

Mitra, Raja Mikael

Working Paper

The Information Technology and Business Process Outsourcing Industry: Diversity and Challenges in Asia

ADB Economics Working Paper Series, No. 365

Provided in Cooperation with:

Asian Development Bank (ADB), Manila

Suggested Citation: Mitra, Raja Mikael (2013) : The Information Technology and Business Process Outsourcing Industry: Diversity and Challenges in Asia, ADB Economics Working Paper Series, No. 365, Asian Development Bank (ADB), Manila, <https://hdl.handle.net/11540/2295>

This Version is available at:

<https://hdl.handle.net/10419/109478>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<http://creativecommons.org/licenses/by/3.0/igo>

ADB Economics Working Paper Series



The Information Technology and Business Process Outsourcing Industry: Diversity and Challenges in Asia

Raja Mikael Mitra

No. 365 | September 2013

Asian Development Bank



ADB Economics Working Paper Series

The Information Technology and Business Process Outsourcing Industry: Diversity and Challenges in Asia

Raja Mikael Mitra

No. 365 September 2013

Raja Mikael Mitra is an economist and a consultant to the Asian Development Bank and the World Bank.

Asian Development Bank

Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org

© 2013 by Asian Development Bank
September 2013
ISSN 1655-5252
Publication Stock No. WPS136002

The views expressed in this paper are those of the author and do not necessarily reflect the views and policies of the Asian Development Bank (ADB) or its Board of Governors or the governments they represent.

ADB does not guarantee the accuracy of the data included in this publication and accepts no responsibility for any consequence of their use.

By making any designation of or reference to a particular territory or geographic area, or by using the term “country” in this document, ADB does not intend to make any judgments as to the legal or other status of any territory or area.

Note: In this publication, “\$” refers to US dollars.

The ADB Economics Working Paper Series is a forum for stimulating discussion and eliciting feedback on ongoing and recently completed research and policy studies undertaken by the Asian Development Bank (ADB) staff, consultants, or resource persons. The series deals with key economic and development problems, particularly those facing the Asia and Pacific region; as well as conceptual, analytical, or methodological issues relating to project/program economic analysis, and statistical data and measurement. The series aims to enhance the knowledge on Asia’s development and policy challenges; strengthen analytical rigor and quality of ADB’s country partnership strategies, and its subregional and country operations; and improve the quality and availability of statistical data and development indicators for monitoring development effectiveness.

The ADB Economics Working Paper Series is a quick-disseminating, informal publication whose titles could subsequently be revised for publication as articles in professional journals or chapters in books. The series is maintained by the Economics and Research Department.

CONTENTS

ABSTRACT	v
I. INTRODUCTION	1
II. WORLDWIDE PRODUCTION, SPENDING, AND SOURCING	3
III. DIFFUSION AND IMPACT	6
IV. INDUSTRY GROWTH, STRUCTURE, AND MARKET ORIENTATION	9
A. Overall Development Trajectories	9
B. Domestic Markets	10
C. Export Markets	12
V. REGIONAL AND COUNTRY-SPECIFIC INDUSTRY DEVELOPMENTS	12
A. South Asia	13
B. Southeast Asia	16
C. East Asia	20
VI. ASIAN DIVERSITY AND LESSONS	23
VII. CONCLUSIONS	25
REFERENCES	26

ABSTRACT

Some countries and regions have been more successful than others in developing information technology-business process outsourcing (IT-BPO) services industries. India and the Philippines in particular have offered educated human resources at low cost, attractive fiscal incentives, and industrial parks although these factors alone do not explain the rapid growth of the industry there as other countries also had these strengths but failed to develop industries as rapidly. A wide range of factors driving and constraining industry development must be taken into account, namely human resources; financial, infrastructure, technology, legal, and regulatory developments; the roles of foreign companies, diasporas, and of indigenous entrepreneurs; the government; industry associations; civil society; production, trade, and knowledge networks; and the interplay of all these factors locally, nationally, and internationally. This analysis of IT-BPO industry developments in Asia points to continued expansion in domestic, regional, and global demand and supply. There is a need for timely, concerted efforts by key stakeholders to define strategies, programs, and projects to respond to opportunities and challenges at all levels. Experiences from Asian economies can offer lessons, but each situation has its own peculiarities. There is no single approach to developing an IT-BPO industry.

Keywords: information technology, business process outsourcing, software industry, offshoring, services, knowledge economy, India, ASEAN, Asia

JEL classification: L8, O14, F1, F63I

I. INTRODUCTION

Asia comprises of a diverse a set of economies with major differences in information and communication technology (ICT) development within and across countries. Some areas are advanced while others have little or no exposure to modern ICTs. Some are advanced while others have little or no exposure to modern ICT. Nevertheless, all economies have much to gain from increased network readiness (WEF 2013). The importance of ICT and of ICT-enabled service industries is not limited to the direct impacts of generating income and new employment opportunities. More importantly, developing the industry and the use of ICT is essential to advancing all social groups and sectors of the economy. Coupled with investments in infrastructure, training, education, and research and with legal and regulatory reforms that can improve government transparency and efficiency and the business climate, ICT is indeed a key driver of innovation and structural transformation in all societies (Castells 2000 and 2001).

Expanding the scale and scope of ICT and of ICT-enabled services has been a key feature in economic development worldwide for many decades, and ICT has become a significant factor in international trade and also a key driver in transforming the domestic economies of both developed and developing countries (Sudan et al. 2010). Moreover, the pace of the ICT and of other technology revolutions is escalating (Schmidt and Cohen 2013).

ICT related development, and more broadly speaking innovative networked knowledge economy transformation, holds promise to be a key pivotal factor in achieving sustainable, ecological and inclusive socio-economic development across all sectors and countries as well as in fostering globalization and regional integration. While ICT related development entails opportunities to promote sustainable and inclusive economic development trajectories it also implies major challenges such as dealing with so called creative destruction (Schumpeter 1950) forging rapid changes in institutions, particularly roles, rights, rules and regulations, and employment. The fostering of ICTs industry development and the application of ICTs has ubiquitous implications for manufacturing industry, agriculture, infrastructure, public utilities, banking and finance, commerce, public sector governance and knowledge management developments, as well as job creation and the structure of employment (Mitra forthcoming a).

Policymakers often want to boost ICT development because it is perceived to have a major, positive socioeconomic impact across various sectors of the economy, not only on the upper and middle classes in cities but also on the poor and those living in rural areas. The evidence for this assumption is, however, often nebulous. Also, developing ICT industries is complicated by rapid changes in technology and by the fact that ICT comprises a widely diverse range of activities and individual firms. Nevertheless, the rapid expansion of the scale and scope of ICT and ICT-enabled industries offers many opportunities and challenges.

This study examines the dynamics of information technology-business process outsourcing (IT-BPO) in Asia from a historical and comparative perspective and identifies factors driving and constraining industry growth. It explores why some countries and regions have been more successful than others in developing IT-BPO industries and highlights lessons, opportunities, and challenges for further development. The focus is on IT services and software industry, and ICT-enabled services such as BPO and knowledge process outsourcing (KPO). Other ICT related industries such as telecommunication, broadcasting, Internet and other media content and hardware manufacturing are mentioned only in brief. The presentation is based on conceptual frameworks for analyzing ICT as developed by the author and applied to case studies on India, the Philippines and other economies (Mitra forthcoming a).

Any analysis of ICT related development is complicated by weaknesses in the data and by the lack of consistency in the definitions used (see the following box).

Box 1: Defining Information and Communication Technology and Information and Communication Technology-Enabled Services

Any analysis of information and communication technology (ICT) development is hampered by the rapid proliferation of new technologies and business models which is reflected in weak data. Furthermore, definitions are often blurred and inconsistent which limits the scope for analyses. The following definitions are based on the terminology used by the Organisation for Economic Co-operation and Development (OECD), the International Telecommunication Union (ITU), the United Nations Conference on Trade and Development (UNCTAD), consulting firms like Gartner, and industry associations like the World Information Technology and Services Alliance (WISTA).

ICT comprises both goods and services. As used here ICT is defined as computing and communication equipment, software and services and communication services, including telecommunications, Internet connectivity, broadcasting and media. It includes among other things, the manufacturing of computers, electronic components, and telecommunication equipment and covers wholesale and retail services related to that equipment as well as telecommunications, consulting services, and other computer-related activities like Internet connectivity. ICT services are often referred to as "computer and information services" and consist of computer programming and information services like data processing, hosting and related activities, and web portals..

Information technology (IT) services refer to computing equipment and software products serving both external and domestic markets. Information technology outsourcing (ITO) refers to cross-border offshoring or outsourcing of software products and services.

ICT-enabled services (also called IT-enabled services or IT-based services) include business process outsourcing (BPO), knowledge process outsourcing (KPO), legal process outsourcing, and government process outsourcing among others. ICT-enabled services are normally not classified as ICT or IT services although the distinction is often blurred. Broadly speaking, BPO includes voice and non-voice services, knowledge and legal processing, and other ICT-enabled services. It should, however, be noted that these terms (and the term ITO) typically refer to cross-border outsourcing/offshoring and do not explicitly cover domestic market services. In view of this, Gartner and others also use terms such as business process management and knowledge process management to cover both international and domestic markets.

The terminology relating to sourcing, outsourcing, offshoring, and in-sourcing has not been standardized. Generally the term "outsourcing" refers to the procurement of material inputs or services by a firm outside the original firm. Outsourcing can be domestic (onshore) or international (cross-border or offshore). This study focuses on international sourcing (offshoring-outsourcing to developing countries particular). Offshoring, or offshore (out) sourcing, is defined as procuring a service or material input from a source in a foreign country. It includes both non-captive offshoring (sourcing to a firm in a foreign country) and captive offshoring (global in-house sourcing to a subsidiary in a foreign country). The terms offshoring and outsourcing are, however, not always favored used as terms like "trade in services," "globally distributed work," "global service delivery" and "global sourcing" are perceived to be less contentious or more correct.

Source: Adapted from OECD 2009, 2011; UNCTAD 2010, 2011, 2012; WITSA 2010; Gartner 2013.

The distinction between ICT and ICT-enabled services is often blurred, and rapid structural changes in the industry offer further complications (OECD 2010). It is hard to compare countries and to draw firm conclusions ICT development from comparative data compiled by organizations such as the International Telecommunication Union (ITU), the Organisation for Economic Co-operation and Development (OECD), the United Nations Conference on Trade and Development (UNCTAD) and the World Economic Forum (WEF) or from reports published by industry associations such as the World Information Technology and Services Alliance, and consulting firms such as A.T. Kearney, Gartner, the Economist Intelligence Unit, the Everest

Research Institute, Forrester Research, the International Data Corporation, and McKinsey and Company. Nevertheless, reports published by ITU, OECD, the World Bank, and UNCTAD are typically rather rigorous in their analyses and use of data. The focus of OECD is mainly on developed economies while United Nations agencies and the World Bank focus on developing economies. Reports published by consulting firms can provide useful, up-to-date information, but the data and analyses should be used with caution due to differences in objectives, methodologies, coverage, and classifications of ICT and ICT-enabled services. Overall, however, there are major gaps in the literature in terms of substantive, regular analyses of the development of ICT and of ICT-enabled service industries in Asia and elsewhere.

II. WORLDWIDE PRODUCTION, SPENDING, AND SOURCING

The development of the ICT industry has generally been highly global, but there are major differences among countries and industry conditions and in segments and type of firms. The development of ICT globally has had a profound effect on the growth of IT-BPO industries in both developed and developing economies although with major differences in terms of performance, industry structure, and type of firms.

Access to skilled labor and a low-cost business environment have been key factors underlying the expansion of IT-BPO exports from developing countries such as India and the Philippines; however, expansion can be fully understood only in the context of developments in technology, financing, entrepreneurship, industrial organization, education and innovative systems, worker migration and other related corporate strategies, and public policy. Such developments include the emergence of the Internet and other technologies along with increased modularization in the production of goods and services (Mitra 2009, OECD 2010).

Globalization boosted by the transportation and ICT revolution along with the liberalization of trade and foreign investment regimes have spurred the internationalization of education, training, and research and have given impetus to furthering the development of production, trade, finance, and knowledge supply chains or networks for delivering an expanded range of goods and services (Cattaneo et al. 2010, McKinsey Global Institute 2005). The dynamic interplay of these factors has resulted in a structural shift in the global economy in which the scale and scope of sourcing services worldwide, both through non-captive offshoring (sourcing to a firm in a foreign country) and captive offshoring (in-house sourcing to a subsidiary in a foreign country), has increased. In parallel, changes in political situations and trends towards automation and cost equalization triggers re-shoring, that is, locating back to the country of origin or the country close to the end users (Mitra forthcoming a).

Globally, there is considerable room for expanding the scale and scope of sourcing in multiple directions—from higher-income to lower-income countries and vice versa, among high-income countries, and between developing countries—all of which bodes well for expanding IT outsourcing and ICT-enabled service industries. These historical trends are likely to prevail barring interruptions by major political conflicts or disruptions precipitated by the public policy environment, severe security predicaments, technical breakdowns, or economic recessions (Mitra forthcoming a).

This transformation of the world economy is reflected in the growth and structural change in ICT demand, production, trade, and investment. As shown in Table 1, global ICT spending is dominated by large, high-income economies suggesting that it is highly correlated with gross domestic product (GDP). ICT spending in Asia is dominated by large economies, and

ICT spending levels are highly correlated with per capita income levels as spending is substantially greater in higher-income economies such as Hong Kong, China; Japan; the Republic of Korea; Singapore; and Taipei, China than in lower-income Asian economies. Also, the data show that ICT spending growth rates are typically in line with the rate of growth in GDP and per capita income. This is reflected in the fact that ICT spending growth has been particularly high in rapidly growing Asian economies.

Table 1: Information and Communication Technology Spending on Services and Hardware
(\$ million)

Region/ Economy	2003	2004	2008	2009	2010	2011	2012	2013
North America	919,067.1	984,113.6	1,189,035.7	1,135,620.7	1,204,411.3	1,291,882.0	1,368,600.9	1,434,553.2
Latin America	55,941.3	74,192.3	157,908.5	152,727.2	166,863.3	174,971.3	181,791.1	187,174.6
Europe								
(EU/EFTA)	693,317.4	800,585.1	1,049,518.5	981,260.1	1,035,641.0	1,134,495.6	1,203,294.1	1,270,263.5
Europe								
(Non-EU/EFTA)	35,671.6	48,572.8	96,238.6	85,225.1	91,361.2	99,865.4	107,045.0	114,004.8
Europe								
(combined)	728,989.0	849,157.9	1,145,757.1	1,066,485.2	1,127,002.2	1,234,361.0	1,310,339.1	1,384,268.3
Asia-Pacific	618,829.6	711,361.5	991,035.5	1,014,591.0	1,113,837.0	1,219,166.1	1,340,140.6	1,456,550.1
Australia	29,504.3	36,224.4	50,685.0	49,335.0	54,691.4	57,875.9	60,571.9	63,320.8
Bangladesh	1,005.9	1,368.2	6,980.9	8,169.4	9,454.2	10,903.4	12,311.6	13,588.4
PRC	137,947.0	172,910.5	327,593.3	350,810.5	382,694.5	427,284.7	486,536.1	553,390.6
Taipei, China	28,093.7	29,049.9	25,076.1	22,951.2	24,554.8	26,330.0	28,713.5	30,807.3
Hong Kong, China	9,972.7	11,636.2	18,713.2	17,177.3	18,824.1	20,340.4	21,677.4	22,996.9
India	19,044.8	26,967.6	56,394.9	62,930.9	79,051.8	96,431.3	112,340.1	124,601.2
Indonesia	5,808.2	6,867.9	16,518.0	19,423.7	23,972.6	27,359.9	30,545.7	32,721.4
Japan	284,613.0	304,704.9	325,019.0	331,762.7	348,136.5	363,851.1	385,107.3	400,727.5
Malaysia	14,152.9	16,517.9	22,463.7	20,945.4	23,725.1	25,996.4	28,321.1	29,839.6
New Zealand	4,866.6	5,565.1	7,361.5	6,813.7	7,392.6	7,827.8	8,248.6	8,614.8
Pakistan	2,644.9	3,271.7	6,336.3	6,162.3	6,503.4	7,099.5	7,745.4	8,343.5
Philippines	4,034.7	5,264.7	10,119.5	10,714.7	12,185.9	13,504.7	14,861.0	16,092.3
Rep. of Korea	57,781.6	68,466.6	79,147.4	68,563.1	79,821.6	88,108.6	93,583.0	99,086.3
Singapore	8,329.1	9,407.5	13,750.8	12,312.5	13,156.2	13,886.8	14,625.2	15,346.3
Sri Lanka	456.3	560.7	2,083.5	2,417.3	2,786.3	3,127.4	3,466.7	3,698.6
Thailand	8,318.8	10,021.9	16,507.1	16,982.3	18,715.7	20,176.0	21,644.6	22,901.4
Viet Nam	2,255.1	2,555.9	6,285.2	7,118.9	8,170.2	9,062.3	9,841.5	10,473.2
Middle East	31,742.6	37,219.8	77,756.4	82,916.9	91,669.5	101,723.2	110,604.4	117,819.6
Africa	22,378.0	30,150.8	64,628.6	65,975.1	76,413.7	85,859.6	94,506.2	103,003.9
World Total	2,376,947.7	2,686,195.9	3,626,121.9	3,518,316.2	3,780,197.0	4,107,963.2	4,405,982.3	4,683,369.8

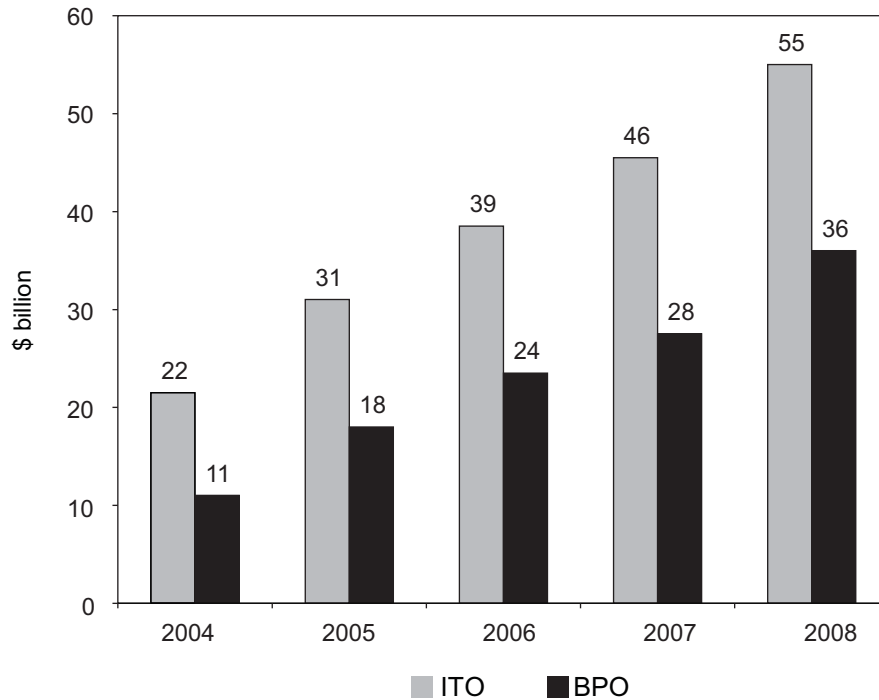
EFTA = European Free Trade Association, EU = European Union, PRC = People's Republic of China.

Note: Data after 2009 are estimates.

Source: WITSA (2010).

The sustained expansion of offshoring/outsourcing from the 1990s to the 2010s points to the potential for continued strong growth in offshore service delivery. The International Data Corporation estimated global IT services at \$557 billion in 2008 compared with \$115 billion for BPO and forecasts that global IT service spending is poised to continue to increase significantly in the 2010s and onwards (IDC 2013). Moreover, Figure 1 shows that spending on IT offshoring and BPO grew about threefold from 2004 to 2008.

Figure 1: Trends in Global Offshoring, 2004–2008



BPO = business process offshoring; ITO = information technology offshoring.

Note: Data cover offshoring and outsourcing to developing countries, Eastern and Central Europe plus Ireland and Canada.

Sources: Everest Research Institute (2009); author's estimates.

The key global spending and production assumptions that will affect IT-BPO industry growth from 2010 and beyond include the following (Mitra forthcoming a).

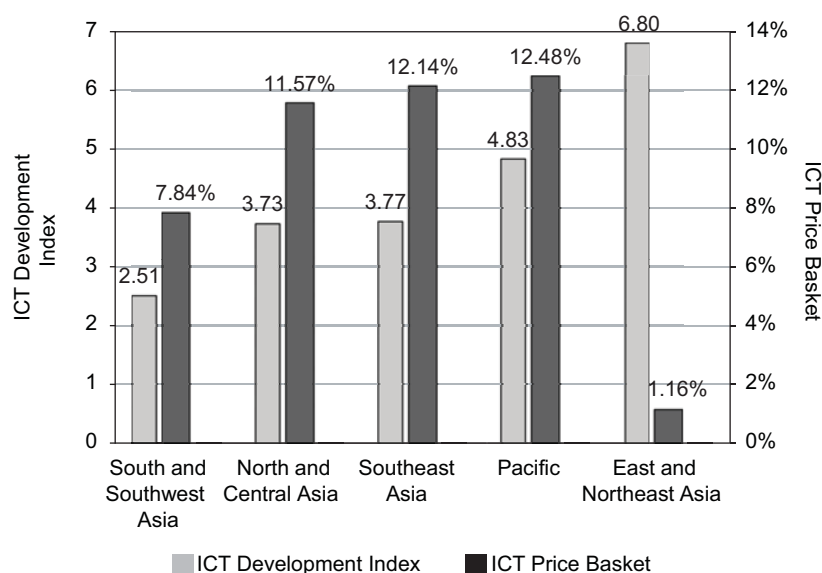
- Global spending on IT-BPO will continue to grow and will undergo major structural changes as new technologies, applications, and business models develop in the medium and long term. Periods of sharp declines in global IT spending growth (e.g., following the international financial crisis in 2008) are atypical or temporary.
- Spending on BPO is likely to grow faster than and potentially overtake spending on IT outsourcing.
- Growth in IT spending will be especially pronounced in developing countries that lag behind in per capita income levels and penetration of ICT.
- Spending on outsourcing of IT-BPO services will grow faster than total spending on IT-BPO outlays.
- Exports and imports of IT-BPO services will continue to expand in scale and scope.
- Asia is expected to continue to experience rapid growth in ICT spending, production, and trade.

III. DIFFUSION AND IMPACT

The ICT Development Index (IDI) compiled by the ITU tracks the overall progress countries make on becoming information societies. It is a composite made up of 11 indicators covering access, use, and skills, and measures the level and evolution of ICT developments over time taking into consideration the situations of both developed and developing countries. According to the 2011 ITU report *Measuring the Information Society*, the top 11 ICT economies in 2010 were the Republic of Korea in first place followed by Sweden; Iceland; Denmark; Finland; Hong Kong, China; Luxembourg; Switzerland; the Netherlands; the United Kingdom; and Norway. They largely correspond to the world's high-income economies given the strong correlation between the level of ICT development and GDP (ITU 2011).

As shown in Figure 2, East and Northeast Asia are well ahead of the rest of Asia in terms of ICT infrastructure and skills and offer relatively affordable services to individuals and businesses. South and Southwest Asia have managed to keep ICT at relatively affordable levels despite lagging infrastructure. The country-specific ICT development index data in Table 2 indicate the wide disparities in Asia and the Pacific.

Figure 2: Information and Communication Technology Readiness and Cost by Region in Asia and the Pacific, 2009



ICT = information and communication technology

Source: Adapted from Bonapace and Martinez-Navarrete (2011) based on ITU (2011).

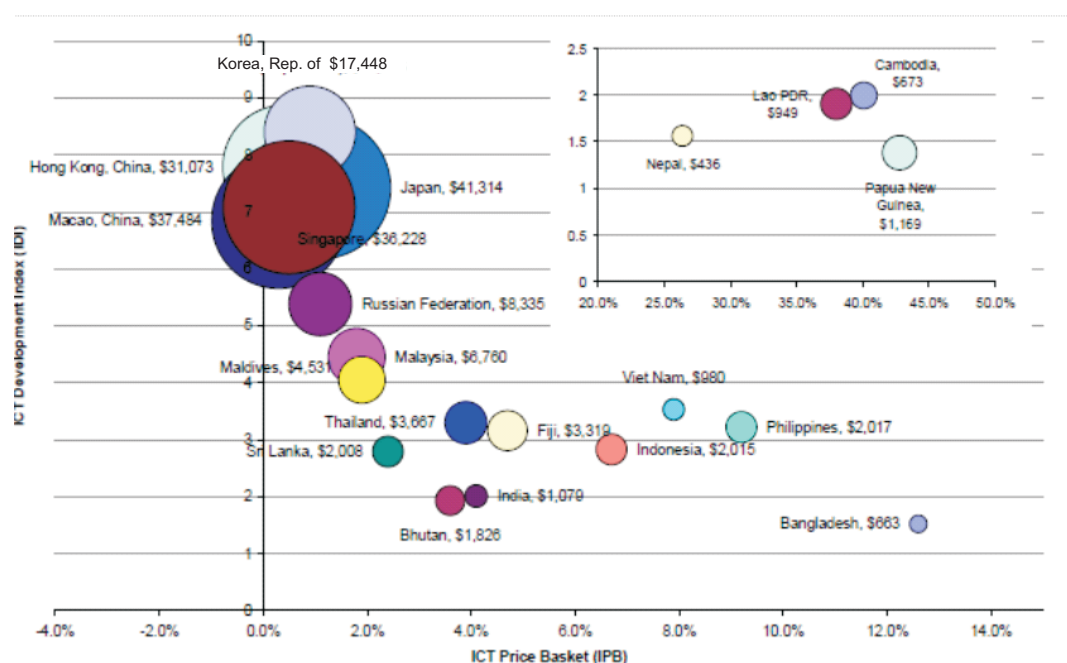
Table 2: Information and Communication Technology Development Index for Asia and the Pacific, 2008–2010

Economy	Regional Rank (2010)	Global Rank (2010)	IDI (2010)	Global Rank (2008)	IDI (2008)	Global Rank Change (2008–2010)
Republic of Korea	1	1	8.40	1	7.80	0
Hong Kong, China	2	6	7.79	6	7.14	0
New Zealand	3	12	7.43	16	6.65	4
Japan	4	13	7.42	11	7.01	–2
Australia	5	14	7.36	14	6.78	0
Singapore	6	19	7.08	15	6.71	–4
Macao, China	7	21	6.84	27	5.84	6
Brunei Darussalam	8	43	5.61	44	4.97	1
Malaysia	9	58	4.45	57	3.96	–1
Maldives	10	67	4.05	66	3.54	–1
PRC	11	80	3.55	75	3.17	–5
Viet Nam	12	81	3.53	91	2.76	10
Mongolia	13	86	3.41	87	2.90	1
Iran	14	87	3.39	84	2.96	–3
Thailand	15	89	3.30	80	3.03	–9
Philippines	16	92	3.22	95	2.69	3
Fiji	17	94	3.16	90	2.82	–4
Indonesia	18	101	2.83	107	2.39	6
Sri Lanka	19	105	2.79	106	2.41	1
India	20	116	2.01	117	1.72	1
Cambodia	21	117	1.99	120	1.63	3
Bhutan	22	119	1.93	123	1.58	4
Lao PDR	23	121	1.90	119	1.64	–2
Pakistan	24	123	1.83	121	1.59	–2
Nepal	25	134	1.56	137	1.28	3
Bangladesh	26	137	1.52	135	1.31	–2
Papua New Guinea	27	143	1.38	139	1.24	–4
Average (simple)			4.06		3.61	

IDI = information and communication technology development index, Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.

Source: ITU (2011).

Figure 3 shows the relationship between ICT connectivity, per capita income, and ICT prices as calculated in ITU indices. The figure reveals the strong correlation between ICT development and per capita income (0.885) for selected economies. In contrast, ICT prices and per capita income have an inverse relationship (–0.446) reflecting the regressive nature of the sector across the income spectrum. Moreover, as the price index increases, the ICT development index falls sharply with a negative correlation value of –0.597. In this regard, what is of even greater concern is that in the very countries that already have the lowest per capita income levels and the lowest ICT development indices, ICT prices have increased four- or five-fold. This underlines the close association between poverty and low ICT connectivity as well as high user prices that are not only out of line with other countries in the region but are also in countries where people are the least able to afford them. Disconnectedness in these countries can turn into a vicious circle that negates, particularly for the poorest, the benefits that the wider integration of the region can bring (Bonapace and Martinez-Navarrete 2011).

Figure 3: Connectivity, Prices, and Incomes in Selected Economies (\$)

ICT = information and communication technology, Lao PDR = Lao People's Democratic Republic.

Note: The size of the bubble refers to gross national income (GNI) per capita, \$ current, 2009. Data on GNI per capita from the ESCAP Statistical Yearbook 2011, data on IPB (2010) and IDI 2010 are from ITU 2011. The IPB is a composite based on user prices for fixed telephony, mobile telephony, and fixed-broadband Internet services calculated as a percentage of average income. The IDI is a composite combining 11 indicators related to the level of networked infrastructure and access to ICT, the level of ICT use in society, and the level of ICT skills.

Source: Adapted from Bonapace and Martinez-Navarrete (2011).

Determining why, when, and how ICT has an impact on economic growth is a complex affair; nevertheless, consensus has emerged among the majority of scholars that both the production and use of ICT contribute significantly to aggregate productivity (Jorgenson and Vu 2005). Total factor productivity increased from 21% of world economic growth from 1990 to 1995 to 29% from 1995 to 2003. This development has been associated to a significant extent with the ICT revolution. The share of this gain attributed to the ICT sector has declined, while productivity growth in industries using ICT has accelerated. The two important components of the ICT industry are equipment manufacturing and IT-enabled services, both of which are highly concentrated regionally, and productivity gains resulting from these industries are currently captured largely by consumers in developed countries rather than by developing country producers (Best and Kenny 2009). Nevertheless, the gains are also considerable in some developing countries, especially in modern cities, and are poised to become more significant in other areas as well (Mitra forthcoming a).

IV. INDUSTRY GROWTH, STRUCTURE, AND MARKET ORIENTATION

A. Overall Development Trajectories

All Asian economies are in the process of developing their IT-BPO industries, but there are significant differences. This raises questions on how and why economies or regions differ in the timing, scale, and scope of development and what the policy and other implications are. An in-depth analysis of these questions must cover a wide range of topics including the overall historical and economic development context, market orientation, and income level; specific human resources and other factor market developments; legal and regulatory environments; fiscal and non-fiscal incentives; and the overall role and organization of the private sector, the government, and other local and foreign stakeholders.

As shown in Table 3, several Asian economies have established significant IT-BPO industries, but the timing of industrial development as well as the scale and scope of operations differ significantly. The size of the IT service industry (especially the domestic industry) is generally in line with the size of GDP and ICT spending and to some extent other overall ICT developments such as rankings provided by the ITU (2012) and the World Economic Forum (WEF 2013). The most sizeable IT service industry (domestic and exports combined) is found in high-income countries such as Japan and the Republic of Korea followed by large developing countries such as the People's Republic of China (PRC) and India. Countries with high per capita incomes (and high ICT spending per capita) typically have larger ICT service industries on a per capita basis than countries with lower per capita income levels (or low ICT spending per capita), but a review of export performance does not imply that all countries or regions follow this pattern. India, for example, is a major exporter of IT-BPO services but lags behind many economies in terms of domestic ICT spending, ICT diffusion, per capita income levels, and a wide range of other socioeconomic indicators.

Furthermore, Asian economies differ significantly in market orientation and industry structure. In large, industrially advanced, high-income economies like Japan and the Republic of Korea, the ICT service industry is to a large extent mostly focused on the domestic market. Also, remuneration levels and value added per employee are typically higher compared to middle- and low-income economies. Among developing countries, the PRC has the largest industry serving a domestic market for telecommunication and other hardware, IT services, and software while India takes the lead in exporting IT-BPO services. Other developing Asian countries that have developed significant IT-BPO export industries include the PRC, Malaysia, the Philippines, Singapore, and Sri Lanka and more recently also Thailand and Viet Nam. Countries lagging behind in efforts to develop a more sizeable and internationally competitive export industry include much of West and Central Asia, Bangladesh, Cambodia, Indonesia, the Lao People's Democratic Republic (Lao PDR), Myanmar, Nepal, Pacific islands, Pakistan, and Papua New Guinea (Akthar et al. 2009)

Several Asian economies have emerged as major global production centers for electronics and ICT hardware. The principal examples currently include the PRC; Japan; the Republic of Korea; Malaysia; the Philippines; Taipei, China; Thailand; and Viet Nam. The hardware industry has well developed global production, trade, and research networks and sourcing or supply-chain networks covering several East and Southeast Asian economies, though there are rapid changes in the division of labor among those economies in addition to major volatility in demand. Compared with most other Asian economies, countries like India and the Philippines have experienced substantially rapid growth in IT-BPO exports, and so far global service outsourcing has continued to grow more steadily than the hardware industry even during

slowdowns in overall economic growth in advanced developing countries. Compared to the manufacturing sector, however, ICT services are behind in developing intra-Asian production, trade, and research networks.

Moreover, there are major differences in the scale, scope, organization, and behavior of individual firms in the hardware and service industries. In Japan, several large electronics and ICT hardware firms have served local and international markets for several decades and have made major investments in research. Subsequently, the PRC; the Republic of Korea; and Taipei,China have also developed major manufacturing firms but with notable differences in terms of timing, industry structure, ownership, and corporate culture. The PRC has several large, state-owned and private corporations that until recently mainly focused on the domestic market. The Republic of Korea is dominated by large, indigenous industrial conglomerates with extensive worldwide sales. Taipei,China has been extraordinarily dynamic in terms of indigenous small and medium-sized enterprise development. In contrast to the IT hardware and telecommunication industries, Asia has few large IT service and software firms that match the scale and scope of the operations of North American and European companies, although several firms in the PRC and India are up and coming. Also, India and the Philippines are so far the only countries in Asia that have established themselves as major BPO industry centers which in the case of India is manifest in large-scale operations of both indigenous and foreign firms as opposed to the Philippines where foreign corporations dominate.

B. Domestic Markets

Variations in the scale and scope of the domestic market for IT-BPO services are typically in line with the size and sophistication of the economy (Table 3) as measured by the size of GDP, per capita income, literacy rates, and the use of computers and broadband. In lower-income countries, the domestic market tends to be underdeveloped implying a significant opportunity for catching up as their economies grow. Moreover, it should be noted that countries differ in terms of the roles of local governments in dealing with foreign firms and in the scale and scope of local value added versus reliance on importing software and services.

Several factors point to the major potential to develop domestic markets in Asia (Mitra forthcoming a).

- Incomes are increasing resulting in more domestic ICT spending by the private and public sectors, households, and individuals.
- The number of persons with basic and higher education and computer literacy is large and growing.
- The economy in Asia overall has been transforming and expanding predominantly in urban areas with a high use of computers, Internet, and other ICT. In addition, there has been rapid growth in the use of wireless telephones and other ICT in rural areas. Examples of applications with major growth potential include e-governance, finance, banking, insurance, postal services, infrastructure, media/entertainment, education, healthcare, public transport, energy and other utility management, and clean/green technology.
- The introduction of new, more affordable and cost-effective hardware and software and the widespread use of increasingly sophisticated wireless telephone and computer

solutions with broadband, cloud computing, and other innovations offer major opportunities for rapid growth in domestic IT-BPO markets. The ongoing ICT revolution implies that a large number of people are using low-cost computers, tablets, mobile phones, and other devices with Internet and computing capabilities.

- The expanded scope for a wide range of entrepreneurial activities empowered by ICT has led to the increasingly rapid adoption of foreign technologies as well as to indigenous technological and business process innovations to serve domestic market needs that subsequently also could result in exports.

Table 3: Information Technology and Business Process Outsourcing Industry Revenue in Major Asian and Pacific Economies, 2008

Economy	Population (million, 2008)	GDP (Current \$ billion, 2008)	GDP (Current \$ per Capita, 2008)	IT-BPO Industry Revenue (\$ billion, 2008)	IT-BPO Industry Revenue (% of GDP, 2008)	IT-BPO Industry Revenue (\$ per Capita, 2008)	Global IDI Ranking (2010)
Less Developed Economies							
<i>South Asia</i>							
Bangladesh	145.5	79.6	547.8	0.6	0.8	4.1	137
India	1,190.9	1,224.1	1,027.9	51.5	4.2	43.2	116
Pakistan	167.4	163.9	978.8	1.7	1.0	10.2	123
Sri Lanka	20.2	40.7	2,013.9	0.6	1.5	29.7	105
<i>Southeast Asia</i>							
Indonesia	235.0	510.2	2,171.7	1.8	0.4	7.7	101
Malaysia	27.5	231.0	8,398.9	2.7	1.2	98.2	58
Philippines	90.2	173.6	1,925.2	6.1	3.5	67.6	92
Thailand	68.3	272.6	3,992.8	2.6	1.0	38.1	89
Viet Nam	85.1	91.1	1,070.2	0.6	0.7	7.1	81
Advanced Economies							
<i>East Asia</i>							
Hong Kong, China	7.0	219.3	31,425.8	1.4	0.6	200.0	6
Japan	127.7	4,849.2	37,972.2	104.5	2.2	818.3	13
Singapore	4.8	166.8	34,465.5	13.8	8.3	2,875.0	19
Republic of Korea	48.9	931.4	19,028.0	10.5	1.1	214.7	1
Taipei, China	22.9	392.9	17,150.5	9.3	2.4	406.1	-
<i>Pacific</i>							
Australia	21.4	1,052.8	49,233.0	15.2	1.4	710.3	14
New Zealand	4.3	130.7	30,611.4	2.9	2.2	674.4	12
Subtotal, less developed economies	2,030.1	2,786.8	2,193.4	68.2	2.4	33.6	
Subtotal, advanced economies	237.0	7,743.1	35,782.8	157.6	2.0	665.0	
Grand total	2,267.1	10,529.9	26,893.2	225.8	2.1	99.6	

- = data not available, GDP = gross domestic product; IDI = ICT Development Index published by ITU (2011).

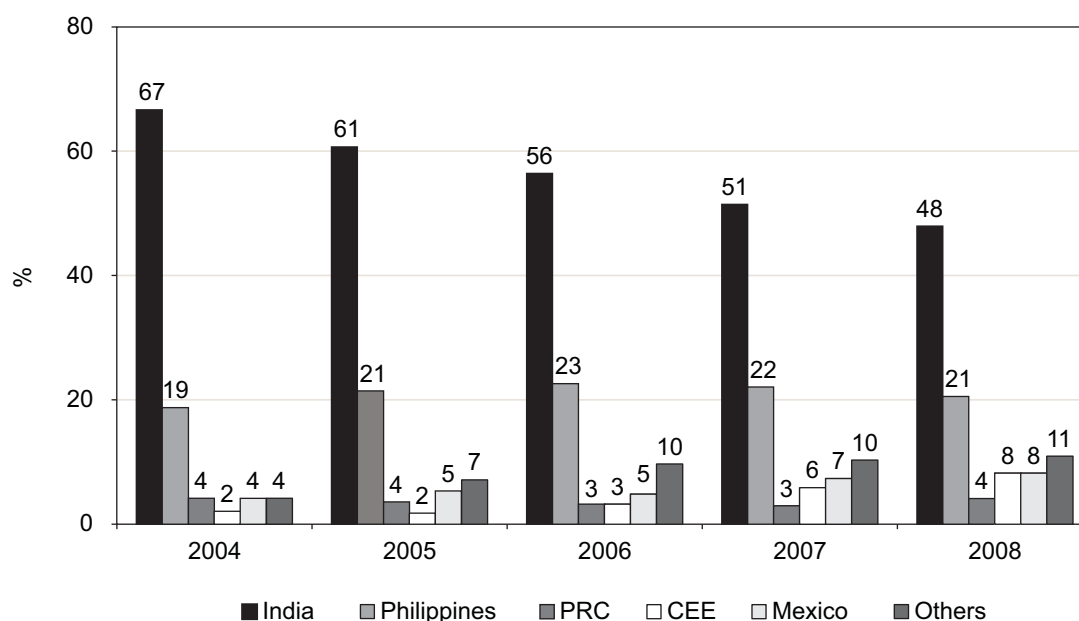
Note: Information technology (IT) software and services and business process outsourcing (BPO) industry data are not strictly comparable across countries due to differences in industry classifications and coverage of domestic and external markets.

Sources: KPMG (2010); World Bank World Development Indicators database (accessed 16 April 2013); ITU (2011); author's estimates.

C. Export Markets

The global market for exporting IT-BPO services has expanded rapidly especially since the 1990s. Trade among advanced industrial economies traditionally has dominated this business, but developing countries have gradually emerged as significant participants as well, with India as a prime example. While India has remained the largest exporter among developing countries, international competition has intensified as IT-BPO services have become a more substantial business niche in many countries. In terms of BPO, India's share of international offshoring (offshoring and outsourcing to developing countries and to Central and Eastern Europe) declined from around 67% in 2004 to around 48% in 2008. Much of this decline is explained by the rapid development of the industry in the Philippines (21% in 2008), Mexico (8% in 2008), and Central and Eastern Europe (8% in 2008) as shown in Figure 4. The PRC has found a lucrative business niche in Japan while the Eastern European countries serve German and Scandinavian markets.

Figure 4: Business Process Offshoring to Developing Countries and to Central and Eastern Europe (%)



CEE = Central and Eastern European countries, PRC = People's Republic of China.

Note: Others include Argentina, Brazil, Malaysia, Singapore, Central America, and the Caribbean region.

Source: Author's estimates, excluding offshoring to Canada and Ireland, based on data provided by Everest Research Institute (2009).

V. REGIONAL AND COUNTRY-SPECIFIC INDUSTRY DEVELOPMENTS

In Asia, the PRC, India, Malaysia, the Philippines, and Singapore are major exporters of IT-BPO services, but the PRC and higher-income countries such as the Republic of Korea are ahead in terms of developing their domestic markets for ICT products and services. Variations in industry size and structure and market orientation across countries (and regions) can be traced to differences in domestic and external demand; technology development; the historical context

including political, corporate, and other cultures; the timing and stage of development; factor market endowment; agglomeration; infrastructure; the legal and regulatory environment; and the role of key stakeholders.

A. South Asia

India has been a star performer in developing an export-oriented IT-BPO industry and has inspired other South Asian countries to follow its example. All countries in the region are characterized by major disparities in economic development as some areas, groups, and institutions are sophisticated while others lag behind. As a whole, South Asia lags behind East Asia in most socioeconomic indicators including per capita income; literacy; ICT spending per capita; the diffusion and use of ICTs; the development of the domestic market for ICT services; and international rankings in terms of competitiveness, ease of doing business, and the overall efficacy of government interventions. While South Asia is generally weak in overall economic development and governance, it is also culturally heterogeneous and in many respects more open to foreign cultures than most of East Asia. Moreover, all the countries were under British colonial rule and hence have long-standing familiarity with that culture. That and costing advantages have so far proved important in giving India and Sri Lanka an edge over many other Asian countries in developing IT-BPO exports (Mitra 2004).

India. The IT-BPO industry in India continues to expand although at lower annual growth rates as the industry has become larger. The industry was estimated to have revenues of \$108 billion in fiscal year (FY) 2012-13 with IT services and software and engineering accounting for \$74.2 billion and BPO accounting for \$20.9 billion (export and domestic markets combined). Much of the industry continued to focus on exports, but the domestic market has gradually become substantial as well. Employment is expected to reach nearly 3 million while indirect job creation is estimated at 9.5 million (Table 4). As a proportion of GDP, revenues have grown from 1.2% in FY1997–98 to nearly 8% in FY2012–13. The share of total exports (merchandise plus services) increased from less than 4% in FY1997 to 23%–25% in FY2012–13 (NASSCOM 2009–2013).

India's success in developing an IT-BPO industry ensues from its early development of a large pool of technical, managerial, and entrepreneurial human resources coupled with strong external demand from the late 1980s onwards. These circumstances or inherent strengths and capabilities gave India "first mover advantages" in developing an export-oriented industry that initially focused on low-end IT services and subsequently also developed stronger capabilities in higher-end IT services and software, engineering services, and BPO exports. Early on, the development of IT services in India was driven by foreign and local private firms (and initially also by public sector entities). As the industry matured, many multinational corporations developed major operations in India at the lower as well as the higher end of the value chain serving both the global and the local markets. Moreover, Indian firms began to establish sales as well as production centers in a large number of developed and developing countries.

It is commonly agreed that access to a large pool of educated human resources that could be hired at a comparatively low cost and the pivotal role of entrepreneurial talent were key factors that enabled India to rapidly develop its export-based industry in the 1990s and 2000s. These facts alone, however, do not explain its success. India in fact had several principal strengths enabling it to respond swiftly to external demand (Mitra 2009).

Table 4: Information Technology-Business Process Outsourcing Industry Revenue and Employment by Service in India, 2003–2004 to 2012–2013

Revenues and Employment	2003–04	2008–09	2009–10	2010–11	2011–12	2012–13p
REVENUES (\$ billion)						
Export Market						
Information technology services	7.3	25.8	27.3	33.5	39.9	43.9
Software products and offshore software product development	0.8	2.0	2.1	2.4	2.7	2.9
Engineering services	1.7	7.6	7.9	9.0	10.3	11.2
Business process outsourcing	3.1	11.7	12.4	14.2	15.9	17.8
Total Exports	12.9	47.1	49.7	59.0	68.8	75.8
Domestic Market						
Information technology services (incl. engineering)	3.1	8.2	9.1	11.0	12.2	12.4
Software products	0.5	2.7	3.0	3.5	3.7	3.8
Business process outsourcing	0.3	1.9	2.3	2.8	3.1	3.1
Total Domestic	3.9	12.8	14.3	17.3	19.0	19.3
Total Export and Domestic Markets						
Information technology services and engineering services	12.1	41.6	44.3	53.5	62.3	67.5
Software products and offshore software product development	1.3	4.7	5.0	5.9	6.4	6.7
Business process outsourcing	3.4	13.6	14.7	17.0	19.0	20.9
Grand total information technology services, products, engineering, and business process outsourcing except hardware	16.8	59.9	64.0	76.3	87.7	95.2
EMPLOYMENT ('000)						
Information technology software and services exports	296	958	1,003	1,153	1,295	1,407
Business process outsourcing exports	216	738	770	826	879	917
Domestic market (IT software and services and business process outsourcing)	318	500	527	562	601	640
Grand Total	830	2,196	2,300	2,542	2,775	2,964

p = provisional projections. Fiscal years ending March 31.

Source: NASSCOM (2009–2013).

- Human resources and cultural factors.** India's principal advantage is its pool of human resources, namely its size; varied technical, managerial, and entrepreneurial competency; English language skills; multicultural adaptability; high domestic and international mobility; and low-cost compared to high-income countries. All these features have been favorable in meeting industry requirements for skilled technical workers as well as for managers and entrepreneurs. Also, the Indian diaspora has played multiple roles in developing the knowledge industry both internationally and in India.
- Capital requirements and financing avenues.** Access to local and foreign capital and the existence of well-established financial institutions has gradually become more important to private sector-led industrial development. The availability of risk-willing capital has increased especially during the rapid appreciation of shares of Indian firms on domestic and foreign stock exchanges. Many foreign firms have invested in India and have established strategic alliances with Indian firms.
- Infrastructure, major urban centers, industrial parks, and living conditions.** New and more efficient telecommunication technology and the growth in computer, telecom, and Internet infrastructure have made the rapid expansion of IT-BPO industries feasible. Nevertheless, while the country's infrastructure has improved, it continues to lag behind

most of East Asia in telecommunication, transportation, energy, and other infrastructure. Poor infrastructure has continued to be a major constraint on economic development in India; in fact, it can be argued that IT-BPO industries could have developed significantly faster if infrastructure had been better.

Major urban centers (Bangalore, Chennai, Hyderabad, the New Delhi National Capital Region, Mumbai, and Pune in particular) with their comparatively better access to modern infrastructure, education, and other facilities have served as magnets for foreign and indigenous corporate investment and also for attracting talent from different parts of the country as they are perceived to offer greater career opportunities and better quality of life. Export-oriented industrial parks in major cities have played a pivotal role by providing land, physical infrastructure, and incubator facilities.

- **Legal and regulatory frameworks.** Gradual improvements in telecommunication, cyber, and intellectual property rights legislation and regulatory frameworks and special fiscal incentives and liberal labor laws for the service sector compared with those in the manufacturing sector have enabled the industry to expand.
- **Foreign and local firms, entrepreneurship, the Indian diaspora, institutional capabilities, and networks.** India's human resource strengths are complemented by institutional capabilities including legal and accounting services, financial and technical services, mass media and entertainment industry management consultants, industrial associations, indigenous and foreign private corporations, public sector institutions, and the academic community. Industry growth has been spurred by the fact that India offers a large pool of technical, managerial, and entrepreneurial talent for institutions to tap locally and overseas to make professional connections with foreign companies. The institutional capabilities and business networks in India and in the Indian diaspora in conjunction with other international knowledge and business networks have enabled the rapid development of the IT-BPO industry.
- **The private sector, government, and academia.** The role of the government has gradually evolved from focusing on investing in public education and research and state corporations to facilitate private sector development and develop public-private partnerships. In India, both indigenous private sector and foreign multinationals have been the prime drivers of the rapid expansion of the IT-BPO industry in both the export and domestic markets.

Early government policies and investments in education and public enterprises were also important in enabling long-term growth, but success did not result from large-scale government planning and investment in ICT. The emergence of new connectivity solutions and decisions by foreign companies to expand outsourcing and offshoring service delivery to low-cost geographies coupled with the dynamic response of the private sector and the spirit of a diverse set of entrepreneurs were the principal factors driving industry development.

In spite of major weaknesses in the overall business environment in most parts of the country, private sector know-how and a swift response to new business opportunities coupled with self-reliance in tackling challenges in corporate strategy and in managing operations were key factors enabling the rapid development of the industry. Academia played an important role in educating and training students in large numbers, although with variations in quality in both government and private institutions. Also, there have

been major shortcomings in matching the education and training requirements of the IT-BPO industry with end users. In fact, the record on fostering links between academia and industry in education and research has been mixed.

- **Agglomeration.** All of the above have been associated with the concentration of technical, managerial, entrepreneurial, and other talents in major cities and the development of various forms of local, national, and international production, trade, finance, and knowledge networks and links. This has resulted in multiple production, technological, educational, and other formal and informal connections between institutions and individuals in ICT as well as in other parts of the economy. Moreover, it can be argued that the industry got special impetus from factors such as branding and success breeding success.

The growth of the industry in India was the result of natural evolution reflecting supply and demand; market and physical infrastructure development; developments in public policy and corporate strategy; and changes in industrial organization and the role of industrial clustering and business and knowledge networks internationally, nationally, and at local firms. It did, however, also have certain “accidental” aspects such as timing in terms of external demand, time zone differences, and the emergence of individual champions. More crucial, though, were the unplanned or default advantages that resulted from access to a large, skilled, English-speaking workforce; low-cost workers (many of whom are graduates or professionals with little or no IT expertise); and the scarcity of attractive employment opportunities in other sectors of the economy. In addition, no other country was able to respond to the extraordinarily strong external demand from the late 1980s onwards as quickly as India primarily due to its human resource endowment. India did not have particularly unique or extraordinarily favorable government policies in ICT or in other fields, especially compared with East Asia; it did, however, have special strengths in terms access to a large pool of technical, managerial, and entrepreneurial talent (Mitra 2009).

Sri Lanka. After India, Sri Lanka has so far been the most successful in exporting IT-BPO services in South Asia. It now has a larger industry than most Indian states aside from Andhra Pradesh, Karnataka, Maharashtra, the National Capital Region, and Tamil Nadu. Sri Lanka currently ranks 21st in the 2011 AT Kearney Global Services Location Index (Kearney 2011). As of 2011, there were more than 300 IT-BPO firms operating in the country employing about 63,000 people (compared to 34,000 in 2006) and generating more than \$300 million in export revenue. With the end of the civil conflict and with active investment and reforms by the government, the IT-BPO industry could well reach its ambitious target to generate more than \$1 billion in revenues by 2016 (Kearney 2012). Key drivers in developing the industry are access to a sizeable talent pool, a cost advantage, supportive government policies, and the fact that Sri Lanka is close to India and can take advantage of industry developments and access to the technical and managerial talent available there (Mitra 2006).

Bangladesh and Pakistan also have significant ambitions in ICT development, but they have so far not been able to keep up with India or Sri Lanka in IT-BPO industry expansion mainly because of the overall weakness of their economies and investment climates.

B. Southeast Asia

Southeast Asia is heterogeneous in terms of ethnic groups, size of population, and historical legacy and has traditionally been more open to foreign cultures than most of East Asia. There are major differences in overall social and economic development across and within countries,

in the scale and scope of government interventions, and in the role of the private sector. These variations are reflected in differences in ICT development such as the potential to develop IT-BPO exports and domestic markets. Malaysia, the Philippines, and Singapore lead in IT-BPO industry development including in exports. Viet Nam started later and is attempting to catch up using strong government support. Indonesia and Thailand lag behind, though they also aspire to develop major IT-BPO industries. Lower-income countries such as Cambodia, the Lao PDR, Myanmar, and Papua New Guinea are, on the other hand, thought to have little scope for developing sizable IT service export industries.

Among the members of The Association of Southeast Asian Nations (ASEAN), Indonesia, Malaysia, the Philippines, and Thailand are ahead of South Asia but lag behind East Asia in socioeconomic indicators such as per capita income; literacy; ICT spending per capita; the diffusion and use of ICT and the development of the domestic market for services; and international rankings in competitiveness, ease of doing business, and e-readiness. Moreover, the region's colonial legacy differs from that of East Asia and is only partly in line with that of South Asia. Malaysia, Myanmar, and Singapore were under British colonial rule and hence are familiar with British culture and legal and business practices. The Philippines was a Spanish colony then came under American rule; Indonesia was a Dutch colony; Cambodia, the Lao PDR, and Viet Nam were French colonies; and Thailand was never a colony. These facts have had a significant impact on their education systems and overall scope to develop IT-BPO export industries.

Singapore. Singapore has outperformed other ASEAN members in ICT as well as other aspects of economic development. It has given high priority to ICT development since the 1980s with the government acting as a direct and indirect catalyst. It has also focused on developing partnerships between government, private industry (both foreign and local), and academia. Early on, the government placed strong emphasis on investing in advanced telecommunication infrastructure and in ICT education, training and research, and institutional capacity building. Under the iN2015 plan, Singapore aims to be a world leader in harnessing ICT and create 80,000 additional jobs, 90% home broadband use, 100% computer ownership for all homes with school-aged children, a three-fold increase in ICT export revenue to \$42 billion (S\$60 billion), and a two-fold increase in the value added by the infocomm industry to \$18 billion (S\$26 billion). As of 2011, the infocomm industry generated \$58 billion (S\$83 billion) in revenue, of which 70% was exports—40% software, IT, and telecommunication services (IDA 2013a and 2013b). Singapore has emerged as a world class center in ICT development, logistics, finance, management consulting, education, research, and other knowledge economy services. It has served as an example from which other countries can distill lessons and also acts as a catalyst for forging global and regional collaboration.

Philippines. The Philippines is second to India in success in establishing a sizeable BPO industry and appears poised to develop a major IT service industry as well. IT-BPO exports grew by 46% annually from 2004 to 2008 and continued to expand by 18%–30% annually from 2009 to 2012. It has outperformed other countries in developing BPO voice exports. IT-BPO export earnings grew from \$100 million in 2001 to \$1.5 billion in 2004 to \$13.5 billion in 2012, and are projected to reach \$16 billion in 2013. They may well reach \$25 billion in 2016 which would be close to 8% of the GDP according to the Business Processing Association of the Philippines (BPAP). Moreover, BPO has also become a major generator of new job opportunities as direct, full-time employment grew from 100,000 in 2004 to 780,000 in 2012 and is projected to reach 926,000 in 2013 and may well reach 1.3 million in 2016. Furthermore, in addition to direct employment, it is estimated the industry will produce 3.2 million indirect employment opportunities by 2016. Much of the industry is likely to continue to be located in the

Greater Metro Manila area or in Cebu, but significant growth is also expected in the so-called “next wave” cities (BPAP 2012, 2013).

The Philippine experience with BPO since 2000 demonstrates the scope for rapid growth in outsourcing services to developing countries. Most of the growth has so far been at the lower end of service provision such as basic call centers and low-end, BPO non-voice services plus some knowledge process outsourcing and legal service outsourcing, IT services and software, and engineering services. The country has, however, considerable potential to expand the scale and scope of service delivery across many sectors at the lower as well as the higher end of the value chain.

While it is can be misleading to compare the scale and scope of overall industry development and the roles of key stakeholders in the Philippines with larger economies such as the PRC and India, it is worth noting that the Philippines has outperformed other ASEAN countries in BPO exports mainly because of access to a large pool of service-minded people with English language and other skills coupled with the limited scope for full employment in other sectors. The successful development of industrial parks in Metro Manila and in other parts of the country has helped as have costing and productivity advantages and increased interest among multinational corporations in expanding the scale and scope of their offshoring and outsourcing operations to a wider range of countries (Mitra forthcoming b).

Malaysia. Malaysia developed an electronics industry early on based on multinational corporations offshoring assembly component manufacturing to serve regional and global markets. The industry started in the early 1970s, grew rapidly in the 1980s, and reached its peak in the 1990s, but subsequently the rate of new foreign investment declined as multinationals began to favor other lower-cost locations such as the PRC, Thailand, and Viet Nam and because progress in moving up the value-added chain was limited in Malaysia. While the growth of the hardware industry has slowed efforts to develop ICT services—primarily telecommunication and computer services—those services have, however, become a major feature in the country’s economic development with the advent of the widespread use of personal computers and the Internet and the surge in outsourcing services to India and other locations starting in the early 1990s. In the 2000s, telecommunications grew at a compound annual growth rate of 10.5%, and computer services grew at 26.8% (MOSTI and PIKOM 2012).

Much of the IT service industry has been concentrated in Kuala Lumpur and the Klang Valley. The government has made major efforts to attract investment into Cyber Jaya located between the Kuala Lumpur city center and the international airport but also wants to develop the industry in other parts of the country as well. One example of this is efforts to develop the Penang area into a center for higher end electronics manufacturing as well as engineering, IT services and other knowledge based industries. Another example is the Iskandar Malaysia project, a major high-technology industry township close to the Singapore border with the potential to attract investors and professionals who would have otherwise operated out of Singapore.

Malaysia differs from the Philippines (and from many other Asian countries) in that the government has been extraordinarily proactive and committed to investing large sums to promote electronics and ICT hardware and subsequently also ICT service industries, though to date the return on this investment has been moderate or low. IT services, and to a more limited extent the BPO industry, have continued to expand in the 2000s and as of 2011 employed about 300,000 people directly, but Malaysia has not been able to match India, the Philippines,

or Sri Lanka in terms of BPO industry growth or the PRC or India in IT services and software products and engineering services.

The Malaysian experience indicates that both the government and the private sector can do a lot to promote ICT development but that the efficacy of government intervention is key. This is illustrated not only by success in attracting foreign investment and in establishing industrial parks but also in terms of the ability to solve problems resulting from fragmentation and the poor implementation of government and public–private partnership initiatives, ineffective subsidy regimes, and corrupt practices. Malaysia's mixed results in ICT development suggest that focusing exclusively on government and public–private partnerships for investing in infrastructure and providing generous tax and other incentives may not be enough to enable major IT-BPO industry development, especially if the investments and policies are ineffective. The importance of early and sound investments in human resources and ensuring that such efforts are carefully monitored and managed is paramount. It is essential to educate, retain, and attract technical, managerial, and entrepreneurial talent and to ensure education and training investments are in line with industry demand. Malaysia continues to face major challenges in the scale, focus, and quality of education and in attracting and training foreign and Malaysian talent, including its diaspora, all of which are needed to enable industrial expansion in line with developments in the market place and with corporate priorities. Also, it needs to compete for more foreign investment and to establish more effective programs to strengthen local entrepreneurship and innovation.

Nevertheless, Malaysia has been an example of bold leadership as illustrated by its Vision 2020 of a technologically advanced society and a technologically enabled government. The government's 8th, 9th, and 10th plans (2010–2015) along with the Knowledge-Based Economy Master Plan, the Digital Transformation Program, and several other government initiatives aim to transform the economy through innovation, knowledgeable and skilled human capital, and the widespread use of technology, in particular ICT. By 2020, the Digital Transformation Program is expected to increase the contribution of the digital economy from the current 12.5% to 17% of gross national income (MOSTI and PIKOM 2012).

Indonesia. Indonesia is an example of a late starter, yet the government has major ambitions to develop ICT hardware and service industries to serve both the export and domestic markets. Compared with India and the Philippines, the scope for exporting IT-BPO services is, however, limited, one principal reason being constraints in English-language skills. Also, unlike several East and Southeast Asian countries, Indonesia has not been able to establish a large, internationally competitive hardware manufacturing industry. Nevertheless, there is a need to serve the sizable local market for both ICT services and hardware as the population reached 242 million in 2012. Major advancements in broadband connectivity are critical for integrating and developing the domestic economy as well as its international interface.

Developing a major IT-BPO or ICT manufacturing industry may, however, prove to be harder than in the PRC or India. Indonesia must try its own model to serve both local and external demand. According to the government's ICT 2025 Vision, the country aims to become a prosperous information society by developing information infrastructure; by facilitating regulations, incentive systems, and institutional convergence; and by developing human resources.

Thailand. Thailand has become a major center for offshoring electronics and other manufacturing, but it has not succeeded in developing a major IT-BPO service industry though the government has declared its intention to do so. Several factors impede the rapid

development of a competitive export industry, notably shortages of skilled and experienced technical, managerial, and entrepreneurial human resources and persons with strong English-language skills. Aside from mobile telephony, Thailand scores rather poorly in terms of networked economy readiness. The institutional environment has so far not been particularly favorable to developing ICT services, and the government has been less ardent in pushing the digital development agenda nationwide compared to many other ASEAN countries (WEF 2013). Nevertheless, the Second ICT Master Plan (2009–2012) has strategies for improving the labor force to support a knowledge- and innovation-based society, for developing ICT infrastructure, and for enhancing the competitiveness of the ICT industry. The goal is that people at all levels of society will be smart and information literate for their own benefit and for the society as a whole.

Viet Nam. Like Thailand, Viet Nam has become a major center for offshoring electronics and other manufacturing, but it has so far not been able to develop a sizeable IT services and-BPO industry for several reasons, especially shortages of skilled and experienced technical, managerial, and entrepreneurial human resources and persons with strong English-language skills and multinational corporation concerns about data and intellectual property rights and e-security. In addition, concerns about the overall quality of the regulatory and business environment have hampered development (WEF 2013). The government has nonetheless declared plans to develop a sizeable IT-BPO industry along with major investments in ICT infrastructure, training and education, and e-government. By 2020, Viet Nam's goal is to be an above average ASEAN member in terms of rank as an information society. It aims to change its socioeconomic structure so that it will have an advanced, networked, knowledge-based economy that will contribute significantly to successful industrialization and modernization (Nguyen, Nguyen, and Nguyen 2009).

C. East Asia

East Asia's high-income economies (Hong Kong, China; Japan; the Republic of Korea; Taipei, China; and major urban areas in coastal PRC) are ahead of most other parts of Asia in socioeconomic indicators including per capita income, literacy, industrial competitiveness, ICT spending per capita, the diffusion and use of ICT, and the development of the domestic market for IT services. East Asian languages and cultures dominate, and except for Hong Kong, China and Macao, China, these economies have not been European colonies which has not hindered their catching up with Western economies in technical and economic development but appears to have hampered their ability to compete with India and the Philippines in exporting IT-BPO services to Europe and North America.

Within East Asia, there are significant variations in the scale and scope of IT-BPO domestic and export markets due to differences in historical legacy, economic development trajectories, factor market endowments, industrial organization, and government policies. High-income, industrially advanced economies such as Japan; the Republic of Korea; and Taipei, China are major centers for internationally competitive ICT hardware export industries and are also advanced in supplying hardware and services in their domestic markets. The PRC is, however, poised to play an increasingly central role due to the size of its domestic market and to opportunities to further develop exports of ICT hardware and services. The size of its population, its rapid economic growth and structural transformation, and the fact that the government is placing major emphasis on investing in ICT, developing human resources, and research in ICT and a wide range of industries and technologies using ICT imply that the PRC will be an increasingly prominent participant in ICT development in Asia and globally. The

country is, in fact, a major regional and global investor and exporter of computer and telecommunication technology.

People's Republic of China. ICT development in the PRC has in many respects been more impressive than that in India leaving aside the fact that India has done better in developing an IT-BPO export industry. Nonetheless, it is hard to compare their performances due to major differences in industry growth trajectories and in their overall economic, political, and cultural backgrounds. The PRC is well ahead of India in developing a sizeable, internationally competitive electronics and ICT hardware manufacturing industry that serves both domestic and international markets. It also has a larger ICT service industry than India, but growth in services has to a large extent been in the domestic market rather than in exports. The PRC is also well ahead of India in terms of penetration of computers, telecommunications, and broadband services. Furthermore, most PRC exports of IT and ICT-enabled services are directed to East Asia, primarily to Japan and the Republic of Korea. While the PRC has ambitions to be a major global participant, it continues to lag behind India in IT-BPO exports and has so far not been able to establish a major foothold in markets in North America and Western Europe (Tschang and Xue 2005, OECD 2007).

The government has played a considerably more prominent role in ICT development than the Governments of India and other Asian economies. This includes major efforts to invest in infrastructure, human resources, research, industrial parks, and state enterprises. Furthermore, the central and several provincial government authorities have made major efforts to attract foreign investment, to stimulate local entrepreneurship, and to enact specific policies to develop export industries. Nevertheless, industry development continues to be impeded by problems in the business environment such as excessive red tape and concerns regarding intellectual property rights (WEF 2013). According to the 12th Five-Year Plan, the PRC will continue to focus on developing its domestic market but will also give high priority to developing a sizeable IT-BPO export industry. The plan identifies promising outsourcing service niches, seeks to attract new foreign investment, and intends to build 10 target outsourcing cities. There are currently strong niche hubs in the Beijing, Shanghai, Shenzhen, Dalian, Hangzhou, and several other locations that provide product engineering, product testing, research and development, and other IT-BPO export services. The plan also aims to establish thousands of small to medium-sized service providers to cater to both the domestic and international markets (Li 2011, Yu 2010).

Hong Kong, China. Traditionally, Hong Kong, China has been open to foreign trade and to new, modern service and technology developments, but so far,, government authorities have played a rather limited role in fostering ICT development compared with the Republic of Korea, Singapore, and Taipei,China, for example. Nevertheless, public policy and corporate decision makers have perceived the development of ICT services as a strategic priority, one principal reason being the need to retain its position as a global center for finance, banking, commerce, and other international business all of which depend on ICT. Realizing this, policymakers set out the Digital 21 IT Strategy to make Hong Kong, China a leading digital city. Earlier, government initiatives include the 1999 launch of the Cyberport project to boost the development of local IT firms and multimedia businesses. The project has resulted in major real estate development but has so far not met expectations for attracting private IT-BPO industrial investment. Also, Hong Kong, China has not been able to capitalize on the rapid ICT development in the PRC in terms of exporting ICT goods or IT-BPO services to the mainland. In fact, the record in terms of developing a major ICT industry has been rather modest compared with that of Singapore and Taipei,China. Hong Kong, China ranks the lowest among Asian's tiger economies in term of networked economy readiness, but it ranks high (just behind Singapore) among Asian

economies in terms of innovation and the overall quality of the business environment (WEF 2013).

Taipei,China. Taipei,China has made major strides in developing a sizeable and internationally competitive ICT industry. It is a global leader in electronics manufacturing and also has ambitions to develop a more substantial IT service and software industry to serve local and external clients. Early on, the ICT industry was helped by close relations with the United States (US), by the role played by its diaspora and returning residents, and by developing links,business and knowledge networks in California’s Silicon Valley in particular. Since 2000, Taipei,China has developed strong ICT industry links with the PRC; currently a large number of its firms and professionals are working in ICT on the mainland (Saxenian 1994, Breznitz 2006).

Government policies and investment, public–private partnerships, a large and vibrant small and medium-sized enterprise sector and the role of the overseas community have all been major factors enabling rapid ICT industry advancement. Moreover, the business and economic development philosophy has put a major focus on “coopetition” rather than primarily relying on competition. Unlike pure competition and true collaboration, coopetition strongly emphasizes that firms need to collaborate and to compete simultaneously (Breznitz 2006).

Rapid change in technology, in business models, and in markets has created major challenges for the private sector, the government, and other the key stakeholders. In 2011, the government commenced construction on the largest IT park in Asia inspired by Akhibara Electronic Town in Japan. It will include an incubator for research and development. The government’s goal for 2020 is to attract more electronics companies to invest in innovative product lines and to develop IT services and software businesses to strengthen the competitiveness of the ICT and other high-technology industries. The goal of the government’s Intelligent [Taipei,China] Project is to achieve balanced development between the living environment and industry for the next 10 years (Intelligent [Taipei,China] 2012).

Republic of Korea. The government has placed a high priority on ICT development for several decades, and the ICT industry has been the principal contributor to the country’s economic growth at around 30%–40% of GDP in the 2000s which is more than in any other OECD member. While ICT (mainly hardware) constitutes around 16%–17% of the total economy, it has been over 30% of total export volume since 2000. The government began to emphasize ICT in the late 1980s but laid down a more concrete foundation for intervention during the 1990s. Since then, the policy has been based on the assumption that a broadband network would play a critical role in economic growth and transformation. During the Asian financial crisis in the late 1990s, the country utilized the effectiveness of economic returns on this investment which eventually helped its speedy recovery. Based on the successful upgrading of the broadband network, the government set out a comprehensive vision in 2002 to foster the development of an information society efficiently using ICT to create new value in the economy, in the government itself, in the private sector, and in households. In 2004, the government introduced IT 839 Strategy which comprised eight services, three types of infrastructure, and nine new growth engines. This comprehensive initiative has greatly influenced the direction of the ICT industry as substantial government and private sector investments after 2004 were channeled to areas identified in it (NIA 2010).

The government announced a new IT strategy in 2008 that aimed at promoting ICT industry development, convergence and a wide range of applications of ICT in business, society and private life. This initiative identified several sectors in which ICT can play important roles including e-government, auto-electronics, and energy efficiency. The country is expected to

increase its IT outsourcing revenues from \$16.1 billion in 2010 to \$20.3 billion by 2014, and the government plans to invest \$341 million in the software industry. Moreover, IT market spending is projected to increase from \$17.8 billion to \$25.6 billion by 2015 with an emphasis on building a cloud computing platform, on IT outsourcing, and developing specific solutions and services. The further development of both the ICT manufacturing and service industries and markets should also foster greater interaction with the PRC and with other Asian countries (KPMG 2010).

Japan. Japan was an early pioneer in developing an internationally competitive electronics and ICT hardware industry in Asia, and the country itself is a large consumer of ICT hardware and services. Moreover, it has also repeatedly affirmed ambitions to develop a sizeable IT service and software industry though to date efforts have focused primarily on the local market. The government has played a significant role in fostering ICT development for several decades. Currently, the overall strategic ambition “i-Japan” (formerly e-Japan) is to foster innovations and strengthen international competitiveness and to establish the foundation for an advanced IT-enabled society. The focus is on three areas: promoting e-government, devising countermeasures against cybercrime, and promoting green ICT. Japan has not yet been able to establish itself as a major exporter of IT services and software, and compared to advanced industrial economies in the West, Japanese firms have showed limited interest in outsourcing IT-BPO services to other countries with the exception in recent years of expanding operations in the PRC and the US.

VI. ASIAN DIVERSITY AND LESSONS

As previously discussed, there are major variations in industry structure and market orientation; factor endowment; the development of industrial hubs; and the scale, scope, and quality of government interventions; and the role of the private sector in IT-BPO industry development in Asia. Also, there are fundamental differences in the timing and the pattern of development as the roles of various stakeholders have changed over time. All these factors need to be examined to explain differences in development; to evaluate past, present, and future prospects; and to distill lessons.

The PRC differs a great deal from India, the Philippines, and other Asian countries in terms of the size, structure, and organization of its ICT hardware, telecommunications, IT service and BPO industries as well as in the scale and scope of government involvement in the development of these industries. The IT-BPO industry has principally focused on serving the needs of a rapidly growing and now sizeable domestic market. Smaller Asian economies cannot compare with the larger ones in IT-BPO development potential. However, this does not mean that they cannot develop software and other ICT industries that are significant relative to their sizes and that can be significant in terms of serving both domestic and international markets.

Malaysia differs from India and the Philippines in most of its early efforts to develop an export industry focused on comparatively higher-end services, finance, and accounting rather than lower-end IT and BPO services. Moreover, the development of the ICT sector has received extraordinarily strong support from a wide range of government-led programs and projects though their effectiveness has varied. Even though Malaysia, Viet Nam, and other countries have made major investments and have provided a wide range of incentives to develop IT-BPO industries, the Philippines has so far scored far better in BPO exports.

The Philippines has outperformed other ASEAN countries in BPO industry growth mainly because of special advantages in culture and human resources plus success in developing industrial parks. This has been combined with costing and productivity advantages and increased interest among multinational corporations in expanding the scale and scope of their offshoring operations to a wider range of countries.

In contrast to India, the Philippines—along with most other developing countries—has a very short history in developing a software and IT service industry. While IT-BPO services have experienced major growth in the Philippines since the early 2000s, the industry is still in an early phase of exploring the potential across various sectors both at the lower and higher ends of the value chain. Compared with India, the PRC, the Republic of Korea, the Philippines and many other developing countries are weak in local entrepreneurship, science and technology capacity, industrial base, and size of the local market. Hence, the focus has been on call centers and more recently also on non-voice BPO, knowledge processing, and IT service exports. Compared to India, the industry in the Philippines is dominated by captive offshore delivery operations of multinationals while indigenous firms have yet to play a major role.

India has more than 50 years of IT service industrial development. It was the first among developing nations to establish a sizeable, export-oriented IT service industry and subsequently became a major participant in software, engineering, knowledge processing, and BPO services. Initially, government investment in education, science and technology, state enterprises, and industrial parks was of fundamental importance, but subsequently the foreign and local private sectors became the prime drivers.

Some parts of India are comparatively advanced while others lag behind in socioeconomic development including the diffusion and use of ICTs. Nevertheless, the country has a large pool of technical, managerial, and entrepreneurial talent with higher education who are familiar with the Anglo-Saxon culture. This and the fact that salaries typically are low compared to advanced developing countries has enabled the country to rapidly establish a sizeable IT-BPO export industry in several major cities despite the fact that India lags behind the PRC and most of East and Southeast Asian economies in terms of overall socioeconomic indicators and the efficacy of government intervention.

In short, the high growth in IT-BPO services in India (and also in the Philippines and in other countries) has resulted from the interplay of global, national, and local developments. The high growth in IT-BPO industries in India was primarily driven by globalization and technological developments that produced a networked economy in which the global mobility of labor, capital, technology, information, and knowledge and the mobilizing of managerial and entrepreneurial talent were central. The rapid growth in external demand and the surge in foreign investment combined with the country's ability to dynamically adapt its industrial organization, entrepreneurship, corporate strategy, and business models to respond to that demand with its large pool of talent and its costing advantages led to success (Mitra 2009 and 2013).

Openness to and alertness in responding to changes in the global business environment and fostering technology and other forms of international cooperation are central to developing IT-BPO industries. Rapid growth has largely depended on the ability to adjust government policies, legal and regulatory frameworks, finances, industrial organization, and business models in different international markets to global changes in technology and business strategies. In the case of India, this was coupled with access to human resources and costing

advantages and the dynamism of private market forces including the pivotal role of multinational corporations.

Developing industrial hubs can pay off substantially if it is done effectively in close partnership with relevant stakeholders. Industrial agglomeration and providing an enabling business environment in large cities is central for establishing and expanding the IT-BPO industry. Big cities can serve as pivotal centers for developing and attracting technical, managerial, and entrepreneurial talent, developing intra- and inter-industry links, scaling up, innovation and moving up the value chain, and fostering international connections. Smaller cities and rural areas can play important roles in providing human resources to major cities, and in the long run they may also be significant industry hubs for small-scale operations.

VII. CONCLUSIONS

There are several common factors that drive and constrain ICT development in Asia and globally, yet Asia also shows a great deal of diversity in overall economic, political and social development and in trajectories for developing IT-BPO industries. Access to educated human resources at low cost, fiscal incentives, and the development of industrial parks have been key factors underlying the expansion of the IT-BPO export industry in the PRC, India, Malaysia, and the Philippines. While important, these characteristics do not fully explain their performance as other countries or regions with these characteristics have been unable to develop industries as rapidly. Also, it does not explain the timing of industry take off and why there are major differences in growth trajectories among countries. It is important to take into account the interplay locally, nationally, and internationally of a wide range of specific aspects driving and constraining industry development, namely historical background including policies, the economy, and culture; domestic and international demand; financing; infrastructure and technology; legal and regulatory policies; and the roles of foreign companies and indigenous entrepreneurs, the government, partnerships, industry associations, civil society, individual champions, diasporas, and other networks.

This analysis of the IT-BPO industry in Asia finds major potential for continued expansion in domestic, regional, and global demand and supply. It further illustrates a diverse set of experiences from which both local and foreign stakeholders can learn and also demonstrates the need for global and regional collaboration in training, education, research, developing legal and regulatory frameworks and fostering new investment, entrepreneurship and innovation. There is a need for a wide range of timely and concerted efforts by key stakeholders to define strategies, programs, and projects to respond to opportunities and challenges at all levels.

While not a panacea for socioeconomic development, ICT is increasingly central to economic growth and structural transformation in all Asian economies. The corporate and public policy implications for IT-BPO industry development in the PRC, India, Malaysia, the Philippines, and other economies as outlined in this study are relevant to other geographies as well, yet each country or region has its own peculiarities. There is no single way to developing the industry. Each region, country, city, sector, firm, social group, or individual needs to develop approaches that are relevant to the local and global conditions at any given place and time.

REFERENCES

- Akthar, Shahid, and Patricia Arinto, eds. 2009. *Digital Review of Asia Pacific 2009–2010*. A Orbicom Network of UNESCO Chairs in Communication and International Development Research Centre (IDRC) publication. New Delhi: Sage Publications.
- Best, M., and C. Kenny. 2009. ICTs, Enterprise and Development. In T. Unwin, ed. *Information Technology for Development*. Cambridge, United Kingdom: Cambridge University Press.
- Bonapace, Tiziana, and Jorge Martinez-Navarrete. 2011. The Digital Economy as an Accelerator of Regional Integration in Asia-Pacific. *Staff Working Paper*. United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP). Bangkok.
- Breznitz, Dan. 2006. Innovation and the State—Development Strategies for High Technology Industries in a World of Fragmented Production: Israel, Ireland, and [Taipei,China]. Paper presented at the Business History Conference annual meeting Political Economy of Enterprise. Toronto. 8–10 June.
- Business Processing Association of the Philippines (BPAP). 2012. Philippines IT-BPO Investor Primer 2012. <http://www.bpap.org/publications>
- . 2013. 2012-2016: *Philippine Information Technology and Business Process Management IT-BPM) Roadmap*. <http://www.bpap.org/publications>
- Castells, Manuel. 2000. *The Rise of Network Society*. Oxford: Blackwell.
- . 2001. *The Internet Galaxy: Reflections on the Internet, Business, and Society*. Oxford: Oxford University Press.
- Cattaneo, Oliver; Michael Engman; Sebastián Sáez; and Robert M. Stern, eds. 2010. *International Trade in Services: New Trends and Opportunities for Developing Countries*. Washington, DC: The World Bank.
- Everest Research Institute. 2009. *Overview of the Global Sourcing Market*. Geneva: Everest Research Institute.
- Gartner. 2013. *Gartner IT Glossary*. <http://www.gartner.com/it-glossary>
- Government of Malaysia, Ministry of Science, Technology and Innovation (MOSTI) and the National ICT Association of Malaysia (PIKOM) 2012. *ICT Strategic Review 2012/13: Innovation for Digital Opportunities*. Kuala Lumpur.
- Infocomm Development Authority of Singapore (IDA). 2013a. Infocomm Landscape Facts and Figures. <http://www.ida.gov.sg/Infocomm-Landscape/Facts-and-Figures>
- . 2013b. iN2015 Masterplan. <http://www.ida.gov.sg/Infocomm-Landscape/iN2015-Masterplan>
- Intelligent [Taipei,China]. 2012. www.intelligenttaiwan.nat.gov.tw

- International Data Corporation (IDC). 2013. State of the Market: Tech Spending Review and Outlook. <http://www.idc.com/getdoc.jsp?containerId=WC20130221>
- International Telecommunication Union (ITU). 2011. Measuring the Information Society 2011. http://www.itu.int/ITU-D/ict/publications/idi/material/2010/MIS_2010_without_annex_4-e.pdf
- . 2012. Measuring the Information Society 2012. http://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2012/MIS2012_without_Annex_4.pdf
- Jorgenson, Dale W., and Khuong Vu. 2005. Information Technology and the World Economy. *The Scandinavian Journal of Economics*. 107 (4). pp. 631–650.
- Kearney, AT. 2011. Offshoring Opportunities amid Economic Turbulence. The AT Kearney Global Services Location Index. <https://www.atkearney.com/gbpc/global-services-location-index>
- . 2012. Competitive Benchmarking: Sri Lanka Knowledge Services. http://www.atkearney.com/paper/-/asset_publisher/dVxv4Hz2h8bS/content/competitive-benchmarking-sri-lanka-knowledge-services/10192
- KPMG. 2010. Asia-Oceania Vision 2020: Enabling IT leadership through collaboration. ASOCIO report prepared with KPMG/India. <http://www.kpmg.com/IN/en/IssuesAndInsights/ThoughtLeadership/Asia-Oceania%20Vision%202020.pdf>
- Li, Guojie, ed. 2011. *Information Science & Technology in [the People's Republic of] China: A Roadmap to 2050*. Chinese Academy of Sciences. Beijing: Science Press and Springer.
- McKinsey Global Institute. 2005. *The Emerging Global Labor Market: Part 1. The Demand for Offshore Talent in Services*. London: McKinsey Global Institute.
- Mitra, Raja M. 2004. ICT Development in South Asia. Background paper. Washington, DC: World Bank.
- . 2006. Emerging Opportunities in Software and IT-Enabled Services Industries: The Case of Sri Lanka. *Information Solutions Group Staff Working Paper Series*. Washington, DC: World Bank.
- . 2009 and 2013 (revised). IT Industry in Transformation: Opportunities and Challenges for India. *Asia Research Centre Working Paper* 29. London: London School of Economics.
- . Forthcoming a. Maximizing the Growth and Impact from the ICT Revolution: Opportunities and Challenges for Developing Asia. Working paper. London: London School of Economics.
- . Forthcoming b. Maximizing the Growth and Impact from the IT-BPO Revolution for Asia: The Case of the Philippines. Working paper. London: London School of Economics.
- National Association of Software and Services Companies (NASSCOM). 2009–2013. Strategic Review. New Delhi: NASSCOM.

- National Information Society Agency (NIA). 2010. Informatization White Paper. *Research Paper No. 258*. Seoul: NIA.
- Nguyen, Bao-Chau, Hoang-Thai Nguyen, and Lam Nguyen. 2009. *Viet Nam Information and Communication Technology Market 2009-2013 Forecast and Analysis*. International Data Corporation (IDC). <http://www.marketresearch.com/IDC-v2477/Vietnam-Information-Communication-Technology-Forecast-2482000/>
- Organisation for Economic Co-operation and Development (OECD). 2007. *Is [the People's Republic of] China the New Centre For Offshoring of IT and ICT-enabled Services?* Paris: OECD.
- . 2009. *Guide to Measuring the Information Society 2009*. Paris: OECD.
- . 2010. *OECD Information Technology Outlook 2010*. Paris: OECD.
- . 2011. *Guide to Measuring the Information Society 2011*. <http://browse.oecdbookshop.org/oecd/pdfs/free/9311021e.pdf>
- Saxenian, AnnaLee. 1994. *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press.
- Schmidt, Eric, and Jared Cohen. 2013. *The New Digital Age: Reshaping the Future of People, Nations and Business*. New York: Alfred A. Knoph.
- Schumpeter, Joseph. 1950. *Capitalism, Socialism and Democracy*. New York: Taylor & Francis Group.
- Sudan, Randeep, Seth Ayers, Philippe Dongier, Arturo Muent-Kunigami, and Christine Zhen-Wei Qiang. 2010. *The Global Opportunity in IT-Based Services: Assessing and Enhancing Country Competitiveness*. Washington, DC: World Bank.
- Tschang, Ted, and Lan Xue. 2005. The Chinese Software Industry. In Ashish Arora and Alfonso Gambardella, eds. *From Underdogs to Tigers: The Rise and Growth of the Software Industry in Brazil, [the People's Republic of] China, India, Ireland, and Israel*. New York: Oxford University Press.
- United Nations Conference for Trade and Development (UNCTAD). 2007. *Manual for the Production of Statistics on the Information Economy*. http://unctad.org/en/docs/sdteecb20072rev1_en.pdf
- . Information Economy Report 2009, 2010, 2011. 2012. <http://unctad.org/en/Pages/Publications/InformationEconomyReportSeries.aspx>
- World Bank 2013. World Development Indicators Online Database. <http://data.worldbank.org/data-catalog/world-development-indicators>. Accessed July 30.
- World Economic Forum (WEF). 2013. *The Global Information Technology Report 2013: Growth and Jobs in a Hyperconnected World*. Geneva: WEF.

World Information Technology and Services Alliance (WISTA). 2010. *Digital Planet 2010*. Vienna, VA: WITSA.

Yu, Jiang and Richard Li-Hua. 2010. [The People's Republic of] *China's Highway of Information and Communication Technology*. Basingstoke, United Kingdom: Palgrave Macmillan.

The Information Technology and Business Process Outsourcing Industry: Diversity and Challenges in Asia

The paper points to the importance of the digital revolution and knowledge economy transformation. It examines who and why some Asian countries have been more successful than others in developing information technology-business process outsourcing services industries. It points that there is no single way to developing the industry. Each region, country, city, sector, firm, and individual needs to develop approaches that are relevant to the local and global conditions at any given place and time.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.7 billion people who live on less than \$2 a day, with 828 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org/economics



Printed on recycled paper

Printed in the Philippines