BOARD OF INVESTMENTS
PHILIPPINES

DEPARTMENT OF TRADE & INDUSTRY
PHILIPPINES

USAID
FROM THE AMERICAN PEOPLE

RTI INTERNATIONAL

THE PHILIPPINES

UPGRADING IN MANUFACTURING GLOBAL VALUE CHAINS

MAY 2016

Duke | CENTER on GLOBALIZATION, GOVERNANCE & COMPETITIVENESS
at the Social Science Research Institute

This research was prepared by the Duke University Center on Globalization, Governance and Competitiveness (Duke CGGC) on behalf of the USAID/Philippines, through the Science, Technology, Research and Innovation for Development (STRIDE) Program. This study is part of the Philippines Department of Trade and Industry (DTI) Board of Investment (BOI) Roadmap Initiative for the revitalization of the manufacturing industry in the Philippines. The report is based on both primary and secondary information sources. In addition to interviews with firms operating in the sector and supporting institutions, the report draws on secondary research and information sources. The project report is available at www.cggc.duke.edu.

Acknowledgements

Duke CGGC would like to thank all of the interviewees, who gave generously of their time and expertise, as well as Richard Umali of the USAID Advancing Philippine Competitiveness (COMPETE) Project for his extensive support and feedback on earlier drafts.

The Duke University Center on Globalization, Governance & Competitiveness undertakes client-sponsored research that addresses economic and social development issues for governments, foundations and international organizations. We do this principally by utilizing the global value chain (GVC) framework, created by Founding Director Gary Gereffi, and supplemented by other analytical tools. As a university-based research center, we address clients' real world questions with transparency and rigor.

www.cggc.duke.edu

Center on Globalization, Governance & Competitiveness, Duke University

The Philippines in Manufacturing Global Value Chains
An Introduction

FINAL DRAFT FOR REVIEW

May 2016

Prepared by

Center on Globalization, Governance & Competitiveness,
Duke University

Prepared for

USAID/Philippines

This study is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of Duke University Center on Globalization, Governance and Competitiveness and do not necessarily reflect the views of USAID or the United States Government.

Table of Contents

List of Tables

List of Figures

Acronyms

AEC	ASEAN Economic Community
AFTA	ASEAN Free Trade Agreement
ASEAN	Association of Southeast Asian Nations
ASPBI	Annual Survey of Philippine Business and Industry
BOI	DTI: Board of Investments
BPS	DTI: Bureau of Product Standards
CHED	Commission of Higher Education
COMPETE	Advancing Philippine Competitiveness Project
DOE	Department of Energy
DOST	Department of Science and Technology
DTI	Department of Trade and Industry
EPZ	Export Processing Zone
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GSP	Generalized System of Preferences
IDC	Industry Development Council
IP	Intellectual Property
IPP	Investment Priority Plan
PEZA	Philippine Economic Zone Authority
PQF	Philippine Qualifications Framework
PSIC	Philippine Standard Industrial Classification
PSA	Philippine Statistics Authority
SBMA	Subic Bay Metropolitan Authority
STRIDE	Science, Technology, Research and Innovation for Development
TESDA	Technical Education and Skills Development
USAID	United States Agency for International Development
UNCTAD	United Nations Commission on Trade and Development
WEF	World Economic Forum

1. Introduction

The Philippines is among the fastest-growing economies in the world with an average annual GDP growth of 5.4% in the last 10 years. A growing population, a strong export-oriented services sector, a significant upswing in Foreign Direct Investment (FDI), and a large and active diaspora have been important drivers to strong growth.

Recently, the government has sought to further drive the country's growth through the revival of the manufacturing sector, which lags behind its explosive services sector development. These efforts have included an extensive range of programs and initiatives to gather information to more fully understand the scope of activities in the country, develop incentive structures to support and prioritize industries for growth, and to attract investment. These have been channeled through the 2012 Industry Development Program and the Manufacturing Resurgence Program amongst others. Through these initiatives, industry roadmaps were developed for a wide range of sectors detailing existing capabilities in the country and industry goals for growth.

To further understand the potential competitiveness of these manufacturing sectors in the global and regional economy, the Philippine Department of Trade and Industry Board of Investments (DTI-BOI), with the assistance of USAID/ Philippines STRIDE program, commissioned a series of Global Value Chain (GVC) analyses to the Duke University Center on Globalization, Governance & Competitiveness. Five manufacturing sectors were selected: Aerospace, Automotive, Chemicals, Electronics & Electrical Equipment, and Paper. These industries represent a range of the country's capabilities, and vary in their importance with respect to foreign exchange earners, employment, and spillover potential. The goals of the study were to provide both a set of recommendations to policy makers with guidance on moving up in the value chains selected, as well as to provide broader insights into binding constraints for the country's insertion in manufacturing chains in general.

This report analyzes each of the five key sectors, and provides a detailed outline of the GVC for each industry. Specific country case studies are also examined, detailing the experience of other countries to identify potential lessons for growth in the industry. In the analysis of the Philippines participation, information from the roadmaps was complemented with the mapping of key firms operating in the country onto the value chains; this allows policy makers to understand the value generated by different types of firms in the country. Importantly, the global analysis of each industry report intentionally seeks to provide a broad perspective of the industry to support policy formation, not only in the short term, but also to help guide decision-making with respect to long-term potential in these sectors. Policy recommendations are provided for a number of different strategic areas essential to value chain participation, including industry institutionalization, attracting FDI in higher value added activities, local firm development, cultivating human capital and improving business environment and regulations.

This introductory chapter is structured as follows: First, the GVC analytical framework is explained; second, the methodology used in this study is outlined; third, the Philippines institutional context is examined as it relates to these five GVCs, focusing on specific areas: trade policy, investment policy, human capital, infrastructure, business environment, and key stakeholders; and finally, the organization of the overall report is outlined.

2. Global Value Chain Framework

This report uses the Duke CGGC Global Value Chain (GVC) framework to analyze five industries (aerospace, automotive, chemicals, electronics and electrical equipment, and paper) with the ultimate goal of identifying potential for the Philippines to expand its position in global manufacturing production networks. The GVC framework has been developed over the past two decades by a global network of researchers from diverse disciplines in order to understand the phenomenon of globalization (Barrientos et al., 2011; Gereffi, 1999, 2005; Gereffi et al., 2005; Humphrey & Schmitz, 2002b; Kaplinsky, 2004, 2010). It allows one to understand how industries are organized by examining the structure and dynamics of the different actors involved. The value chain describes the full range of activities that firms, workers and supporting institutions around the world perform to bring a product from conception through production and end use. By examining the labor inputs, technologies, standards, regulations, products, processes and markets in specific industries and locations, it provides a holistic view of industries both from the top down and the bottom up (Gereffi & Fernandez-Stark, 2011).

Understanding how GVCs operate is essential for a country such as the Philippines as it seeks to use increased integration in the global economy to promote inclusive development, increase employment, add value to its domestic industries, and further diversify its export basket. The evolution of these GVCs has significant implications in terms of global trade, production and employment, and how developing countries are integrated in the global economy. Insertion and sustained participation in GVCs can be paramount for the economic growth, particularly in developing nations, due to accompanying job creation potential, inflow of foreign currency, contributions to poverty reduction, and more recently, access to the global knowledge economy. Understanding these chains is critical not only for attracting investment, but also supporting the competitive growth of local firms. These firms must compete with a growing number of foreign firms not only for the local market, but also for international clients and thus are forced to improve the efficiency and quality of their operations.

Identifying how value is distributed along the chain is a central element of GVC analysis. By adding value to production or moving into higher value activities, different actors can increase the benefits from participating in these global industries; this is referred to as "economic upgrading" in the GVC literature (Gereffi et al., 2005). Upgrading trajectories can be analyzed at both the firm and the country levels. In general, a country upgrades when a critical mass of firms located within its borders achieves upgrading. Upgrading depends considerably on how firm strategy leverages local competitive advantages such as qualified labor, presence of suppliers, geographic location and regulatory conditions. **How the Philippines can "upgrade" in these five respective GVCs is the central question in this study.**

Economic upgrading includes six distinct changes in the firm's participation in a production model: *entry into the value chain*, when a new actor begins to participate in the value chain; *product upgrading*, which describes the shift into the production of a higher value product/service; *process upgrading* describes improvements in efficiency in the production systems, such as the incorporation of more sophisticated technology; *functional upgrading* describes the movement to higher value stages in the chain that require additional skills; *chain upgrading*, which describes the entry into a new GVC by leveraging the knowledge and skills acquired in the current chain; and finally, *end market upgrading*, which describes the incursion

into new market segments (Gereffi, 2005; Fernandez-Stark, et al., 2011; Humphrey & Schmitz, 2002). Countries often pursue functional upgrading as the most direct way of increasing the value of their participation in these chains. Yet, in developing countries, product and process upgrading are often more easily attainable – particularly in the short to medium term, since they may require relatively minor adjustments in production and skills development with lower overall investment. Mapping out these upgrading trajectories in GVCs helps policymakers to define their ultimate upgrading goals by identifying the specific activities that their firms currently perform, as well as potential future opportunities for these firms (Gereffi & Fernandez-Stark, 2011).

Powerful lead firms determine how resources and knowledge are generated and distributed through the chain (Gereffi, 1994; Humphrey & Schmitz, 2002a). In the past, the large flow of information regarding production processes between these lead firms and suppliers helped to facilitate development of capabilities, and expertise of the latter were important drivers for upgrading in developing countries (Gereffi, 1999). This system is being transcended by the development and use of global standards by lead firms to shape their supplier behavior. These standards allow for the timely and efficient dissemination of large quantities of codified information regarding both the characteristics of the product and the manner in which it is produced to meet the quality requirements of developed-country markets. Through these measures, lead firms can ensure a consistent supply of products from diverse groups of global providers. As compliance is essential for sustained value chain participation, the widespread adoption of standards has required developing country industries to undergo both product and process upgrading. To meet these standards, producers must enhance their efficiency and systematically increase productivity (Altenburg & von Drachenfels, 2006). Adopting the necessary protocols often requires financial, informational and network resources that are beyond the scope of suppliers in emerging markets, and thus can serve as important barriers to GVC participation (Lee et al., 2010; Paus & Gallagher, 2008).

The GVC framework has been used to different degrees to understand the five industries studied. The electronics sector was one of the first industries to adopt a global production model to leverage Asian supply chains and has a larger body of literature.[1] Important GVC analysis in this area has been led by Sturgeon (DTI, APMP, et al., 2014; Sturgeon, 2003; Sturgeon & Kawakami, 2011). Sturgeon has also contributed to a broad literature on automotive value chains at both the regional and global level, placing the industry's evolution into the context of the GVC methodology (Sturgeon & Florida, 2000; Sturgeon & Van Biesebroeck, 2011; Sturgeon et al., 2008). In the aerospace sector, seminal GVC works have been carried out by Niosi & Zhegu (2010; 2005), with more recent work by Bamber & Gereffi (2013). The chemicals and paper industries, on the other hand, have been analyzed very little using the GVC framework.

[1] Due to increasing overlap between the electronic and the electrical equipment industries, both at the firm and trade-statistics level, these two industries were analyzed together. Unlike electronics, there is not a previous body of GVC literature on the electrical segment.

3. Methodology

This research draws on multiple sources of information: an extensive review of the academic and business literature available for these five global value chains; in-country interviews with representatives from the private sector, government and regulatory bodies and academic institutions; national industry roadmaps prepared by leading industry associations; aggregated international and national trade data from the Philippines as reported in the United Nations Statistics Division database, UN Comtrade. In the case of the paper industry, extensive use was made of the FAOStat database on production and exports. Three firm-specific datasets provided by the Philippines Statistics Authority (PSA), the Philippines Export Zone Authority (PEZA) and the Department of Trade and Industry-Board of Investments (DTI-BOI) were also used. The first dataset provided firm-specific import and export data from 2007–2014; the second draws on company registration for PEZA-status under the country's export processing zone regime for relevant years from 1974–2015 (September) and finally, the third dataset covered DTI-BOI-approved investments from 1974-2015. The PSA database included 10-digit Philippine Standard Commodity Classification (PSCC) codes, trade value, and destination/origin by company. In order to provide anonymity, a dummy code was used in place of the firm name. This dataset was used to explore the activities being performed by different firms in each GVC, concentration of exports in various sectors, backward linkages, primary end markets and type of products exported at a more detailed level than is provided with six-digit data available in UN Comtrade. Additional data, particularly concerning number of firms and total employment in 2010 for the sectors as a whole, was derived from the Philippines Annual Yearbook (2013) published by PSA. The Trade in Value Added database, hosted by the Organisation for Economic Cooperation and Development (OECD) was also used, however, findings were not incorporated into the reports as the level of aggregation in the statistics, combined with the Philippine comparatively low levels of trade, led to misleading cross-country analysis in these industries.

Firms participating in GVCs were identified based on the analysis of the DTI-BOI and PEZA investment lists, individual industry roadmaps, review of press releases for new foreign direct investment in the country, lead firms identifying their local suppliers and competitors, and a review of earlier studies in select industries. 69 individuals were interviewed at twenty-nine firms (the majority of the interviewees were in senior management positions), six industry associations and eight public and educational institutions.[2] Companies interviewed were identified by Duke CGGC and interviews were requested and coordinated by the Department of Trade and Industry, with assistance from USAID, through both the Science, Technology, Research and Innovation for Development (STRIDE) and Advancing Philippine Competitiveness (COMPETE) programs.

[2] A list of the interviews conducted for this project is included in the Appendix.

4. Philippine Economic Development: Foundations for GVC Participation

The Philippines is among the fastest-growing economies in the world with an average annual GDP growth of 5.4% in the last ten years (IHS Connect, 2016). The country is following a steady path to growth after decades of economic stagnation driven by a growing population, trade, investment and a large and active diaspora. One of the key agenda of recent governments has been inclusive economic growth through creating more jobs and consequentially reducing poverty (NEDA, 2011). The economic boom started in the early 2000s; in just 12 years, the country tripled its GDP per capita from close to US$900 in 2001 to US$2,800 in 2013 (World Economic Forum, 2016b). With 100 million people, the country is categorized as a 'lower middle income' with a large population living abroad (The World Bank, 2016b). Progress has been made in public health, access to financing, government stability, and developing an ethical and educated labor force (World Economic Forum, 2016b). Political stability, a sound macroeconomic environment and a robust education system have facilitated this boom. By 2015, the Global Competitiveness Report by the World Economic Forum ranked the country 47th out of 140 economies, having risen 24 places since 2006 (World Economic Forum, 2006, 2016b). While, certain weaknesses continue to erode competitiveness and hamper its participation in GVCs including poor infrastructure, corruption and a lack of innovation, important efforts are already underway to address many of these challenges. Nonetheless, many of these are long-term initiatives and thus will take some time to enhance the country's participation in GVCs.

This section provides a brief overview of the country's current participation in GVCs at an aggregate level followed by insights into key elements of the country's economic, social and institutional environment that enhance or inhibit upgrading of this participation in an effort to provide the reader with the broader context for individual industry studies.

4.1. Trade

The Philippines is a relative newcomer to GVCs compared to other countries in the ASEAN region. Over the past few decades, the economy of the Philippines has evolved from an agriculturally based one to one dependent on services, with manufacturing—until recently—playing a more marginalized role. This is reflected in the country's export basket and its participation in GVCs. In 2014, total exports reached US$87 billion; of this, services exports accounted for approximately 28.5%, having grown four times since 2005 to reach US$25 billion (UNCTAD, 2016). Comparatively, goods exports have grown by less than 100%, from US$37 billion to US$62 billion during the same period. Today, services represent as much as half of goods exports. Manufacturing exports have been dominated by the electronics and electrical equipment industry (HS 84 & 85). With a combined export value of US$32 billion in 2014, these two categories accounted for 52% of the Philippines' product exports.[3] Given its importance, the sector was selected for GVC analysis in this study. Other leading manufacturing exports include precision equipment, vehicles, ships and apparel.

[3] Where electronics and electrical (E&E) components exports overlapped with the automotive and aerospace industries, these were excluded from the E&E report to avoid double-counting.

Table 1. Philippine Top 15 Exports by HS Code: 2007, 2010, 2012 and 2014

HS Code	Description	Value ($, Billion)				Share of Total Exports (%)				CAGR
		2007	2010	2012	2014	2007	2010	2012	2014	2007-14
Total		**50.5**	**51.5**	**52.0**	**61.8**					**2.9%**
85	Electrical machinery and equipment and parts thereof	22.2	14.2	20.5	23.1	43.9	27.6	39.4	37.4	0.6%
84	Machinery and mechanical appliances; parts thereof	10.8	6.2	7.4	8.9	21.4	12.1	14.1	14.4	-2.7%
44	Wood and articles of wood; wood charcoal	0.8	1.1	2.2	3.1	1.6	2.1	4.3	5.0	21.0%
26	Ores, slag and ash	0.9	0.8	1.1	2.9	1.7	1.5	2.2	4.6	18.6%
90	Optical, photographic, measuring, precision, medical, etc. equipment	1.2	0.5	2.1	2.3	2.3	1.0	4.0	3.7	10.3%
27	Mineral fuels, mineral oils and products of their distillation	1.4	1.1	1.3	1.8	2.8	2.1	2.4	3.0	3.8%
08	Edible fruit and nuts; peel of citrus fruit or melons	0.7	0.6	1.0	1.7	1.3	1.1	2.0	2.7	14.2%
87	Vehicles other than railway or tramway rolling stock	1.8	1.9	1.9	1.7	3.6	3.6	3.7	2.7	-1.2%
89	Ships, boats and floating structures	0.0	0.4	1.1	1.6	0.1	0.8	2.1	2.5	72.8%
15	Animal/vegetable fats and oils	0.7	1.3	1.1	1.5	1.5	2.5	2.2	2.4	10.4%
61	Apparel and accessories, knitted or crocheted	1.1	0.6	0.8	1.0	2.1	1.2	1.6	1.7	-0.6%
29	Organic chemicals	0.1	0.4	0.5	0.9	0.3	0.7	0.9	1.4	31.0%
62	Apparel and accessories, woven	1.2	0.5	0.7	0.8	2.4	0.9	1.4	1.3	-6.1%
73	Articles of iron or steel	0.3	0.3	0.5	0.7	0.5	0.5	0.9	1.1	14.9%
74	Copper and articles thereof	1.5	1.0	0.8	0.7	2.9	2.0	1.6	1.1	-10.7%
Top 15 (in 2014)		**44.6**	**30.7**	**43.1**	**52.6**	**88.4**	**59.5**	**82.9**	**85.1**	**2.4%**

Source: UN Comtrade; based on two-digit HS chapter, HS02; retrieved 10/12/15; represents Philippine exports to the world. Shading indicates CAGR is greater than the Philippines economy-wide average for the given time frame.

The Philippines trades mostly with regional partners, including Japan, China/Hong Kong and Singapore (UNComtrade, 2015; UNCTAD, 2016b). This is partly a result of strong **regional trade agreements**. The Philippines maintains close economic links with its Southeast Asian neighbors; membership in the Association of Southeast Asian Nations (ASEAN) has encouraged open trade links and given the Philippines a greater degree of political influence on the regional stage (IHS Connect, 2016). The ASEAN Free Trade Agreement (AFTA) was signed in 1993, and expanded in late 1990s (ASEAN, 2016a). This agreement brought together ten countries with diverse populations and varying levels of economic development, as shown in Table 2. The agreement covers the reduction of tariffs as well as the elimination of non-tariff barriers, harmonization of customs nomenclature, valuation, and procedures and development of common product certification standards. ASEAN took a step closer to becoming a fully integrated economic union with the ASEAN Economic Community (AEC), which came into effect at the end of December 2015.

Table 2. Key Indicators ASEAN Member Countries, 2014

Country	GDP per capita (current, PPP)	Population	Merchandise Exports (US$ billion)	Key Products Exported
Singapore	82,763	5,469,700	410	Electronics and electrical products, refined petroleum, chemicals and plastics
Brunei Darussalam	71,184	417,394	11	Petroleum and liquefied natural gas
Malaysia	25,638	29,901,997	234	Electronics, petroleum and palm oil
Thailand	15,735	67,725,979	228	Electronics and electrical products, plastics, auto and auto parts
Indonesia	10,517	254,454,778	176	Minerals, Palm oil, machinery/electrical
Philippines	**6,969**	**99,138,690**	**62**	**Electronics and electrical products, minerals and vegetable products**
Vietnam	5,629	90,730,000	150	Electronics and electrical products, apparel and footwear
Laos	5,320	6,689,300	4	Wood and Minerals
Cambodia	3,262	15,328,136	11	Textiles, apparel, footwear
Myanmar	1,324	53,260,000	12	Petroleum gas, dried legumes, rough wood and precious stones

Source: CID (2016); World Bank (2016a); exports: UN Comtrade (based on total HS02) except Myanmar & Laos.

The ASEAN Economic Community (AEC) agreement will facilitate trade among member countries in both goods and services sectors through a variety of measures designed to increase regulatory consistency and customs communication among the 10 member nations—tariffs have been nearly eliminated, restrictions in the trade of services have been reduced, barriers to labor mobility have been curtailed (although not completely removed), and obstacles to capital mobility have been restricted. This agreement has facilitated the creation of a common market of over 600 million people, close to the size of the European Union (EU-28). Over the next decade, policymakers have set goals of fully implementing the ASEAN Single Window,[4] the ASEAN-wide Self-Certification,[5] and the ASEAN Trade Repository.[6]

The size of the ASEAN market has provided Southeast Asian countries with greater leverage in the global trade arena. ASEAN has signed commercial agreements with several partners, facilitating market access across all major markets in Asia: (1) ASEAN-China Free Trade Agreement (ACFTA) was signed in 2002 creating the largest free trade area globally in terms of population and third largest in terms of nominal GDP; (2) ASEAN-India Free Trade Agreement (AIFTA) in 2003. This is a framework agreement that eventually will lead to a Regional Trade and Investment Area (RTIA), which includes FTA in goods, services, and investment; (3) ASEAN-Korea Free Trade Agreement (AKFTA) signed in 2005; (4) ASEAN-Japan Comprehensive Economic Partnership Agreement (AJCEPA). This partnership signed in 2008

[4] The ASEAN Single Window will standardize customs duties and declarations, government permits, commercial documents, flight handling information, and other regulatory measures between participating countries.
[5] ASEAN Self-Certification would allow certified exporters to declare all goods comply with rules of origin instead of national governments.
[6] National trade repositories among ASEAN countries currently provides information about general import tariffs, preferential tariffs, rules of origin, non-tariff measures, national trade and customs laws and regulations, and lists of authorized traders. The ASEAN effort would link the individual repositories across the region.

provides the basis for the establishment of a future FTA; and finally, (5) Australia-New Zealand Free Trade Agreement (AANZFTA) in 2009 (ASEAN, 2016b; DTI, 2016c).

Membership of ASEAN has been important for the Philippines to gain access to new end markets. Independent of the group, the Philippines has not signed any bilateral trade agreements with major markets. Negotiations are underway with both the US and EU, however, they are not yet near completion. Negotiations with the US, which started in 1989, are still under consultation (ARIC, 2016), while negotiations for a EU-Philippines FTA began in 2015 (European Council, 2016). Nonetheless, the Philippines has been a long-standing beneficiary of the Generalized System of Preferences (GSP) programs of both markets. These provide preferential tariff-free access to the US (US Department of State, 2015), and through the EU GSP+ program to which the Philippines was admitted in 2014,[7] tariff free entry of some 6,274 products with local content over 40% (European Commission, 2015). It is the only GSP+ beneficiary country in ASEAN. Overall, these agreements have not resulted in increased exports for the Philippines. EU exports have remained approximately the same between 2003 and 2014 (UNComtrade, 2015), while exports to the US have declined by 8% since 2003 (United States Trade Representative, 2016).

4.2. Investment

The country has been the recipient of considerable foreign direct investment in the recent years, ramping up investment by approximately five times since 2010, driven to a large degree by manufacturing and services investments, indicating that government efforts to attract manufacturing operations are paying off to some degree. In 2014, FDI amounted to US$6.2 billion, accounting about 2.5% of the country's GDP (UNCTAD, 2016b; World Bank, 2016b). The number of foreign investors increased by an impressive 89% from 2011 to 2014. Japanese and US firms are the main investors in a range of sectors including: automotive components, chemicals, consumer products, energy, industrial machinery, healthcare and business services, and real estate.[8] In 2015, manufacturing and energy sectors attracted the highest investment values, accounting for 55% and 19% respectively (PSA, 2016a). Business services attracted the largest number of projects (DTI-BOI, 2014b).

DTI-BOI is the key agency responsible for overall investment promotion in the country. One of the key goals of DTI-BOI is to attract FDI to support the country's economic growth agenda in sustainable and inclusive growth. Efforts to improve the investment environment have been rewarded; major credit rating agencies have classified the country as 'investment grade' since 2013, qualifying the country as 'stable' for investors. Standard & Poor's has raised the long-term sovereign rating positioning twice to BBB, higher than India, Italy and South Africa. In addition, according to UNCTAD, the Philippines is among the top 20 host economies for FDI during 2013-2015 (Trading Economics, 2016; UNCTAD, 2013).[9]

[7] Some electronics products are excluded from GSP benefits as 'import-sensitive' products.
[8] By value, however, cumulative investment between 2012 and 2014, was highest from financial centers (e.g. British Virgin Islands and the Cayman Islands), followed by the Netherlands thanks to a major expansion from Unilever, accounting for 26% of FDI in 2014 (DTI-BOI, 2014b).
[9] This is based on 159 MNCs survey responses.

Incentives for Investors

An important share of foreign and domestic investment oriented to GVC participation in the manufacturing sector takes place in the export processing zones (EPZs) throughout the country. The Philippine Economic Zone Authority (PEZA), attached to Department of Trade and Industry, is the government agency that promotes investments, extends assistance, registers, grants incentives, and facilitates the business operations of investors in export-oriented manufacturing and service facilities inside EPZs. It also oversees and administers incentives to EPZ developers and/or operators (PEZA, 2016a). Two additional investment promotion agencies manage a small number of zones—the Bases Conversion and Development Authority—in charge of converting the former US military bases,[10] and the Subic Bay Metropolitan Authority (SBMA).

PEZA EPZs have played a key role in supporting the Philippines GVC participation to date. Between 2001 and 2009, PEZA exports grew by US$10 billion to reach US$28.9 billion, (Manasan, 2013). By 2015, the zones accounted for 85% of the country's total exports and 84% of FDI (Field Research, 2016). The number of direct workers in PEZA zones increased by 10 percent annually on average between 2001–2015 from 289,548 to 1.2 million people (56% in manufacturing) (Field Research, 2016; Manasan, 2013).

Key benefits of operating in EPZs include income tax holidays, tax and duty free imports, reduced bureaucracy such as simplified import and export procedures, and access to special non-immigrant visas for employees. The income tax holiday exempts companies from paying the standard 30% income tax. Once the tax holiday ends, PEZA firms pay a single 5% tax in lieu of any and all other taxes. Philippine EPZs are open to both foreign and domestic investors, either to serve as indirect exporters (selling/servicing firms in the EPZs) or as direct exporters, provided exports account for at least 70% of their output (Field Research, 2016). Domestically owned firms have a lower threshold, and exports must account for just half of their output to qualify for PEZA status.

In addition, the Philippine government offers incentives through DTI-BOI for firms seeking to leverage the domestic market demand to drive economies of scale and scope. These investments are unrestricted in terms of sales to the export or domestic market. These investments must fall under one of the prioritized sectors in the Investment Priority Plan (IPP) developed every three years by DTI-BOI.[11] The prioritized manufacturing sub-sectors in 2014-2016 relevant to this study include automotive parts and components, hybrid and electric vehicles, aerospace parts and components, oleo- and petrochemicals and chlor-alkali operations, copper wire and virgin pulp production (DTI-BOI, 2015a). These sectors were chosen for their job creation and upgrading potential, as well as to diversify the country's industrial base. Both domestic and export oriented investment incentives are detailed in Table 3.

[10] The two bases were closed in 1992 and 1993.

[11] Firms may be eligible to apply for "pioneer" status, extending the potential tax holiday from six to eight years in domestic market operations and from four to six years in export-oriented operations, if they are using innovative technologies in the Philippines, or manufacturing innovative products – particularly in the area of alternative fuels or where they leverage large amounts of domestically produced raw materials.

Table 3. Investment Incentives for Manufacturing Firms in the Philippines

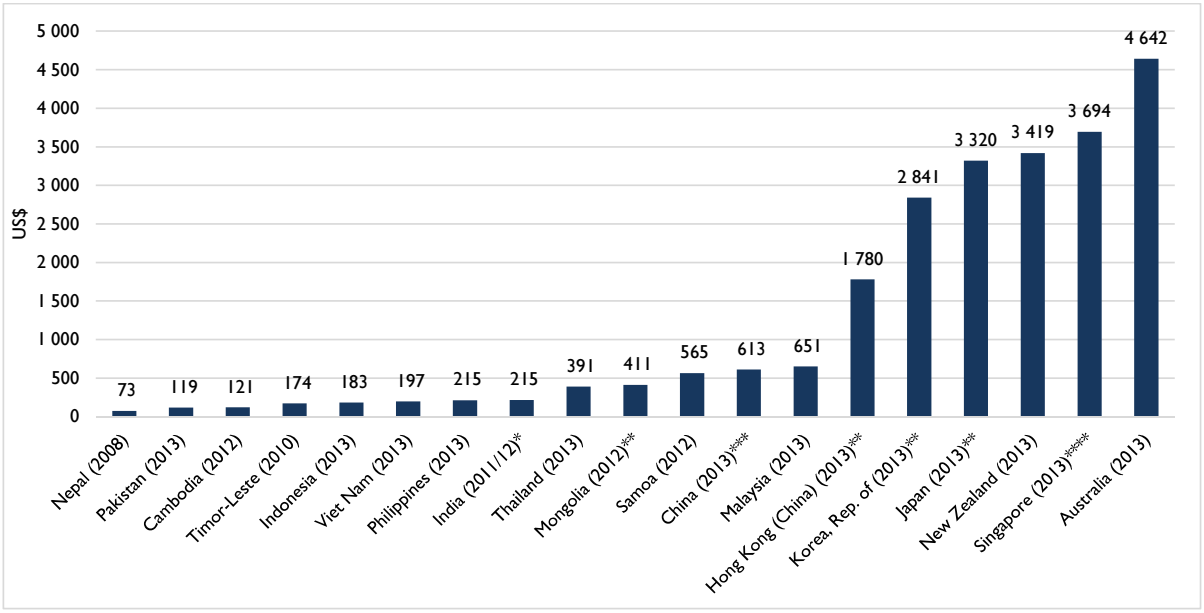
Investment/ Incentive Requirement	Details	Time Frame	Unrestricted Investments (BOI)	Export Market-Oriented Investments (PEZA)
Corporate Income Tax Rate Exemptions (standard 30%)	• Pioneer project	6-8 years	Up to 8 years	Up to 6 years
	• Non-pioneer project	4-6 years	Up to 6 years	Up to 4 years
	• Income Tax holiday (ITH) extension, depends on: • Net forex earnings of US$500 million • Capital equipment: labor <US$10,000 : 1 • Local raw materials > 50% of total raw materials	Up to 3 years (1 per criteria)	✓	✓
	• Special 5% tax (gross income) in lieu of other national and local taxes	Post –ITH period	No	✓
Tax Credit	• Equivalent of 25% of duties for import substitution of raw materials used in producing non-traditional exports • Equivalent of 100% of taxes and duties on domestic capital equipment	No limit	• Raw materials tax credit • Reduced rates on capital equipment	✓
Import Duties: Raw Materials, Components, Capital Goods	• Duty-free imports		Spare parts only (reduced rates on others)	✓
Export and Excise Tax	• Exempt		10 year exemption	✓
Right to Remittances/ Repatriation Tax	• Yes		✓	✓
Sales Tax/ Consumption Tax	•		No	Exempt
Minimum Exports	• Minimum export requirement; (actual and intended)		None	70% (Foreign firms) 50% (Domestic firms)
Ownership	• Foreign ownership permitted • Repatriation of profits		40% Limited	100% Yes
Other Requirements/ Benefits	• Employment of foreign nationals • Additional deductions for training expensive and labor expenses; • Simplified import-export procedures (Electronic Import Permit System and Automated Export Documentation System)			100% foreign employment permitted in first year; after that 5%.
Strategic Sub-Sector	Identification of specific sub-sectors eligible to apply for incentives		Aerospace, Automotive, Chemicals, Shipbuilding, Virgin Pulp, Iron and Steel and Tool & Die	

Sources: DTI-BOI (2014a); Field Research (2016); Manasan (2013); PEZA (2015, 2016b)

4.3. Human Capital

The Philippine labor force is considered by firms to be one of the country's most important assets. In 2015, the size of the labor force was 39 million, with an unemployment rate that has been declining from over 10% in the last decade to 6.4% in 2015. Employment share is lowest in industry at just 17% compared to 54% in services and 29% in agriculture (PSA, 2015). Of this, manufacturing employment accounted for approximately 10% in 2014. The labor force is concentrated in Luzon, which accounts for 49% (Bureau of Labor and Employment Statistics, 2014). Luzon has two major urban areas, Metro Manila with almost 12 million people and Calabarzon with 12.6 million inhabitants (PSA, 2012). Wages are generally competitive with other countries in the region; although recent growth in the manufacturing sector has contributed to rising costs, some estimates suggest that the increase may be below that key competitors in the region (DTI-BOI, 2015b).

Figure 1. Average Monthly Wages, Asia-Pacific, 2013 (US$)



Source: ILO (2014)

Note: *Average daily wage of salary earnings of regular wage and salaried employees aged 15-59 years, multiplied by 313..52. The exchange rate is from the Statistical Yearbook, India 2014. ** Based on an establishment survey with broad coverage; Hong Kong, and Japan refer to full-time employees. ***Based on establishment surveys; calculated as employment-weighted average of urban units and private enterprises.**** Based on administrative records from Central Provident Fund Board.

English speaking workers with strong soft skills are considered a plus in every industry analyzed. Foreign investors tend to highlight that Filipinos are committed to work, responsible and loyal (Field Research, 2016). This sentiment is reflected in the low attrition rates.[12] One of the main labor issues in the country, however, is brain drain and the loss of talented and qualified employees to other countries. There are an estimated 10 million Filipino workers based overseas. Foreign-exchange remittances amount to around 10% of the country's GDP (IHS

[12] Of the five industries studied, only the chemical sector indicated high attrition rates.

Connect, 2016; UNCTAD, 2016b). Many of the Filipino professionals who migrate are highly skilled professionals, including doctors and nurses, engineers, and information technology specialists (IHS Connect, 2016). The Philippines Oveseas Employment Administration alone had placed some 1.8 million Filipinos abroad by 2013 (Philippine Overseas Employment Administration, 2014). This included an annual average of approximately 7,300 engineers (the equivalent of 15% of the graduating class of 2013) and 10,250 engineering technicians between 2008 and 2010 (TESDA, 2014).

Education

The literacy rate has improved dramatically; from 92.3% in 2000 to 97.5% in 2010 (PSA, 2016b). The country has continued to invest heavily in education with a vision of inclusive growth in the Philippine Development Plan 2011-2016 (NEDA, 2011). Several laws have been passed to secure these goals in recent years. For example, in 2013, kindergarten was made compulsory (UNESCO, 2015), while the entire primary and secondary education system was restructured in 2012 to align it with other countries in the AEC and to ensure responsiveness to changing demands for labor in the global economy.

The education system is now divided as follows: *primary* (6 years); *secondary* (6 years; the last two are divided in upper secondary and upper technical); and *tertiary* (Goverment of the Philippines, 2016). Due to changes in the number of years in secondary school, there will be a two-year period, beginning in 2017 with very few new high school graduates to enter into the labor force. This will be reflected at the university level four to five years later. This may have strong short-term impact in economic sectors that hire high school graduates. Some other changes include the creation of the Philippine Qualifications Framework (PQF) in 2012; the PQF recognizes the development of skills and knowledge acquired through different ways and methods and not only formal education. This also allows for continued entry and exit of the education system, facilitating ongoing skills upgrading, essential for GVC participation and upgrading in the long term (Gereffi et al., 2011). Furthermore, it is designed to support mobility through comparability and mutual recognition of skills across countries (UNESCO, 2015). This is important as the Philippines strengthens its ties with the AEC which allows for the free movement of labor.

At the tertiary level from which the manufacturing sector tends to draw its labor force, there are 3 million students enrolled at approximately 2,300 institutions in the Philippines; just less than 30% are state universities and colleges (SUCs) while around 70% are private. Graduation rates at 17.2% (CHED, 2016) could be improved. Leading universities include University of the Philippines—with campuses throughout the archipelago, Ateneo de Manila University, De la Salle University and University of Santo Tomas (Top Universities, 2016). The manufacturing sector draws primarily on the country's engineering graduates which account for approximately 11% of the country's graduates. Enrollment in engineering and technology courses has increased by 55% between 2005/6 (298,964) and 2014/15 (463,221). The number of graduates from these courses also increased during that period, from 48,466 to 65,660 (35%). However, desertion remains an important problem, as with the rest of the tertiary sector; just 18% of students enrolling in engineering and technology courses in 2010/11 graduated in 2014/15.[13] These

[13] In the US, the overall graduation rate in 2013 was 59% (IES, 2016). However, the rate drops in science, technology, engineering, or mathematics (STEM) related discipline. The graduation rate for Latino, Black and

programs are typically five years in length and require either a thesis or on-the-job training to graduate (CHED, 2016). Graduate level training is available although at a smaller scale than undergraduate programming and few courses correspond to the manufacturing sector; 28% of higher education institutions offer master's programs[14] and 14% offer doctoral programs. The most popular programs include education, public administration, nursing, business administration, and philosophy (Ofreneo, 2014).

Table 4. University Graduates in the Philippines by Popular Disciplines, 2005-2014

Discipline	2005-06	2007-08	2009-10	2011-12	2013-14
Business Administration and Related	95,004	94,034	117,399	141,327	169,846
Education and Teacher Training	67,297	63,188	56,419	69,738	98,277
Information Technology	37,440	38,237	49,786	66,672	72,976
Engineering and Technology	48,466	47,725	49,373	56,690	63,539
Medical and Allied	88,134	121,702	116,380	80,800	50,513
Others	84,537	81,054	91,974	107,343	130,137
TOTAL	**420,878**	**445,940**	**481,331**	**522,570**	**585,288**

Source: CHED (2016a)
Note: Figures include pre-baccalaureate to doctoral programs.

4.4. Other Competitiveness Factors

Participation and upgrading in manufacturing GVCs also requires an enabling environment that is conducive to trade and investment. In particular, transportation and energy infrastructure are critical factors for GVC engagement in production. Upgrading into more sophisticated segments of value chains—focused on knowledge intensive operations requires a rigorous protection of intellectual property and ideas. A conducive business environment helps reduce the overall cost of participation and enables countries to be more competitive. The Philippines has made efforts to improve these areas, however, they remain constraining factors for GVC growth.

Infrastructure and related services is a key determinant of competitiveness in GVCs, affecting principally transportation/logistics and energy (Bamber et al., 2013; Kowalski, 2014; Taglioni & Winkler, 2016). This is heightened in archipelago countries such as the Philippines where domestic shipping must play an important role (Taglioni & Winkler, 2016). As seen in Table 5, the Philippines ranks very poorly in the majority of the infrastructure indicators compared to neighboring countries. This is a serious challenge for investors seeking to establish production facilities in the country (IHS Connect, 2016), particularly as alternative destinations in the region seek to increased connectivity further (UNCTAD, 2016a). It is estimated that the economic cost of congestion in Metro Manila alone is about US$27 billion per year (JICA, 2014; KPMG, 2015).

Native American is close to 15%, while the White and Asian American students who completed their degree is 24.5% and 32.4% respectively (Hurtado et al., 2010).

[14] Around 92,000 enrolled in master's programs in the year 2011-12 and approximately 13% graduated. In the case of doctoral programs, the estimated enrollment in 2011-12 is 11,400 and graduation rate is about 10%.

Table 5. General Infrastructure Rankings in ASEAN

Categories (Ranks out of 140)	Philippines	China	Indonesia	Malaysia	Thailand	Vietnam
Infrastructure (2nd Pillar Rank)	90	39	62	24	44	76
Overall (transport, comm., energy)	106	51	81	16	71	99
Roads	97	42	80	15	51	93
Railroads	84	16	43	13	78	48
Ports	103	50	82	16	52	76
Air Transport	98	51	66	21	38	75
Availability of Airline Seats	27	2	15	22	14	30
Electricity Supply	89	53	86	36	56	87
Mobile Phone Subscriptions	76	107	49	24	31	28
Fixed Telephone Lines	108	63	80	73	88	100

Source: World Economic Forum (2016a); includes all nine areas related to infrastructure (index numbers 2.01-2.09)

Infrastructure for the manufacturing sector, like human capital, is concentrated in the northern part of the archipelago. There are three main international ports in the Philippines—Manila, Subic and Batangas.[15] These are all located in Luzon and contribute to geographic clustering of the manufacturing sector on the northern island. As the most central port, Manila is often congested; Subic and Batangas, on the other hand, generally operate under capacity, with fewer shipping lines docking in these ports. Port congestion as a result of a 2014 trucking ban during peak hours in Manila—estimated to have cost the Philippines' economy over US$1 billion by disrupting trade—forced many companies to use the alternative ports (Patalinghug et al., 2015). This shift in practice opened up the potential to redirect trade and increase logistics efficiency.

In response to infrastructure constraints, the government has increased infrastructure spending from around US$4.4 billion in 2011 to more than US$8.5 billion in 2014 with a number of new public and private partnerships projects (World Economic Forum, 2014). The government has developed a "Dream Plan" for Metro Manila with a total investment of US$65 billion in infrastructure to be completed by 2030. The major infrastructure spending is focusing on railways, roads, airports and seaports.

Energy deficiencies remain a limiting factor for growth in the manufacturing sector in the near term, as the sector depends heavily on power inputs. Electricity prices are amongst the highest in Asia (Enerdata, 2014). In the recent past, tight and, at times, unreliable supply has required many new investors to build their own power plants or invest in back-up generators, increasing the cost of operating in the country and eroding the advantages of cheaper labor (Field Research, 2016). This is partly due to a lack of investment in new technologies, including enhancements in the grid network (EIU, 2015; Enerdata, 2014; Field Research, 2016). Total installed capacity in 2014 reached 17,944 MW (DOE, 2015). Committed investments, however, to date for 2015-2019 would ramp up an additional 5,200 MW (DTI, SPIK, et al., 2014), increasing capacity by almost 30%. The government estimates that it needs to add around 1,000 MW of new capacity every year to avert a repeat of the energy crisis in 2013 (Enerdata, 2014). Electricity demand in the Philippines is projected to grow at 5.7% per year on average between 2015 and 2020 and 4.6% annually over the next 20 years (EIU, 2015; IEA, 2013).

[15] There are other ports throughout the country, including several large ports in Mindanao, however, these are generally smaller in scale and less easily accessible than those in the North.

The Philippines has made impressive gains in improving its **Intellectual Property (IP) protection framework** in recent years. These include a new legal code which came into effect in 1998 covering copyrights, and enforcement; the creation of an inter-agency taskforce for enforcing these rules, the National Committee on Intellectual Property Rights, in 2008; and the formation of an Intellectual Property Office in 2013. These efforts were recognized in 2014 by the US removal of the Philippines from the Special 301 Watchlist after 22 years (United States Trade Representative, 2014). In 2015, it was ranked 71st out of 140 countries by the World Economic Forum's Global Competitiveness Ranking for IP protection, up some 29 places since 2011 (World Economic Forum, 2016b). However, the country still needs to overcome its poor reputation in this area before foreign companies will be willing to locate sensitive technologies and product operations within its borders. In addition, local tax regimes are not conducive to promoting R&D relationships between firms and universities as income from these are highly taxed (USAID, 2014).

The Philippines has also made progress in improving its **general business environment**, however, problems remain particularly with respect to high levels of bureaucracy and corruption. The country is ranked 95th out of 167 in Transparency International's Corruption Perception Index (Transparency International, 2015). In the 2016, the World Bank Doing Business report ranked the country 103 out of 189 economies, up from 144 in 2010 (The World Bank, 2016a). Nonetheless, this is below the regional average, as well as below Vietnam, Thailand and Malaysia. Some of the major problems highlighted are difficulties starting a business, enforcement of contracts, high levels corruption, poor infrastructure, tax regulations and government bureaucracy (Field Research, 2016; The World Bank, 2016a).

4.5. Key Stakeholders Driving Participation in Global Economy

Concentrated policy efforts have been underway to help the Philippines integrate into the GVCs through its manufacturing sector over the past five years. In 2012, the Department of Trade and Industry-Board of Investments (DTI-BOI) launched an ambitious Industrial Development Program, the first stage of which was the Industry Roadmap Initiative, together with the Chamber of Commerce, in an effort to identify industrial policy needs for a wide range of different industries in the Philippines economy. By 2015, industry roadmaps had been completed for 32 sectors, and 22 more industries had indicated interest in participating in the project. Manufacturing is a key element of this program: the DTI-BOI formulated the Manufacturing Resurgence Program to revitalize the manufacturing sector. It aims to create more stable and decent jobs consistent with the goals of inclusive growth. Specifically, its goal is to increase manufacturing's contribution to the economy to 30% of total value added (up from 22.8%) and to generate 15% of the country's total employment by 2025 compared to the current 10% (DTI, 2016b).

A key outcome of the project has been to cultivate stronger private sector industry associations as well as strengthen public-private coordination. In general, the private sector has assumed a proactive stance vis-à-vis industry development, and the new coordination mechanisms have opened up channels of communication between industry players and the government. In addition, efforts are underway to improve inter-departmental coordination to ensure that policies can be effectively implemented with an inter-agency council. The Industrial Development Council is led by the Secretary of the DTI which is tasked with bringing together

working groups – including one on chemicals at the government level (DTI, 2016a; DTI, SPIK, et al., 2014; Field Research, 2016).

Table 6. Key Stakeholders in Driving Participation in the Global Economy

English Name	Role in Manufacturing GVCs
Department of Trade and Industry (DTI)	Tasked with coordinating with the private sector to grow the manufacturing sector in the country; launched the Roadmaps Initiative in 2012.
DTI: Board of Investments (DTI-BOI)	The Board of Investments, reviews and approves applications for investment incentives for the industry. Coordinating agency of technical working groups to overcome industry-binding constraints.
Industrial Development Council	Initially established in 1996, the IDC was re-convened in April and October 2014. The council is responsible for inter-departmental coordination for industry growth
Philippine Economic Zone Authority (PEZA)	PEZA serves a dual role, managing both the granting of EPZ incentives across the country, as well as directly engaging in the promotion of FDI in the country. The organization provides a one-stop-shop for all issues regarding investments and exports. PEZA's leadership under Dr. Lilia De Lima has provided important continuity to the investment regime in the country.
Commission on Higher Education (CHED)	CHED is responsible for overseeing higher education in the country. Responsibilities include formulation of policy and programming such as foreign scholarships and training and accreditation of tertiary educational institutions.
Technical Education and Skills Development (TESDA)	TESDA is responsible for technical and vocational training, both offering courses and overseeing other technical institutions in the country.
Philippine Chamber of Commerce and Industry (PCCI)	The Chamber has led the private sector response to the manufacturing roadmap initiatives.

Source: Authors.

5. Organization of the Overall Report

The remainder of the report includes one report per industry. Each of the five chapters begins with a global perspective of the corresponding GVC and ends with industry-specific upgrading trajectories and recommendations. The global perspective provides a comprehensive overview of the entire industry, including: key sources of demand and supply; stages in which different countries operate; the governance structure of the chain; and the human capital required for each segment. This allows policy makers to understand the geographical distribution of the value chain, identify both potential competitors and buyers, and appreciate how power is exerted through the chain. These characteristics of the chain are important for both FDI recruitment strategies as well as agencies focused on promoting local firm participation in value chains. In particular, knowing the standards that govern entry into the chain is an essential step, and policy makers can support local firms by helping to ensure the presence of certifying firms within the country and providing grants or loans for these firms to achieve certification. As part of this analysis throughout the reports comparisons are made to other competing countries or countries in similar positions to the Philippines as well as to regional peers in the ASEAN region including Malaysia, Thailand, Uruguay, and Vietnam.

Finally, each chapter closes with a discussion of Philippines position in the value chain, identifying upgrading trajectories that may be most suitable for the country to pursue based on its competitive advantages and recommending strategies for upgrading.

6. References

Altenburg, Tilman and Christian von Drachenfels. (2006). "The "New Minimalist Approach" to Private-Sector Development: A Critical Assessment." *Development Policy Review, 24*(4): 387-411.

ARIC. (2016). United States-Philippnes Free Trade Agreement. Retrieved March, 2016, from https://aric.adb.org/fta/united-states-philippines-free-trade-agreement. .

ASEAN. (2016a). ASEAN Free Trade Area. from http://www.asean.org/asean-economic-community/asean-free-trade-area-afta-council/.

---. (2016b). Free Trade Agreement with Dialogue Partners. Retrieved March, 2016, from http://www.asean.org/asean-economic-community/free-trade-agreements-with-dialogue-partners/.

Bamber, Penny, Karina Fernandez-Stark, Gary Gereffi, and Andrew Guinn. (2013). Connecting Local Producers in Developing Countries to Regional and Global Value Chains. Paris: Organisation for Economic Co-operation and Development.

Bamber, Penny and Gary Gereffi. (2013). Costa Rica in the Aerospace Global Value Chain: Opportunities for Upgrading Durham, N.C.: Duke CGGC.

Barrientos, Stephanie, Gary Gereffi and Arianna Rossi. (2011). "Economic and Social Upgrading in Global Production Networks: A New Paradigm for a Changing World." *International Labour Review, 150*(3-4): 319-340.

Bureau of Labor and Employment Statistics. (2014). Current Labor Statistics, October 2014. Manila: Bureau of Labor and Employment Statistics, Philippines.

CHED. (2016). Higher Education Indicators. Manila: Commission for Higher Education, Philippines.

CID. (2016). The Atlas of Economic Complexity. In H. U. Center for International Development (Ed.). Cambridge.

DOE. (2015). 2014 Philippines Power Statistics. Manila: Department of Energy. http://www.doe.gov.ph/doe_files/pdf/02_Energy_Statistics/power_statistics_2014.pdf.

DTI. (2016a). Industry Development Council. Retrieved March, 2016, from http://industry.gov.ph/industry-development-council/.

---. (2016b). Manufacturing Resurgence Program. Retrieved March, 2016, from http://industry.gov.ph/manufacturing-resurgence-program/.

---. (2016c). Trade Agreements. Retrieved March, 2016, from http://www.dti.gov.ph/dti/index.php/resources/trade-agreements.

DTI, APMP and BOI. (2014). Philippine Petrochemicals Roadmap. Manila: Philippine Department of Trade and Investment. October.

DTI, SPIK and BOI. (2014). Philippine Chemicals Industry Roadmap. Maniila: Philippine Department of Trade and Investment. October.

DTI-BOI. (2014a). 2014 Investment Priorities Plan (IPP). Manila, Philippines: Department of Trade and Industry, Board of Investment (DTI-BOI). pp. 98. http://industry.gov.ph/investment-priorities-plan-ipp-2014-2016/.

---. (2014b). Annual Report. Manila: Board of Investors, Department of Trade and Industry.

---. (2015a). Memorandum Circular No. 2015-01. Makati City: Department of Trade and Industry, Philippines.

---. (2015b). Philippines Asia's Rising Tiger. Manila DTI-BOI.

EIU. (2015). Power Sector Woes: The Economist Intelligence Unit. http://www.eiu.com/industry/article/1173164301/power-sector-woes/2015-05-14.

Enerdata. (2014). Philippines High Electricity Price is Keeping Foreign Investors Away. Retrieved 2016, March, from http://www.enerdata.net/enerdatauk/press-and-publication/energy-news-001/philippines-high-electricity-price-keeping-foreign-investors-away_26287.html. .

European Commission. (2015). The EU's Generalized Scheme of Preferences. Brussels: European Commission http://trade.ec.europa.eu/doclib/docs/2015/august/tradoc_153732.pdf

European Council. (2016). EU-Philippines Free Trade Agreement: Negotiations to Start. Retrieved March 2016, from http://www.consilium.europa.eu/en/press/press-releases/2015/11/16-eu-philippines-trade-agreement/. .

Field Research. (2016). Philippines Field Research. Personal communication with P. Bamber & J. Daly.

Gereffi, Gary. (1994). The Organization of Buyer-Driven Global Commodity Chains: How US Retailers Shape Overseas Production Networks. In G. Gereffi & M. Korzeniewicz (Eds.), *Commodity Chains and Global Capitalism* (pp. 95-122): Praeger Publishers.

---. (1999). "International Trade and Industrial Upgrading in the Apparel Commodity Chain." *Journal of International Economics, 48*(1): 37-70.

---. (2005). Export-Oriented Growth and Industrial Upgrading: Lessons from the Mexican Apparel Case: Study commissioned by the World Bank, Jan. 31.

Gereffi, Gary and Karina Fernandez-Stark. (2011). Global Value Chain Analysis: A Primer. Durham, North Carolina, USA: Center on Globalization, Governance & Competitiveness (CGGC) Duke University. http://www.cggc.duke.edu/pdfs/2011-05-31_GVC_analysis_a_primer.pdf

Gereffi, Gary, Karina Fernandez-Stark and Phil Psilos. (2011). *Skills for Upgrading: Workforce Development and Global Value Chains in Developing Countries*. Durham: Duke University Center on Globalization Governance & Competitiveness.

Gereffi, Gary, John Humphrey and Timothy Sturgeon. (2005). "The Governance of Global Value Chains." *Review of International Political Economy*: 78-104.

Goverment of the Philippines. (2016). The K to 12 Basic Education Program. Retrieved March, 2016, from http://www.gov.ph/k-12/.

Humphrey, John and Hubert Schmitz. (2002a). "How Does Insertion in Global Value Chains Affect Upgrading in Industrial Clusters." *Regional Studies, 36*(9): 1017-1027.

---. (2002b). "How Does Insertion in Global Value Chains Affect Upgrading in Industrial Clusters?". *Regional Studies, 36*(9): 1017-1027.

Hurtado, Sylvia, Kevin Eagan and Mitch Chang. (2010). Degrees of Success: Bachelor's Degree Completion Rates among Inital STEM Majors. Los Angeles: Higher Education Research Institute, UCLA.

IEA. (2013). Southeast Asia Energy Outlook. Paris: International Energy Agency adn the Economic Research Institute for ASEAN. September.

IES. (2016). Fast Facts: Graduate Rates. Retrieved March 2016, from https://nces.ed.gov/fastfacts/display.asp?id=40.

IHS Connect. (2016). Country Reports: Country Outlook: Economic - Philippines.

ILO. (2014). Wages in Asia and the Pacific: Dynamic but Uneven Progress. Bangkok: ILO Regional Office for Asia and the Pacific.

JICA. (2014). Roadmap for Transport Infrastructure Development for Metro Manila and its Surronding Areas: JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) and NATIONAL ECONOMIC DEVELOPMENT AUTHORITY (NEDA). http://www.jica.go.jp/english/news/field/2014/140925_03.html.

Kaplinsky, Raphael. (2004). "Spreading the Gains from Globalization: What Can Be Learned from Value-Chain Analysis?". *Problems of Economic Transition, 47*(2): 74-115.

---. (2010). The Role of Standards in Global Value Chains. Washington D.C.: The World Bank. http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2010/08/04/000158349_20100804134640/Rendered/PDF/WPS5396.pdf.

Kowalski, Przemyslaw. (2014). Developing Country Participation in Global Value Chains - Implications for Trade and Trade-Related Policies. Paris: OECD. December.

KPMG. (2015). Infrastructure In-depth: Philippines. http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/Documents/infrastructure-in-depth-philippines.pdf.

Lee, Joonkoo, Gary Gereffi and Janet Beauvais. (2010). "Global Value Chains and Agrifoods Standards: Challenges and Possibilities for Smallholders in Developing Countries." *Proceedings of National Academy of Sciences*: PNAS Early Edition, Dec. 13.

Manasan, Rosario. (2013). Export Processing Zones, Special Economic Zones: Do We Really Need to Have More of Them? : Philippine Institute for Development Studies. http://dirp4.pids.gov.ph/webportal/CDN/PUBLICATIONS/pidspn1315.pdf.

NEDA. (2011). The Philippines Development Plan 2011-2016. Manila: National Economic Development Agency

Niosi, Jorge and Majlinda Zhegu. (2010). "Multinational Corporations, Value Chains and Knowledge Spillover in the Global Aircraft Industry." *International Journal of Institutions and Economies* 2(2): 109-141.

Niosi, Jorge and Majlinda Zhegu. (2005). "Aerospace Clusters: Local or Global Knowledge Spillovers?". *Industry and Innovation, 12*(1): 5-29.

Ofreneo, Mira Alexis. (2014). "A Profile of Graduate Education Programs i the Philippines." *Policy Notes: PIDS*(06).

Patalinghug, Epictetus, Gilberto Llanto, Alexis Fillone, Noriel Tiglao, Christine Salazar, Cherry Ann Mardirag, and Ma. Diyina Gem Arbo. (2015). "Port Congestion and Underutilization in the Greater Capital Region: Upacking the Issues." *Policy Notes: PIDS*(2015-07).

Paus, Eva and Kevin Gallagher. (2008). "Missing Links: Foreign Investment and Industrial Development in Costa Rica and Mexico." *Studies in Comparative International Development (SCID), 43*(1): 53-80.

PEZA. (2015). Opportunities for American Investors in Philippines Economic Zones. Conference: APEC, Makati City. November 19, 2015.

---. (2016a). About Us. Retrieved March, 2016, from http://www.peza.gov.ph/index.php/about-peza.

---. (2016b). Implementing Rules and Regulations Retrieved March, 2016, from http://www.peza.gov.ph/index.php/about-peza/implementing-rules-and-regulations.

Philippine Overseas Employment Administration. (2014). 2010-2014 Oversease Employment Statistics. Manila: Philippine Overseas Employment Administration. http://www.poea.gov.ph/stats/2014 POEA Stats.pdf.

PSA. (2012). The 2010 Census of Population and Housing Reveals the Philippine Population at 92.34 million. Manila: Philippine Statistics Authority.

---. (2015). Labor Force Survey. Retrieved March 2016, from https://psa.gov.ph/statistics/survey/labor-force.

---. (2016a). Foreign Investment: Fourth Quarter 2015. Manila: Philippine Statistics Authority. 22 February https://psa.gov.ph/sites/default/files/FI Q4 2015.pdf.

---. (2016b). NSO's 2010 Census of Population and Housing (CPH). Retrieved March, 2016, from http://www.psa.gov.ph.

Sturgeon, Timothy. (2003). Exploring the Risks of Value Chain Modularity: Electronics Outsourcing During the Industry Cycle of 1992-2002, pp. 58.

Sturgeon, Timothy and Richard Florida. (2000). Globalization and Jobs in the Automotive Industry: Alfred P. Sloan Foundation.

Sturgeon, Timothy and Momoko Kawakami. (2011). "Global value chains in the electronics industry: characteristics, crisis, and upgrading opportunities for firms from developing countries." *International Journal of Technological Learning, Innovation and Development, 4*(1/2/3): 120–147.

Sturgeon, Timothy and Johannes Van Biesebroeck. (2011). "Global value chains in the automotive industry: an enhanced role for developing countries?". *Int. J. Technological Learning, Innovation and Development, 4*(1): 25.

Sturgeon, Timothy, Johannes Van Biesebroeck and Gary Gereffi. (2008). "Value chains, networks and clusters: reframing the global automotive industry." *Journal of Economic Geography, 8*(3): 24.

Taglioni, Daria and Deborah Winkler. (2016). *Making Global Value Chains Work for Development*. Washington, D.C.: World Bank.

TESDA. (2014). *Philippine TVET Statistics 2008-2013*. Manila Technical Education and Skills Development Authority.

The World Bank. (2016a). Doing Business 2016- Economic Profile Philippines. http://www.doingbusiness.org/data/exploreeconomies/~/media/giawb/doing business/documents/profiles/country/PHL.pdf?ver=3.

--- (2016b). The Philippines- Country Overview. Retrieved February, 2016, from http://www.worldbank.org/en/country/philippines/overview

Top Universities. (2016). QS Wolrd University Rankings 2015/16. http://www.topuniversities.com/university-rankings/world-university-rankings/2015 -sorting=rank+region=+country=122+faculty=+stars=false+search.

Trading Economics. (2016, 4/10/2016). Philippines Credit Ratings. Retrieved March, 2016, from http://www.tradingeconomics.com/philippines/rating.

Transparency International. (2015). Corrtuption Perceptions Index 2015. Berlin: Transparency International http://www.transparency.org/cpi2015

UNComtrade. (2015). Philippines Exports by All Partners, 2005-2014 (based on HS-2002), *Retrieved October 31, 2015 from UNComtrade*. New York: United Nations Statistics Division (UNSD).

UNCTAD. (2013). World Investment Report: Global Value Chains, Investment and Trade for Development. Geneva: United Nations Conference on Trade and Development (UNCTAD).

---. (2016a). ASEAN Investment Report 2015: Infrastructure Investment and Connectivity. Geneva: UNCTAD. http://unctad.org/en/PublicationsLibrary/unctad_asean_air2015d1.pdf.

---. (2016b). UNCTAD STAT: Philippines Country Profile Geneva: UNCTAD. http://unctadstat.unctad.org/CountryProfile/GeneralProfile/en-GB/608/index.html.

UNESCO. (2015). Education for All 2015 National Review. Geneva: United Nations Educational, Scientific and Cultural Organization. http://www.unevoc.unesco.org/go.php?q=World+TVET+Database&ct=PHL.

United States Trade Representative. (2014). US Removes the Philippines from the Special 301 Watchlist. Washington, D.C.

---. (2016). Philippines. Retrieved March, 2016, from https://ustr.gov/countries-regions/southeast-asia-pacific/philippines

US Department of State. (2015). U.S. Relations with the Philippines. Washington, D.C.: US Department of State, Bureau of East Asian and Pacific Affairs. November 13. http://www.state.gov/r/pa/ei/bgn/2794.htm.

USAID. (2014). Science, Technology, Research and Innovation for Development (STRIDE): Philippines Innovation Ecosystem Assessment. Manila: USAID. November.

World Bank. (2016a). World Development Indicators. Washington, D.C.: World Bank. http://data.worldbank.org/data-catalog/world-development-indicators.

---. (2016b). World Development Indicators: Foreign Direct Investment, net inflows (BoP, current US$). Retrieved March, 2016, from http://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD

World Economic Forum. (2006). Global Competitiveness Report- Philippines.

--- (2014). The Future of the Philippines. Retrieved February, 2016, from http://www.weforum.org/agenda/2014/05/philippines-president-benigno-simeon-aquino-forum-east-asia/

---. (2016a). Global Competitiveness Report. Geneva.

---. (2016b). Global Competitiveness Report- Philippines. http://reports.weforum.org/global-competitiveness-report-2015-2016/economies/ - indexId=GCI&economy=PHL.

7. Appendix: List of Interviewees

Firm	Interviewee	Position	Date
Aerospace Industries Association of the Philippines	John Lee	President	11/26/2015
Asian Transmission Corp	Rose Lynn Zara-Coloma Don Joseph G. Rivera	AVP for Personnel & Legal VP for Production Control, Maintenance Eng and IMS-SAE	01/27/2016
Association of Petrochemical Manufacturers of the Philippines	Homer Maranan	Executive Director	11/25/2015
B/E Aerospace	Mathew Baxter	VP and GM	01/22/2016
BAG Electronics	Franz Roland Odenthal	General Manager	01/27/2016
Chemrez	Glen Apostol Henry Siy Tramon Taniola	Marketing Development Manager General Manager HR Director	01/29/2016
Commission on Higher Education	Ma. Cynthia Rose Bautista	Commissioner	01/21/2016
Continental Temic	Glenn Everett	General Manager	01/27/2016
De La Salle University	Dr. Raymond Girard Tan	Vice Chancellor for Research and Innovation	01/18/2016
Deloitte	John Dixon	Global Forest, Paper & Packaging Leader	09/11/2015
Dow Chemical	Roberto Batungbacal	Country Manager	01/19/2016
DTI-BOI	Rafaelita Aldaba	Assistant Secretary	11/26/2015
DTI-BOI	Eries Cagatan	Director, Manufacturing Industries Service	11/26/2015
Eaton Industries	Fortunato Chia	General Manager	01/22/2016
Famous Secret Precision Machining	Dennis Chan Rodolfo Ramos	President, Marketing Department Head	01/22/2016
Federation of Automotive Industries of the Philippines	Vicente Mills	President	11/27/2015
Fujitsu Ten	Ronald Teves Masamichi Kida	General Administration Manager VP/Treasurer	01/26/2016
Glatfelter	William Yanavitch	Senior VP of HR and administration	04/15/2016
IMI	Mary Ann Natividad	Head of Global Business and Strategies	01/26/2016
International Wiring System (Sumitomo)	Ken Yoshida, Edwin Dimatulac Noemi Madamba Ariel Jose Michael Pajayon	Vice President, Logistics & Marketing Assistant Senior Manager Planning & Control Manager, Logistics & Marketing Division Senior Manager, Finance & Management Division HR	01/21/2016
Ionics	Earl Qua	Vice President	01/28/2016
JAMCO	Hermie Flores	Planning Purchasing Materials and Logistics Manager	01/21/2016
JG Summit Petrochem	Patrick Henry Go Napoleon Vasay Maria Veron Munar	EVP and Sr. Managing Director Vice President Finance and Administration Assistant Manager Business Research	01/19/2016
Manly Plastics	Vicente Co	VP, Sales & Marketing	01/26/2016

Firm	Interviewee	Position	Date
Maxim	Exequiel Abad	Human Resources Manager	02/22/2016
Mitsubishi Motors	Dante Santos	First VP & Secretary Corporate Management Division	01/25/2016
Moog	Willie Estoque, Efren Alberto	Director, Corporate Relations	11/26/2015
Pacific Paint Boysen	Johnson Ongking Catherine Ramirez	Vice President Research and Development Manager	01/21/2016
PEZA	Elmer San Pascual	Group Manager	11/26/2015
Philippine Paper Manufacturers Association, Inc.	Ray Geganto	President	11/27/2015
Philippine Resins Industry, Inc. (PRII)	Concepcion Tanglao Roda Maliski	VP for Corporate Planning Assistant Manager Corporate Planning	01/19/2016
Philippines Parts Makers Association, Inc.	Ferdinand Raquelsantos	President	11/25/2015
Schneider Electric	Claude Mazallon Reynaldo del Mundo	Country President Manager/Field Sales Specifiers	01/22/2016
SEIPI	Dan Lachica Katrina Magcalayo Katherine Reyes	President Business Lead for External Affairs Industry Analyst	11/26/2015
SIIX	Shinya Oho	Managing Director	02/22/2016
STRIDE	David Hall	Chief of Party	11/26/2015
Tann Philippines	Oliver Carsi-Cruz	President	01/22/2016
Technological Education and Skills Devt Authority (TESDA)	Marissa Legaspi	Executive Director	01/18/2016
Technological University of Phils (TUP)	Felipe Ronald Argamosa Teodinis Garcia	VP for Research and Extension Executive Director Integrated Research and Training Center	01/20/2016
Texas Instruments (TI)	Mohammad Yunus	President and Managing Director	01/21/2016
the Bangko Sentral ng Pilipinas	Anna Clarissa Laureaga	Laboratory Officer	02/03/2016
Toshiba	Cherry Ricanor	VP, Factory Planning	01/25/2016
Toyota Auto Parts	Manny Mendoza	General Manager	01/25/2016
Toyota Motors	Rommel Gutierrez Vitaliano Mamawall III	First Vice President, Government & Industry Affairs Technical Consultant, Toyota Motor Philippines	01/27/2016
Trust International Paper Corp (TIPCO)	Edgar Pataroque	President and COO	01/18/2016
United Coconut Chemicals (Cocochem)	Evelina Patino	President and CEO	01/19/2016
United Pulp and Paper Corp.	Wichan Charoenkitsupat Jirasak Kaewubol (Boyd)	President Vice President – Marketing	01/28/2016
University of the Philippines (UP)	Rhodora Gonzalez	Associate Dean for Institutional Linkages, College of Engineering	01/20/2016
USAID-COMPETE	Henry Basilio Greg Alling Lydia Martinez Richard Umali	Chief of Party Vice Chief of Party Team Leader	01/20/2016
Yazaki-Torres	Feliciano Torres	President & CEO	11/27/2015