER (69.598) 6. UK (64.084)	1. D (1321.359) 2. JAP (119.16) 3. USA (101.634) 4. IN (98.409) 5. GER (61.791) 6. UK (46.793)	1. D (1546.622) 2. JAP (139.119) 3. USA (124.166) 4. IN (110.543) 5. GER (62.85) 6. KOR (54.58)	1. D (1763.999) 2. JAP (150.245) 3. USA (148.886) 4. IN (114.564) 5. GER (75.705) 6. UK (70.116)
PHILIPPINES	1. D (136.394) 2. USA (15.567) 3. JAP (12.185) 4. GER (3.133) 5. SIN (3.051) 6. UK (2.281)	1. D (103.128) 2. JAP (23.623) 3. USA (17.283) 4. IN (6.021) 5. KOR (6.013) 6. ISR (5.534)	1. D (167.952) 2. IN (46.502) 3. JAP (44.799) 4. ISR (35.157) 5. USA (33.767) 6. UK (9.419)	1. D (359.642) 2. IN (107.117) 3. USA (32.997) 4. ISR (30.882) 5. MAL (20.409) 6. CHI (15.318)	1. D (385.952) 2. IN (88.23) 3. ISR (67.542) 4. JAP (30.231) 5. MAL (24.191) 6. USA (22.863)	1. D (438.075) 2. IN (176.929) 3. ISR (38.086) 4. JAP (33.599) 5. KOR (32.305) 6. USA (26.097)	1. D (521.439) 2. IN (145.216) 3. KOR (95.544) 4. ISR (42.214) 5. CHI (25.956) 6. USA (22.795)

Table 16. Value Added in Gross Exports

	1995	2000	2005	2008	2009	2010	2011
Singapore	1. D (942.933) 2. USA (237.704) 3. JAP (84.553) 4. UK (70.63) 5. IN (66.272) 6. AUS (33.549)	1. D (949.882) 2. USA (358.53) 3. JAP (207.5) 4. AUS (85.218) 5. UK (61.791) 6. NET (52.786)	1. D (1305.217) 2. UK (520.478) 3. IND (430.798) 4. USA (332.174) 5. ISR (130.979) 6. JAP (102.558)	1. D (1773.2775) 2. IND (576.586) 3. UK (377.006) 4. ISR (361.857) 5. USA (264.176) 6. JAP (164.783)	1. D (1710.816) 2. IN (430.684) 3. ISR (314.917) 4. USA (306.289) 5. UK (232.548) 6. MAL (152.952)	1. D (2059.666) 2. IN (608.478) 3. USA (392.487) 4. ISR (289.054) 5. MAL (229.743) 6. KOR (188.095)	1. (2562.715) 2. IN (574.798) 3. USA(411.464) 4. ISR (399.551) 5. MAL (246.651) 6. KOR (225.618)
Thailand	1. D (99.432) 2. JAP (22.444) 3. USA (15.81) 4. FRA (7.522) 5. SIN (7.403) 6. GER (6.586)	1. D (108.396) 2. JAP (58.47) 3. USA (30.123) 4. UK (15.14) 5. GER (9.573) 6. KOR (8.772)	1. D (130.704) 2. JAP (93.84) 3. USA (42.495) 4. UK (26.067) 5. IND (18.273) 6. KOR (16.428)	1. D (174.363) 2. JAP (109.641) 3. USA (73.311) 4. UK (42.93) 5. IN (36.837) 6. AUS (36.362)	1. D (189.757) 2. JAP (115.066) 3. USA (60.259) 4. UK (33.454) 5. GER (33.389) 6. IN (33.389)	1. D (208.816) 2. JAP (140.64) 3. USA (73.794) 4. IN (47.016) 5. AUS (39.575) 6. GER (37.375)	1. (239.072) 2. JAP (162.388) 3. USA (94.552) 4. IN (53.434) 5. AUS (52.708) 6. GER (51.35)
Vietnam	1. D (17.204) 2. JAP (1.638) 3. SIN (1.182) 4. USA (0.839) 5. KOR (0.736) 6. FRA (0.69)	1. D (24.077) 2. JAP (8.58) 3. KO (4.275) 4. USA (4.123) 5. SIN (2.899) 6. FRA (1.745)	1. D (38.992) 2. JAP (12.538) 3. KOR (10.819) 4. USA (6.933) 5. UK (6.107) 6. IN (6.071)	1. D (60.733) 2. J (30.041) 3. KOR (22.542) 4. USA (14.31) 5. CHI (14.016) 6. IN (10.977)	1. D (65.121) 2. JAP (25.547) 3. KOR (20.954) 4. USA (15.703) 5. CHI (13.403) 6. IN (9.969)	1. D (78.068) 2. JAP (31.821) 3. USA (21.336) 4. KOR (19.884) 5. CHI (16.646) 6. IN (14.631)	1. D (94.038) 2. JAP (39.128) 3. USA (27.711) 4. KOR (26.559) 5. CHI (21.439) 6. IN (17.762)

Table 17. Value added in Final Demand

	1995	2000	2005	2008	2009	2010	2011
CHINA	1. D (682.054) 2. JAP (73.574) 3. USA (60.196) 4. GER (33.775) 5. FRA (29.521) 6. HKG (28.959)	1. D (2,466.833) 2. JAP (279.655) 3. USA (167.451) 4. KOR (83.043) 5. UK (80.065) 6. GER (74.153)	1. D (7648.209) 2. JAP 710.917 3. USA (427.069) 4. KOR (330.785) 5. GER (223.403) 6. UK (222.13)	1. D (15288.636) 2. JAP (1100.706) 3. USA (786.344) 4. GER (490.489) 5. KOR (480.886) 6. IN (383.556)	1. D (19122.05) 2. JAP (1106.004) 3. USA (863.475) 4. GER (628.538) 5. KOR (579.208) 6. IN (449.261)	1. D (22904.216) 2. JAP (1305.808) 3. USA (1083.621) 4. GER (661.423) 5. KOR (605.2016) 6. IN (594.087)	1. D (28540.325) 2. JAP (1526.055) 3. USA (1279.887) 4. GER (915.585) 5. IN (753.777) 6. KOR (750.627)
HONG KONG	1. D (1,849.64) 2. USA (41.916) 3. JAP (40.254) 4. FRA (25.278) 5. UK (24.651) 6. SIN (20.452)	1. D (2,323.257) 2. USA (56.537) 3. UK (50.35) 4. JAP (50.114) 5. CHI (17.889) 6. AUS (13.559)	1. D (2891.055) 2. USA (65.87) 3. UK (59.107) 4. JAP (33.915) 5. CHI (30.577) 6. AUS (22.068)	1. D (2508.378) 2. USA (94.606) 3. UK (73.504) 4. JAP (59.07) 5. CHI (58.54) 6. IN (38.753)	1. D (2382.219) 2. USA (103.965) 3. UK (65.226) 4. CHI (61.613) 5. IN (59.645) 6. JAP (56.691)	1. D (2732.842) 2. USA (131.273) 3. IN (83.134) 4. CHI (82.718) 5. UK (74.809) 6. JAP (72.423)	1. D (3069.478) 2. USA (147.782) 3. UK (99.016) 4. JAP (96.039) 5. CHI (92.894) 6. IN (76.539)
TAIWAN	1. D (379.116) 2. JAP (106.403) 3. USA (95.083) 4. GER (31.984) 5. FRA(26.585) 6. UK (20.639)	1. D (1,576.979) 2. JAP (281.947) 3. USA(179.491) 4. UK (50.801) 5. GER(45.136) 6. KOR (36.034)	1. D (2294.892) 2. JAP (312.872) 3. USA (176.617) 4. UK (68.657) 5. KOR (57.073) 6. IN (54.688)	1. D (3319.959) 2. JAP (289.18) 3. USA (181.45) 4. GER (71.086) 5. UK (64.971) 6. CHI (62.367)	1. D (3426.016) 2. JAP (243.01) 3. USA (175.026) 4. GER (67.837) 5. CHI (59.063) 6. IN (54.473)	1. D (3778.591) 2. JAP (316.691) 3. USA (245.11) 4. IN (67.837) 5. GER (92.712) 6. CHI (84.817)	1. D (3778.591) 2. JAP (320.817) 3. USA (260.749) 4. IN (106.292) 5. GER (100.243) 6. CHI (79.73)

Table 18. Value Added in Final Demand

	1995	2000	2005	2008	2009	2010	2011
AUSTRALIA	1. D (5,497.981) 2. USA (162.244) 3. UK (95.948) 4. JAP (70.254) 5. SIN (68.24) 6. GER (47.216)	1. D (6,276.939) 2. ISR (190.917) 3. USA (180.58) 4. UK (162.213) 5. JAP (82.785) 6. SIN (60.731)	1. D (11250.75) 2. USA (336.241) 3. UK (326.238) 4. IN (296.185) 5. ISR (200.176) 6. JAP (161.4)	1. D (23580.204) 2. USA (548.053) 3. UK (433.66) 4. IN (397.915) 5. JAP (212.027) 6. GER (186.257)	1. D (25076.784) 2. USA (589.324) 3. UK (338.101) 4. IN (397.915) 5. ISR (277.369) 6. GER (191.381)	1. D (31504.021) 2. USA (681.394) 3. IN (444.242) 4. UK (374.174) 5. GER (235.672) 6. ISR (230.946)	1. D (37416.269) 2. USA (885.864) 3. UK (477.988) 4. IN (452.966) 5. ISR (337.48) 6. GER (330.305)
NEW ZEALAND	1. D (634.562) 2. AUS (89.528) 3. USA (15.354) 4. UK (12.813) 5. JAP (8.736) 6. FRA (6.003)	1. D (554.835) 2. AUS (99.389) 3. UK (19.584) 4. USA (17.9) 5. JAP (7.758) 6. GER (3.454)	1. D (1148.788) 2. AUS (135.856) 3. IN (91.462) 4. USA (43.602) 5. UK (35.902) 6. JAP (26.451)	1. D (943.393) 2. AUS (164.821) 3. ISR (115.116) 4. IN (62.835) 4. USA (54.865) 6. UK (32.393)	1. D (828.324) 2. AUS (161.542) 3. ISR (69.575) 4. USA (49.771) 5. IN (35.813) 6. UK (24.309)	1. D (1205.645) 2. AUS (173.998) 3. IN (113.316) 4. ISR (103.305) 5. USA (70.848) 6. UK (42.626)	1. D (976.283) 2. AUS (159.762) 3. ISR (121.378) 4. IN (96.32) 5. USA (59.796) 6. UK (29.087)
JAPAN	1. D (48084.631) 2. US (1,065.853) 3. UK (443.741) 4. ISR (430.433) 5. IND (275.608) 6. GER (251.065)	1. D (86773.066) 2. US (1792.944) 3. UK (724.946) 4. ISR (660.917) 5. GER (431.848) 6. FRA (320.959)	1. D (92820.608) 2. US (2093.482) 3. UK (1448.053) 4. GER (565.499) 5. IN (445.856) 6. AUS (385.122)	1. D (105825.281) 2. USA (1949.763) 3. IN (1125.276) 4. UK (1 112.696) 5. ISR (869.663) 6. CHI (709.291)	1. D (107968.075) 2. USA (2061.625) 3. IN (952.931) 4. UK (872.212) 5. ISR (761.327) 6. GER (708.767)	1. D (109648.254) 2. USA (2082.718) 3. IN (1 010.762) 4. CHI (769.525) 5. UK (732.833) 6. KOR (691.369)	1. D (119882.204) 2. USA (2414.198) 3. ISR (1057.852) 4. IN (1050.486) 5. CHI (863.89) 6. UK (813.377)
KOREA	1. D (2,382.316) 2. USA (178.348) 3. JAP (169.023) 4. UK (68.494) 5. GER (49.388) 6. CHI (43.406)	1. D (5,383.205) 2. USA (330.216) 3. JAP (296.896) 4. IN (200.81) 5. UK (95.915) 6. ISR (82.46)	1. D (8 685.745) 2. USA (504.397) 3. IN (477.957) 4. JAP (372.467) 5. UK (312.711) 6. CHI (211.75)	1. D (9 071.97) 2. IN (658.474) 3. USA (648.381) 4. CHI (611.508) 5. UK (449.82) 6. JAP (410.139)	1. D (8 526.971) 2. USA (761.63) 3. CHI (643.956) 4. IN (469.456) 5. JAP (394.412) 6. GER (237.273)	1. D (7 505.827) 2. IN (810.974) 3. USA (754.1) 4. JAP (409.308) 5. CHI (345.608) 6. ISR (198.82)	1. D (8 419.355) 2. IN (1 134.431) 3. USA (776.722) 4. JAP (424.824) 5. ISR (275.341) 6. CHI (270.553)

Table 19. Value Added in Gross Exports

	1995	2000	2005	2008	2009	2010	2011
CHINA	1. D (259.004) 2. JAP (57.579) 3. USA (39.234) 4. GER(18.189) 5. KOR (16.997) 6. FRA (16.431)	1. D (361.668) 2. JAP (236.044) 3. USA (128.972) 4. KOR (92.459) 5. UK (57.4) 6. GER (54.414)	1. D (1 814.001) 2. JAP 700.122 3. USA (353.275) 4. KOR (336.682) 5. UK (179.238) 6. GER (173.741)	1. D (5 290.852) 2. JAP (1 045.681) 3. USA (598.558) 4. KOR (469.361) 5. GER (371.265) 6. UK (297.987)	1. D (4 879.174) 2. JAP (835.491) 3. USA (518.208) 4. KOR (458.778) 5. GER (376.71) 6. UK (206.024)	1. D (6 154.792) 2. JAP (987.919) 3. USA (676.324) 4. KOR (427.596) 5. GER (403.392) 6. IN (297.538)	1. D (7 186.446) 2. JAP (1 131.874) 3. USA (817.272) 4. GER (550.844) 5. KOR (509.636) 6. IN (361.142)
HONG KONG	1. D (297.659) 2. JAP (10.455) 3. USA (9.954) 4. UK (6.068) 5. FRA (4.965) 6. SIN (3.931)	1. D (329.118) 2. USA (12.571) 3. JAP (12.035) 4. UK (11.192) 5. KOR (3.951) 6. AUS (3.66)	1. D (389.175) 2. USA (16.878) 3.JAP (13.286) 4. CHN (6.727) 5. NLD (6.238) 6. AUS (6.11)	1. D (933.917) 2. UK (38.032) 3. USA (35.628) 4. JAP (20.075) 5. IND (15.406) 6. CHN (15.18)	1. D (848.391) 2. USA (34.213) 3. UK (21.879) 4. JPN (15.429) 5. CHN (14.836) 6. IND (14.759)	1. D (1 106.085) 2. USA (40.623) 3. UK (26.005) 4. IND (21.366) 5. CHN (20.665) 6. JAP (18.299)	1. D (1 506.548) 2. USA (47.433) 3. UK (33.327) 4. JAP (25.451) 5 CHI (24.394) 6. IN (21.758)
TAIWAN	1. D (391.527) 2. JAP (65.569) 3. USA (41.096) 4. GER (15.067) 5. FRA (12.171) 6. UK (8.728)	1. D (623.674) 2. JAP(179.101) 3. USA (87.32) 4. GER (26.41) 5. KOR (23.698) 6. FRA (16.622)	1. D (417.072) 2. JAP (226.116) 3. USA (95.917) 4. KOR (48.98) 5. UK (39.594) 6. GER (34.653)	1. D (678.282) 2. JAP (270.069) 3. USA (121.407) 4. KOR (55.76) 5. GER (54.496) 6. AUS (50.162)	1. D (622.38) 2. JAP (201.389) 3. USA (90.578) 4. KOR (47.242) 5. GER (45.833) 6. CHN (40.843)	1. D (835.224) 2. JAP (273.392) 3. USA (143.307) 4. GER (60.843) 5. IND (57.743) 6. KOR (56.462)	1. D (1 017.383) 2. JAP (291.564) 3. USA (166.666) 4. GER (73.332) 5. AUS (67.249) 6. CHN (66.59)

Table 20. Value Added in Gross Exports

	1995	2000	2005	2008	2009	2010	2011
AUSTRALIA	1. D (923.018) 2. USA (19.522) 3. UK (12.263) 4. JAP (8.226) 5. SIN (8.018) 6. GER (5.835)	1. D (1 182.832) 2. USA (25.966) 3. ISR (25.68) 4. UK (21.979) 5. JAP (11.506) 6. SIN (8.938)	1. D (1 997.439) 2. UK (41.451) 3. USA (38.749) 4. IN (35.163) 5. ISR (24.439) 6. SIN (16.963)	1. D (3 150.127) 2. USA (62.986) 3. UK (38.548) 4. IN (24.642) 5. JAP (17.326) 6. GER (20.777)	1. D (2 590.998) 2. USA (62.986) 3. UK (38.548) 4. IN (24.642) 5. ISR (21.569) 6. GER (20.777)	1. D (3 361.575) 2. USA (76.264) 3. UK (46.362) 4. IND (41.568) 5. GER (26.227) 6. JAP (21.102)	1. D (3 870.467) 2. USA (99.287) 3. UK (60.614) 4. IN (41.806) 5. GER (36.07) 6. ISR (29.736)
NEW ZEALAND	1. D (169.037) 2. AUS (19.374) 3. USA (3.221) 4. UK (3.038) 5. JAP (1.389) 6. FRA (1.187)	1. D (146.311) 2. AUS(23.53) 3. UK (5.992) 4. USA (4.787) 5. JAP (1.449) 6. GER (0.963)	1. D (231.894) 2. AUS (17.477) 3. UK (6.246) 4. IN (6.1) 5. USA (4.887) 6. JAP (2.115)	1. D (244.078) 2. AUS (28.809) 3. USA (8.271) 4. ISR (7.469) 5. UK (6.297) 6. IND (5.203)	1. D (200.662) 2. AUS (21.193) 3. USA (6.766) 4. ISR (4.252) 5. UK (3.49) 6. GER (3.147)	1. D (247.878) 2. AUS (26.038) 3. USA (9.548) 4. ISR (7.69) 5. IND (7.271) 6. UK (4.757)	1. D (296.909) 2. AUS (27.281) 3. USA (10.947) 4. IN (8.064) 5. ISR (6.431) 6. UK (6.375)
JAPAN	1. D (2 618.046) 2. USA (64.186) 3. UK (26.152) 4. ISR (21.289) 5. GER (17.608) 6. AUS (15.468)	1. D (6 151.394) 2. USA (135.624) 3. UK (57.332) 4. ISR (39.529) 5. GER(36.524) 6. FRA (24.072)	1. D (8 200.995) 2. USA (203.668) 3. UK (131.564) 4. GER (62.973) 5. IN (42.273) 6. KOR (41.634)	1. D (10 566.691) 2. USA (252.033) 3. UK (131.156) 4. IND (115.494) 5. CHN (95.295) 6. GER (91.859)	1. D (8 616.923) 2. USA (181.947) 3. UK (75.615) 4. IN (72.761) 5. GER (71.271) 6. CHN (60.226)	1. D (9 851.576) 2. USA (224.706) 3. IN (96.243) 4. CHI (88.124) 5. UK (81.919) 6. GER (78.88)	1. D (10 738.891) 2. USA (262.179) 3. CHN (101.298) 4. IN (101.208) 5. UK (93.47) 6. GER (92.53)
KOREA	1. D (465.133) 2. JAP (49.862) 3. USA (42.392) 4. UK (15.761) 5. GER (12.61) 6. AUS (11.835)	1. D (1 268.44) 2. JAP (143.597) 3. USA (120.02) 4. IND(48.938) 5. UK (35.854) 6. GER (25.949)	1. D (2 540.717) 2. JAP (235.867) 3. USA (195.127) 4. IND (149.597) 5. UK (121.034) 6. CHI (71.144)	1. D (3 668.103) 2. JAP (346.715) 3. USA (305.628) 4. IND (275.088) 5. CHN (273.879) 6. UK (219.254)	1. D (3 363.989) 2. USA (338.051) 3. JPN (307.637) 4. CHI (271.749) 5. IN (198.067) 6. JAP (134.199)	1. D (5 831.476) 2. USA (346.505) 3. IND (335.929) 4. JAP (327.77) 5. CHI (170.392) 6. GER (117.222)	1. D (6 824.942) 2. IN (478.151) 3. USA (383.632) 4. JAP (353.886) 5. GER (160.601) 6. CHI (154.582)

Appendix 2

Industry source for trade in value added

Table 21. Sources of Demand for trade in value added in Final Demand.

		2000		2005		2008		2011
Indonesia	Business Services	28.331	Construction	151.797	Construction	61.229	Construction	541.207
	Construction	18.87	Business Services	108.682	Manufactures	52.347	Manufactures	191.389
	Manufactures	11.264	Manufactures	86.033	Business Services	41.804	Business Services	186.549
	Personal services	9.426	Personal services	63.261	Personal services	21.865	Personal services	138.826
	Utilities	0.993	Agriculture	8.581	Agriculture	3.476	Agriculture	16.312
	Agriculture	0.912	Utilities	5.268	Utilities	1.627	Utilities	7.939
	Mining	0	Mining	0.068	Mining	0.017	Mining	0.108
Malaysia	Business Services	4.279	Manufactures	19.929	Business Services	34.138	Business Services	67.372
	Manufactures	2.962	Business Services	16.542	Manufactures	23.125	Manufactures	35.847
	Personal services	0.929	Personal services	7.734	Personal services	12.772	Personal services	24.255
	Construction	0.844	Construction	3.007	Construction	3.754	Construction	6.396
	Agriculture	0.121	Utilities	0.503	Agriculture	0.747	Agriculture	1.339
	Utilities	0.043	Agriculture	0.489	Utilities	0.39	Utilities	0.598
	Mining	0.026	Mining	0.002	Mining	0.003	Mining	0.002
Philippines	Business Services	33.838	Personal services	60.188	Business Services	141.835	Personal services	188.136
	Personal services	5.508	Business Services	58.62	Personal services	137.42	Business Services	184.647
	Manufactures	2.338	Manufactures	21.461	Manufactures	38.176	Manufactures	48.034
	Construction	1.242	Agriculture	6.063	Agriculture	14.383	Agriculture	17.733
	Utilities	1.069	Construction	2.917	Construction	6.3	Construction	7.504
	Agriculture	0.403	Utilities	0.367	Mining	0.593	Utilities	0.969
	Mining	0.001	Mining	0.21	Utilities	0.541	Mining	0.878

Table 22. Sources of Demand for trade in value added in Final Demand.

		2000		2005		2008		2011
Singapore	Business Services	9.127	Business Services	148.214	Business Services	456.849	Business Services	382.544
	Personal services	7.815	Manufactures	70.267	Personal services	187.253	Personal services	170.776
	Construction	4.876	Personal services	61.63	Manufactures	41.223	Manufactures	36.776
	Manufactures	2.362	Construction	9.022	Construction	30.621	Construction	28.912
	Utilities	0.057	Utilities	0.436	Utilities	1.877	Utilities	1.504
	Agriculture	0.023	Agriculture	0.009	Mining	0.188	Mining	0.321
	Mining	0.006	Mining	0.001	Agriculture	0.013	Agriculture	0.015
Thailand	Business Services	4.313	Manufactures	15.17	Manufactures	27.37	Manufactures	46.824
	Manufactures	2.745	Business Services	11.622	Business Services	20.587	Business Services	32.068
	Construction	0.954	Construction	4.52	Construction	7.51	Construction	9.36
	Personal services	0.813	Personal services	2.23	Personal services	4.033	Personal services	5.702
	Agriculture	0.101	Agriculture	0.667	Agriculture	1.128	Agriculture	1.723
	Utilities	0.042	Utilities	0.248	Utilities	0.405	Utilities	0.601
	Mining	0	Mining	0.001	Mining	0.001	Mining	0.002
Vietnam	Business Services	1.263	Manufactures	9.952	Manufactures	19.137	Manufactures	21.631
	Manufactures	0.916	Business Services	2.954	Business Services	6.062	Business Services	6.968
	Construction	0.485	Construction	2.11	Construction	3.067	Construction	4.22
	Personal services	0.18	Personal services	0.73	Personal services	1.037	Agriculture	1.172
	Agriculture	0.079	Agriculture	0.415	Agriculture	0.836	Personal services	1.148
	Utilities	0.02	Utilities	0.051	Utilities	0.083	Utilities	0.087
	Mining	0.002	Mining	0.026	Mining	0.02	Mining	0.071

Table 23. Sources of Demand for trade in value added in Gross Exports.

		2000		2005		2008		2011
Indonesia	Manufactures	13.287	Manufactures	70.582	Manufactures	20.196	Manufactures	86.094
	Business Services	8.4	Business Services	34.743	Business Services	9.622	Business Services	56.046
	Mining	3.145	Mining	5.903	Mining	2.986	Mining	16.377
	personal services	0.358	personal services	1.774	Agriculture	0.717	Agriculture	3.585
	Agriculture	0.064	Construction	1.188	personal services	0.438	personal services	2.136
	Construction	0.02	Agriculture	0.758	Construction	0.333	Construction	1.759
	Utilities	0	Utilities	0	Utilities	0	Utilities	0
Malaysia	Manufactures	6.984	Manufactures	40.294	Manufactures	49.052	Manufactures	75.714
	Business Services	2.351	Business Services	15.649	Business Services	20.233	Business Services	33.507
	Mining	0.181	Mining	1.211	Mining	2.214	Mining	2.95
	Agriculture	0.081	Agriculture	0.467	Community	0.567	Community	1.106
	Construction	0.052	Construction	0.195	Construction	0.417	Agriculture	0.685
	personal services	0.028	personal services	0.373	Agriculture	0.363	Construction	0.598
	Utilities	0.003	Utilities	0.005	Utilities	0.004	Utilities	0.005
Philippines	Business Services	3.248	Business Services	23.359	Business Services	67.624	Business Services	99.914
	Manufactures	2.553	Manufactures	20.218	Manufactures	34.497	Manufactures	33.996
	personal services	0.148	Mining	1.172	Mining	2.579	Mining	6.802
	Agriculture	0.03	personal services	1.013	personal services	1.575	personal services	3.165
	Mining	0.024	Agriculture	0.7	Agriculture	0.663	Agriculture	1.205
	Construction	0.018	Construction	0.04	Construction	0.179	Construction	0.133
	Utilities	0	Utilities	0	Utilities	0	Utilities	0

Table 24. Sources of Demand for trade in value added in Gross Exports.

		2000		2005		2008		2011
Singapore	Business Services	20.726	Business Services	228.874	Business Services	400.325	Business Services	348.891
	Manufactures	17.511	Manufactures	196.209	Manufactures	167.424	Manufactures	214.696
	personal services	0.462	personal services	4.801	personal services	6.726	personal services	8.712
	Construction	0.033	Construction	0.676	Construction	1.904	Construction	2.324
	Agriculture	0.015	Utilities	0.178	Mining	0.086	Agriculture	0.064
	Utilities	0.013	Agriculture	0.043	Agriculture	0.073	Mining	0.058
	Mining	0.011	Mining	0.017	Utilities	0.048	Utilities	0.052
Thailand	Manufactures	3.003	Manufactures	14.601	Manufactures	29.074	Manufactures	42.13
	Business Services	0.997	Business Services	3.096	Business Services	6.161	Business Services	8.7
	personal services	0.097	personal services	0.245	personal services	0.468	Agriculture	1.261
	Construction	0.034	Agriculture	0.103	Construction	0.267	Community	0.92
	Agriculture	0.018	Construction	0.1	Agriculture	0.658	Construction	0.239
	Mining	0.012	Mining	0.092	Mining	0.167	Mining	0.143
	Utilities	0.007	Utilities	0.035	Utilities	0.042	Utilities	0.04
Vietnam	Manufactures	0.489	Manufactures	4.002	Manufactures	7.906	Manufactures	13.93
	Business Services	0.344	Business Services	1.368	Business Services	1.917	Business Services	2.584
	Mining	0.087	Mining	0.441	Mining	0.661	Agriculture	0.657
	Agriculture	0.025	Agriculture	0.155	Agriculture	0.366	Mining	0.433
	personal services	0.015	Construction	0.052	Construction	0.07	Construction	0.09
	Construction	0.014	personal services	0.051	personal services	0.055	personal services	0.066
	Utilities	0	Utilities	0.001	Utilities	0.001	Utilities	0.002

References

1. Baldwin, Richard. 2007. Managing the Noodle Bowl: The Fragility of East Asian Regionalism, ADB Working Paper Series on Regional Economic Integration No. 7.
2. Baldwin, Richard. 2011. "Trade and Industrialization after Globalization's 2nd Unbundling: How Building and Joining a Supply Chain Are Different and Why It Matters," NBER Working Papers 17716, National Bureau of Economic Research, Inc.
3. Baldwin, Richard, Tadashi Ito and Hitoshi Sato. 2014. Portrait of Factory Asia and its implication for growth – the 'smile curve'
4. Gereffi, Gary and Karina Fernandez Stark, Global Value Chain Analysis: A Primer, 2011, Centre on Globalization, Governance and Competitiveness (CGGC), Duke University, Durham, North Carolina, USA.
5. India IT-BPM Overview, <http://www.nasscom.in/indian-itbpo-industry>
6. Javorsek, Marko and Ignacio Camacho. 2015. Trade in Value Added: Concepts, Estimation and Analysis, 2015, ARTNeT Working Paper Series No. 150, 2015, Bangkok, ESCAP.
7. Miroudot, Sebastien. 2016. Services in Global Value Chains: from inputs to value creating activities. OECD
8. Mukherjee, Arpita and Tanu M. Goyal. 2015. Integrating South and Southeast Asia through services Value Chain: The Case of India and Thailand, Working Paper No. 301, ICRIER.
9. Rainer Lanz and Andreas Maurer. 2015. Services and Global Value Chains- Some Evidence on Servicification of Manufacturing and Service Networks, WTO Working Paper ERSD-2015-03.
10. Survey on Computer Software & Information Technology Exports: 2002-03 through 2015-16, RBI Monthly Bulletin, various issues, Reserve Bank of India,
11. Taneja, Nisha., Neetika Kaushal Nagpal, and Saon Ray. 2014. India-Korea CEPA: Harnessing the Potential in Services, Working Paper No. 280, ICRIER.
12. Tewari, Meenu, C. Veeramani, and Manjeeta Singh. 2015. The Potential for involving India in regional production networks: Analyzing vertically specialized trade patterns between India and ASEAN, Working Paper No. 292, ICRIER.
13. Tharakan P. K. M., Ilke Van Beveren and Tom Van Ourti. 2005. Determinants of India's Software Exports and Goods Exports, The Review of Economics and Statistics, Vol. 87, No. 4, pages 776-780.
14. Timmer, Marcel P, Erik Dietzenbacher, Bart Los, Robert Stehrer and Gaitzen J. de Vries. 2015. An illustrated User Guide to the World Input-Output Database: the Case of Global Automotive Production, Review of International Economics, Vol 23(3), pages 575-605.
15. Trade in Value Added: Concepts, Methodologies and Challenges (joint OECD-WTO note), <http://www.oecd.org/sti/ind/49894138.pdf>.