

# INDUSTRY CAREER GUIDE MANUFACTURING

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# Executive Summary

Manufacturing sector in the Philippines has one of the largest contributions to the growth of the economy. Throughout the years, starting from the 1970s, the manufacturing sector has been one of the driving forces behind the country's growth. It has proven its importance in the economy because of benefits such as employment generation and technological innovation.

However, this growing sector has a number of threats that diminish its exceeding potential. This driver of growth is faced with the issue of competitiveness, as the Philippine manufacturing sector fails to be on top of its competitors in terms of cost. Fluctuating exchange rates and economic turmoil in key countries also contribute to the difficulty of harnessing this sector's potential. Addressing these major issues through the correct policies will yield great returns with respect to the country's economic growth.

This report gives an overview of the industry, its performance, and contribution to economic growth and highlights the job outlook and prospects in the long run. The various issues faced by the sector will also be discussed to assist policy makers in developing possible course of action.

# Chapter 1

## *Nature of the Industry*

### *A. Agriculture / Industry / Service*

The manufacturing sector is part of the industry sector and it has the largest contributed to the growth of the economy. Throughout the years, starting from the 1970s, the manufacturing sector has been one of the driving forces behind the country's growth. It has proven its importance in the economy because of benefits such as employment generation and technological innovation. According to the National Statistical Coordination Board (2013), the manufacturing sector refers to the “mechanical or chemical transformation of organic or inorganic substances into new products, whether the work is performed by power driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail.”

The manufacturing industry in the Philippines is composed of 20 sub-sectors and 3 of these sub-sectors have several components. The food manufacturing is the largest of all the sub-sectors in terms of the number of establishments while the electrical machinery, particularly the semi-conductor devices and other electronic components is the largest in terms of employment.

### *B. Industry Sub-Sectors*

#### **i. Types of Establishment**

Establishments belonging to the manufacturing sector are engaged in various activities that involve food and beverages, garments and footwear, wood and furniture among others. Manufacturing establishments are engaged in processing

materials and they may also contract other establishments to do the processing for them.

The Annual Survey of Philippine Business and Industry for 2008 (ASPBI) (NSO, 2008) identified the types of establishment in the manufacturing sector. This includes: shop/factory, bakery, millwork, distillery, refinery, cannery, abattoir, brewery, foundry, tannery or plant engaged in manufacturing products mechanically manually.

### **Shops**

Manufacturing shop establishments vary depending on what they produce. First, a flow shop is a manufacturing facility that produces one or two similar products using high-volume specialized equipment and an example of this is an assembly line. Another type of shop is the job shop which refers to a facility that produces various products in smaller batches. An example of this is a machine shop <http://www.toolingu.com/definition-900160-11806-job-shop.html>.

Various manufacturing shops in the Philippines produce parts and machineries, paints and chemicals, car parts, audio and accessories, battery, and electronics and semi-conductors.

The ASPBI(2010) reports that there are 65 sawmilling and planing of wood shops, 416 manufacture of wood and other related materials shops, 124 manufacture of rubber products shops, 299 basic iron and steel shops, 26 basic precious and other non-ferrous metals shops, 75 casting of metals shops, 808 fabricated metal products shops, 188 electronic equipment shops, 186 machinery and equipment shops, 221 motor vehicles and trailers shops, 57 other transport equipment shops, and 686 furniture shops.

### **Bakeries**

Philippine bakery establishments produce and sell flour-based food baked such as bread, pastries, cakes, pies and other similar perishable bakery products. Based on the ASPBI (2010), bakery establishments ranked the highest with 3,308 establishments, comprising 20% of the total number of establishments in the country.

### **Food Establishments**

These kinds of establishments are very common in the Philippines. The ASPBI (2010) identifies the number of establishments for the follow: 99 meat processing, 131 processing and preserving fish, 29 fruits and vegetables, 113 manufacture of vegetables and animal oils and fats, 36 dairy products, 885 grain mill production, starch and starch products, and 697 other food products.

On the other hand, beverages are also considered part of food establishments. There are a total of 41 manufacture of softdrinks and 1090 drinking water and mineral water establishments.

### **Millwork Establishments**

Establishments engaged in millwork produce woodwork such as doors, window casings, and baseboards, all of which are ready-made by a lumber mill. Based on the ASPBI (2010), the total number of establishments that manufacture of other builders' carpentry and joinery; millworking is 87.

### **Distillery Establishments**

There are a total of 22 distillery establishments in the Philippines (ASPBI, 2010). Examples of establishments include La Tondena, Distileria Limtuaco, and Tanduay and they produce distilled spirits, whiskies, brandy, gin, rum, vodka,

tequila, cocktails, herbal, and sweet wine. These establishments have a total of 1,354 employees as of November 2010.

### **Refinery Establishments**

Refinery establishments are engaged in the process of purifying a crude substance such as petroleum or oil using mechanical and chemical means to convert it to a more useful form. Sugar, ore, and metal are also examples that undergo refinery. There are a total of 30 establishments engaged in sugar refining, manufacture of refined petroleum products, and gold and other precious metal refining (ASPBI, 2010).

Petron Bataan Refinery is the largest refinery in the country and processes crude oil to produce a wide range of petroleum products such as gasoline, jet fuel, industrial fuel, oil, diesel, kerosene, and liquefied petroleum gas <http://www.hydrocarbons-technology.com/projects/petron-bataan-refinery-philippines/>.

### **Cannery Establishments**

A cannery establishment is a factory wherein meat, fish, or fruit is canned and preserved. There are around 50 establishments that cater to canning/packing of fish and other marine products, 38 establishments that process, preserve and can fish, crustacean and mollusks, 54 establishments that can/pack and preserve fruits and fruit juices, and 12 establishments that can/pack and preserve vegetables and vegetable juices.

One of the largest cannery establishments in the country is Century Canning Corporation that pioneered in tuna canning. The total value of output of all establishments that can/pack fish and other marine products is Php22.7 billion (ASPBI, 2010). Del Monte is another example that produces canned fruits and fruit juices. The total value of output of all establishments that

can/pack and preserve fruits and fruit juices is Php34.5 billion (ASPBI, 2010).

### **Abattoir Establishments**

Establishments engaged in the operation of slaughter houses are also called abattoir. This is a facility where animals are killed and processed into meat products <http://www.fao.org/ag/ags/rural-infrastructure/abattoirs/en/>. The ASPBI (2010) defines it as the operation of slaughterhouses engaged in killing, dressing, or packing meat of cattle, hogs, sheep, goats, horses, poultry, among others; production or by-products such as raw hides and skins; production of pulled wool; and production of feathers and down.

As of 2010, there were 55 slaughtering and meat packing establishments in the country.

### **Brewery Establishments**

The establishment that caters to the manufacture of malt liquors such as beer and ale is called a brewery. It usually goes through a process of fermentation. There are a total of 8 establishments that manufacture malt liquor and malt and this include companies such as San Miguel Corporation and Asia Brewery (ASPBI, 2010).

### **Foundry Establishments**

A foundry establishment deals with the melting and molding of metal to form various items. There are only a few establishments in the Philippines, with 18 casting/foundry of iron establishments, and 15 casting/foundry of steel. The total value of output for iron foundry establishments is Php517 million while total value of output for steel is Php376 million (ASPBI, 2010)

## **Tannery Establishments**

Tannery establishments are concerned with the tanning of animal skins and/or hides that cater mostly to the leather industry. There are many tanneries in the country but are small in operations and most are located in Meycauayan, Bulacan. Based on the ASPBI (2010), there were 11 tanning and dressing of leather establishments and its total value of output reached Php130 million in 2010.

### ***Summary***

In the 2010 Annual Survey of Philippine Business and Industry (ASPBI), the total number of manufacturing establishments was estimated at 16,269 reflecting a 4.8 percent decline from 2009. Among the 441 industry sub-classes, bakery products topped the list of the top ten that accounted for 20.3 percent of the total number of establishments. Bottled water and printing both ranked second, wherein each accounted for 6.7 percent.

The manufacturing sector had a total employment of 978,027 with 99 percent as paid employees. Semi-conductor devices and other electronic components industry had the largest number of workers with 117,346 in the year 2010 (ASPBI, 2010).

## **ii. Regional Distribution/Concentration of Industry Activity**

Based on the preliminary results of the 2010 Annual Survey of PBI, most of the manufacturing establishments with total employment of 20 and over are concentrated in the National Capital Region or NCR (41 percent), followed by CALABAZON (26 percent), and Central Visayas (11 percent). The total number of manufacturing establishments in the Philippines has seen a downward trend since 1999 but the NCR remains the region with the most number of establishments. In 2001, the number of establishments in NCR declined 8.73 percent and further dropped to 10.75 percent in 2003. However,

two years later, the number of establishments increased by 5.48 percent. In 2010, the figures slipped again by 7.58 percent compared to figures in 2006.

**Table 1. Distribution of Manufacturing Establishments, by Region, Philippines: 1999-2010**

Region	1999	2001	2003	2005	2006	2010
National Capital Region	3,426	3,127	2,791	2,944	1,957	1,898
Cordillera Administrative Region	28	22	19	21	22	16
I - Ilocos Region	86	59	49	59	50	48
II - Cagayan Valley	40	26	22	17	13	17
III - Central Luzon	722	566	520	617	501	433
IVA – CALABARZON	1,660	1,318	1,342	1,548	1,357	1,212
IVB – MIMAROPA		14	8		4	3
V - Bicol Region	65	58	51	53	49	35
VI - Western Visayas	185	152	130	142	119	99
VII - Central Visayas	633	543	539	651	536	491
VIII - Eastern Visayas	25	25	22	20	19	20
IX - Zamboanga Peninsula	82	71	58	62	41	42
X - Northern Mindanao	105	126	103	131	105	100
XI - Davao Region	293	183	156	184	155	141
XII – SOCCSKSARGEN	50	72	62	75	65	58
XIII – Caraga Autonomous Region in Muslim Mindanao	45	7	5	6	6	5
<b>PHILIPPINES</b>	<b>7,450</b>	<b>6,397</b>	<b>5,901</b>	<b>6,554</b>	<b>5,024</b>	<b>4,643</b>

*Source: National Statistics Office.*

The fluctuations in the number of manufacturing sectors per region could be attributed to external factors such as cheaper cost of labor in other countries like Vietnam and India. Moreover, the 2008 global economic and financial crisis affected the manufacturing sector mainly through a reduced demand for our exports. It could also be noted that the share of establishment in NCR declined from 2005 to

2006, from 45 percent down to 39 percent. Despite this, there has been an increase in the number of establishments in the nearby provinces of NCR such as Central Luzon and CALABARZON, as well as Central Visayas.

### **iii. Industry Organization Relative to Sub-sector**

There are various industry organizations in the Philippines that give support to the sub-sectors. Their main goal is to promote the interest of these sub-sectors by providing support and professional advice. The sub-sectors can be members of the following associations: Motor Vehicle Parts Manufacturers Association of the Philippines Inc., Philippine Pharmaceutical Manufacturers Association, Chamber of Automotive Manufacturers Association of the Philippines, Inc., Garment Manufacturers Association of the Philippines, Integrated Food Manufacturers Association of the Philippines, Tire Manufacturers Associations of the Philippines, and the Cement Manufacturers' Association of the Philippines among others.

#### *Association for Motor Vehicle Parts Manufacturers*

The Motor Vehicle Parts Manufacturers Association of the Philippines Inc. was established in 1996 to maximize the benefits from liberalization, deregulation and privatization, the country's membership in multi lateral and regional trade organizations such as the WTO, the ASEAN, and the APEC.<sup>1</sup> There are currently 101 automotive parts and components manufacturing companies as members of the association. In order to strengthen the position of the industry, the association seeks to help members become major players in producing original equipment and replacement parts in the domestic and global market.

#### *Association for Pharmaceutical Manufacturers*

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<sup>1</sup><http://www.mvpmmap.com/organization.htm>

The Philippine Pharmaceutical Manufacturers Association is one of the oldest manufacturing associations in the country, having started in September 1950. The main role of the association is to provide a venue for pharmaceutical manufacturers to share technical and logistical expertise to improve the quality and manufacturing standards.<sup>2</sup> To date, there are over 40 members engaged in promoting the goals of the association.

The pharmaceutical industry has been growing in value in the past years, having grown at 8 percent from 2005 to 2008 and is considered the largest pharmaceutical market in the region. The Food and Drug Administration reported in 2009 a total number of 284 drug manufacturers, which includes local and foreign or multinational companies (Reyes et al., 2011). Most of the drug manufacturers are located in NCR followed by Region 4A – CALABARZON and Region 4B – MIMAROPA.

#### *Association for Automotive Manufacturers*

Formed in 1995, the Chamber of Automotive Manufacturers of the Philippines, Inc. (CAMPI) aims to develop the industry particularly the local automotive industry. It has contributed to enhance the competitiveness of the industry through various programs and advocacies, promote and develop labor in the industry, provide consumer protection, promote safety, provide environmental protection, support for alternative sources of energy, and tax reforms. The formulation of the Executive Order No. 156, also known as the New Motor Vehicle Development Program and the development of safety belts standards through Republic Act No. 8750 are examples of the contributions of the association.<sup>3</sup> There are 12 members in the association.

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<sup>2</sup><http://www.ppma1950.com/about/history.html>

### *Association for Cement Manufacturers*

The Cement Manufacturer's Association of the Philippines started in 1957 with the main goal of pooling resources of the industry to support its growth and contribute to the development of the country in the long run. Moreover, it promotes the interests of member through the following activities: consistency in production of high quality cement; development of products and cement based products; prevent unfair competition and provide a level playing field for manufacturers, provide leadership in the implementation of sustainable development initiatives; and public relations for the industry.

### *Association for Food Manufacturers*

The food manufacturing sub-sector is one of the largest in the industry. The Philippine Chamber of Food Manufacturers was established in December 1959 to aid in finding ways to increase consumer demand and promote its products in the local and international market. To date, there are 21 members including the large multinational companies such as Nestle, Unilever, and San Miguel.

Furthermore, other agencies such as the Philippine Economic Zone Authority (PEZA) and the Philippine Chamber of Commerce and Industry (PCCI) assist in maintaining the competitiveness of firms through its various programs. These agencies assist the manufacturing industries to be more competitive not only in the local market but more so in the international market. For instance, the PEZA aims to enhance the manufacturer's competitiveness through the effective management of economic zones, efficient administration of incentives and investment promotion.

### ***C. Economic Profile***

#### ***i. Contribution to Philippine GDP***

Though it has been affected by external forces such as the Asian Financial Crisis and the Global Financial Crisis, the manufacturing sector remains resilient. The role of the sector was highlighted when the country started to engage in the global production networks. The dependence of the manufacturing sector on its major trading partners such as Japan and the United States makes it vulnerable to fluctuations in their economy. This is where the government and private sector come in through the provision of safety nets and investments, respectively.

The percentage share of the manufacturing sector has been almost constant from the years 1982 until 2010, but has gradually declined over the years. This has many implications on the value added of the products produced by the manufacturing sector. One reason behind this is that the competitiveness of some of the sub-sectors in the manufacturing sector has lost steam due to fierce competition in the market, especially in the international market.

**Table 3. Percentage Share to GDP (Average, at Constant 1985 Prices), by Industry Sector, Philippines: 1982-2010**

<b>Year</b>	<b>Agriculture</b>	<b>Mining</b>	<b>Manufacturing</b>	<b>Electricity</b>	<b>Construction</b>	<b>Services</b>
1982-1985	0.23	0.02	0.26	0.09	0.03	0.38
1986-1990	0.24	0.02	0.25	0.05	0.03	0.41
1991-1995	0.22	0.01	0.25	0.05	0.03	0.43
1996-2000	0.20	0.01	0.25	0.06	0.03	0.44
2001-2005	0.20	0.01	0.24	0.04	0.03	0.47
2006-2010	0.18	0.02	0.23	0.05	0.03	0.49

*Source: Computation of author based on CEIC data.*

The growth of the manufacturing sector has been remarkable from the 1980s to the present. However, there were several internal and external events that affected the performance of the sector. The economy's growth slowed down in the early 1980s due to the government's growing external debt, declining demand for our exports. In 1983, the country was in a political and economic crisis which affected that performance of the manufacturing sector.

**Table 4. Average Growth Rate of Sectors in the Philippines in percentage points at constant 1985 prices**

Year	GDP Growth (y-o-y, %)	Agriculture	Mining	Manufacturing	Electricity	Construction	Services
1982-1985	-2.28	-1.35	7.14	-4.18	-14.44	3.37	0.94
1986-1990	4.74	2.73	-1.27	5.07	7.83	3.86	5.70
1991-1995	2.19	1.47	-1.85	2.07	1.65	7.03	2.58
1996-2000	3.96	2.27	1.73	3.17	8.43	4.57	4.74
2001-2005	4.49	3.72	14.64	4.34	-6.09	2.96	6.04
2006-2010	4.90	2.27	12.34	3.92	11.72	5.20	5.54

*Source: Computation of author based on CEIC data.*

In the next decade, the manufacturing sector was able to pick up but slowed down in the early part of the decade due to internal factors such as the El Niño, the major earthquake that hit Northern Luzon, and power-generating capacity crisis that left the country with brownouts almost on a daily basis. In 1997, the Asian Financial Crisis hit the region and did not spare the Philippines. The manufacturing sector was able to recover right away as it grew at a positive rate until the Global Financial Crisis struck in 2008. In 2010, the manufacturing sector has the second highest growth rate with 12.34 percent, the highest since 1982.

The performance of the manufacturing sector seems to consistently be one of the major sources of growth after of course the services sector, except during periods wherein external and/or internal factors affected the economy. The potential in the manufacturing sector can contribute to greater growth in the future subject to the

increase in the value added production of the sector. The current link of the Philippines' manufacturing sector to the global production network should be seen as an advantage to increase our market share by improving our value added but with the competition coming from other countries in the region such as Thailand and Malaysia, this becomes more challenging.

**Table 5. Average sources of GDP growth in percentage points**

Year	GDP Growth (y-o-y, %)	Agriculture	Minin g	Manufacturin g	Electricit y	Constructio n	Service s
1982-1985	-2.28	-0.31	0.10	-1.07	-1.37	0.06	0.30
1986-1990	4.74	0.66	-0.02	1.28	0.40	0.10	2.34
1991-1995	2.19	0.33	-0.03	0.51	0.07	0.20	1.11
1996-2000	3.96	0.46	0.02	0.79	0.46	0.15	2.08
2001-2005	4.49	0.74	0.18	1.06	-0.37	0.10	2.80
2006-2010	4.90	0.43	0.21	0.89	0.50	0.16	2.71

*Source: Computation of author based on CEIC data.*

## a. Industry Sub-sectors

### i. *Distribution of Employment*

The top three manufacturing sub-sectors in terms of number of establishments, based on the preliminary results of the 2010 Annual Survey of Philippine Business and Industry, are manufacture of other food products (410 establishments), manufacture of wearing apparel, except fur apparel (347 establishments), and manufacture of plastic products (337 establishments). Total number of manufacturing establishments (with total employment of 20and over)in 2010 was recorded at 4,643 establishments.

**Table 6. Distribution of and Employment, by Sub-sectors, Philippines: 2010**

<b>Industry Description</b>	<b>Number of Establishments</b>	<b>Total Employment</b>
<b>PHILIPPINES</b>	<b>4,643</b>	<b>871,796</b>
Processing and preserving of meat	68	12,245
Processing and preserving of fish, crustaceans and molluscs	98	19,217
Processing and preserving of fruits and vegetables	73	28,672
Manufacture of vegetable and animal oils and fats	69	7,767
Manufacture of dairy products	24	8,187
Manufacture of grain mill products, starches and starch products	59	5,779
Manufacture of other food products	410	53,889
Manufacture of prepared animal feeds	82	6,907
Manufacture of beverages	64	16,714
Manufacture of tobacco products	17	11,355
Spinning, weaving and finishing of textiles	50	5,603
Manufacture of other textiles	107	11,684
Manufacture of wearing apparel, except fur	347	85,805
Custom tailoring and dressmaking	13	574
Manufacture of knitted and crocheted apparel	28	7,961
Tanning and dressing of leather; manufacture of luggage and handbags	22	4,014
Manufacture of footwear	66	5,348
Sawmilling and planing of wood	21	1,366
Manufacture of products of wood, cork, straw and plaiting materials	107	17,337
Manufacture of paper and paper products	157	15,733
Printing and service activities related to printing	236	13,669
Reproduction of recorded media	4	556
Manufacture of refined petroleum products	8	1,784
Manufacture of basic chemicals	92	8,759
Manufacture of other chemical products, n.e.c.	146	15,682
Manufacture of pharmaceuticals, medicinal chemical and botanical products	66	13,496

Manufacture of rubber products	71	8,210
Manufacture of plastic products	337	34,488
Manufacture of glass and glass products	29	4,101
Manufacture of non-metallic mineral products,	136	18,617
Manufacture of basic iron and steel	122	12,802
Manufacture of basic precious and other non-ferrous metals	20	3,307
Casting of metals	40	4,038
Manufacture of structural metal products, tanks, reservoirs and steam generators	83	13,925
Manufacture of weapons and ammunition	4	1,348
Manufacture of other fabricated metal products; metal working service activities	233	26,783
Manufacture of electronic components	131	117,227
Manufacture of computers and peripheral equipment and accessories	38	53,133
Manufacture of communication equipment	4	645
Manufacture of consumer electronics	25	10,186
Manufacture of measuring, testing, navigating and control equipment; watches and clocks	12	3,958
Manufacture of optical instruments and photographic equipment	26	9,777
Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	32	6,138
Manufacture of batteries and accumulators	6	540
Manufacture of wiring and wiring devices	31	12,146
Manufacture of electric lighting equipment	23	3,971
Manufacture of domestic appliances	18	2,671
Manufacture of other electrical equipment	11	1,757
Manufacture of general purpose machinery	61	6,594
Manufacture of special purpose machinery	67	8,728
Manufacture of motor vehicles	18	5,535
Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	10	924

Manufacture of parts and accessories for motor vehicles	111	44,388
Building of ships and boats	10	22,155
Manufacture of air and spacecraft and related machinery	8	3,033
Manufacture of transport equipment, n.e.c.	18	5,769
Manufacture of furniture	214	19,009
Manufacture of jewelry, bijouterie and related articles	36	3,140
Manufacture of musical instruments	a/	a/
Manufacture of sports goods	17	3,446
Manufacture of games and toys	21	3,263
Manufacture of medical and dental instruments and supplies	20	4,257
Other manufacturing, n.e.c.	58	4,274
Repair of fabricated metal products, machinery and equipment	108	7,410

*n.e.c. – not elsewhere classified*

*a/ - no available data.*

*Source: National Statistics Office.*

Despite the manufacture of food products being the sub-sector with the most number of establishments, it came in only third to having the most number of employees (53,889 employees). The electronic components manufacturing came in first with the most number of employees (117,227) followed by wearing apparel manufacturing (85,805).

## ***ii. Recent Developments in the Manufacturing Sector for the Past 3 to 5 Years***

In a study by Alcorta and Nixson (2011), world output declined 0.6 percent in 2009 as an effect of the 2008 global financial crisis. Moreover, global trade figures contracted 12.2 percent in the same year after the full impact of the crisis hit the global economy. Developing countries in Asia were not spared as exports dropped 5 percent in the fourth quarter of 2008. Countries, such as the Philippines, that was heavily dependent on manufactured goods exports were

affected by the financial crisis so much so that unemployment went up. In 2009, unemployment rate was 7.7 percent from 7.4 percent in the previous year (NSO, 2011).

Since the Philippines was exporting more electronic products as inputs to consumer durable goods such as electronic gadgets, automobiles and capital goods, the slowdown in the economy of the US resulted in lower demand for these manufactured goods. In fact, total exports dropped to an average of 20 percent in 2009(NSO, 2011). However, in the following year, exports were able to pick up again reaching an average growth of 34.7 percent. The volume production index for the manufacturing sector also slowed down in 2009. However, it picked up in 2010 with an average growth of 24 percent for the whole year. Villegas (2012) highlighted the importance of the automotive manufacturing sector, particularly the sub-sectors vehicle manufacturing and parts and components manufacturing, for its significant contribution to total manufacturing output and employment.

## Chapter 2

# *General Employment*

### *A. Occupations in the Sub-sectors*

The type of occupations in the manufacturing sub-sectors have changed over time from labor-intensive to a more capital-intensive type. This has resulted in the shift in the demand for more skilled workers. The following discusses the various occupations in the manufacturing sub-sectors based on the National Statistics Office. Most of the sub-sectors have production supervisors and general foremen, accounting and bookkeeping clerks, and production clerks as the common occupation.

### **Food Products and Beverages**

The sub-sector food products and beverages have both skilled and unskilled occupations. The skilled occupations include production supervisors and general foremen, food technologists, chemical engineering technicians, quality inspectors, food processing and trade related work, food and related products machine operators, accounting and bookkeeping clerks, and production clerks. The unskilled occupations include other office clerks.

### **Textiles**

For the sub-sector textiles, skilled occupations include the following: production supervisors and general foremen; quality inspectors; accounting and bookkeeping clerks; fiber preparers; weavers, knitters and related workers; fiber preparing, spinning and winding machine operators; weaving and knitting machine operators; and bleaching, dyeing and cleaning machine operators.

### **Wearing Apparel**

The next sub-sector wearing apparel has the following skilled occupations, some of which are similar to the manufacture of textiles: production supervisors and general foremen; quality inspectors; accounting and bookkeeping clerks; production clerks; tailors and dressmakers and hatters; textile, leather and related pattern makers and cutters; sewers, embroiderers and related workers; and sewing machine operators.

### **Tanning and Dressing of Leather**

For the sub-sector on tanning and dressing of leather; manufacture of luggage, handbags and footwear the following are the skilled occupations: production supervisors and general foremen; quality inspectors; accounting and bookkeeping clerks; production clerks; tanners; shoemakers and related workers; leather preparing machine operators; and shoemaking and related machine operators.

### **Wood and Wood Products**

For the sub-sector wood and wood products, the skilled workers include: production supervisors and general foremen; accounting and bookkeeping clerks; production clerks; wood treaters; woodworking-machine setters and setter-operators; wood processing plant operators; wood products machine operators; and wood and related products assemblers.

### **Paper and Paper Products**

The next sub-sector is that of paper and paper products and includes the following skilled occupations: production supervisors and general foremen; mechanical engineers; mechanical engineer technicians; accounting and bookkeeping clerks; production clerks; paper pulp plant operators;

papermaking plant operators; and paperboard and related products assemblers.

### **Publishing and Printing**

The sub-sector publishing and printing include the following occupations: production supervisors and general foremen; mechanical engineers; journalists and other writers; accounting and bookkeeping clerks; proofreaders and copymarkers; compositors, typesetters; stereotypers and electrotypers; printing and engravers and etchers; bookbinders; and pressman letterpress.

### **Coke, Refined Petroleum and Other Fuel Products**

The sub-sector concerned with coke, refined petroleum and other fuel products have the following occupations: production supervisors and general foremen; chemical engineers; chemical engineering technicians; accounting and bookkeeping clerks; production clerks; industrial machinery mechanics and fitters; crushing, grinding and chemical mixing machinery operators; chemical-filtering and separating equipment operators; petroleum refining plant operators; and coke production plant operators.

### **Chemicals and Chemical Products**

The sub-sector chemicals and chemical products has similar occupations to petroleum refinery with the addition of pharmaceutical and toiletry product machine operators.

### **Rubber Products**

The sub-sector rubber products include the following occupations: production supervisors and general foremen; accounting and bookkeeping clerks; production clerks; mechanical and chemical engineers; chemical engineering

technicians; quality inspectors; and rubber products machine operators.

### **Plastic Products**

The sub-sector concerned with plastic products has very similar occupations with that of rubber products with the addition of plastic products machine operators.

### **Other Non-metallic Mineral Products**

The next sub-sector on other non-metallic mineral products include the following occupations: production supervisors and general foremen; accounting and bookkeeping clerks; production clerks; mechanical engineers; quality inspectors; cement and other mineral product machine operators; potters and glass-makers; and glass, ceramics plant operators.

### **Basic Metals**

On the sub-sector on basic metals, the following are the occupations: production supervisors and general foremen; accounting and bookkeeping clerks; metal molders and core makers; sheet-metal workers; ore and metal furnace operators; metal melters, casters and rolling-mill operators; metal heat treating plant operators; and metal drawers and extruders.

### **Metal Products**

For the sub-sector fabricated metal products, except machinery and equipment, the following are the occupations: production supervisors and general foremen; accounting and bookkeeping clerks; quality inspectors; welder and flamecutters; structural metal preparers; blacksmiths, hammersmiths and forging press operators; machine-tool setters and setter-operators; machine tool operators.

## **Machinery and Equipment**

For the sub-sector machinery and equipment, the following are the applicable occupations: production supervisors and general foremen; accounting and bookkeeping clerks; production clerks; mechanical engineers; quality inspectors; Welder and Flamecutters; Tool Makers and Related Workers; Agricultural or Industrial Machinery Mechanics and Fitters; and Mechanical Machinery Assemblers.

## **Electrical Machinery and Apparatus**

The next sub-sector electrical machinery and apparatus has the following occupations: production supervisors and general foremen; accounting and bookkeeping clerks; production clerks; electrical engineers; electrical engineering technicians; quality inspectors; electrical mechanics and fitters; and electrical equipment assemblers.

## **Radio, Television and Communication Equipment and Apparatus**

The sub-sector radio, television and communication equipment and apparatus have the following occupations: production supervisors and general foremen; accounting and bookkeeping clerks; production clerks; electronics and telecommunications engineers and technicians; quality inspectors; electronics fitters; and electronic equipment assemblers.

## **Motor Vehicles, Trailers and Semi-Trailers**

The occupations for the sub-sector motor vehicles, trailers and semi-trailers are the following: production supervisors and general foremen; accounting and bookkeeping clerks; mechanical engineers and technicians; quality inspectors; sheet-

metal workers; motor vehicle mechanics and related trades workers; and mechanical machinery assemblers.

### **Building and Repair of Ships and Boats**

The next sub-sector building and repair of ships and boats has the following occupations: accounting and bookkeeping clerks; production clerks; marine engineers; quality inspectors; plumbers, pipe fitters and other related workers; welders and flamecutters; structural metal preparers, erectors and related workers; riggers and cable splicers; and marine crafts mechanics.

### **Manufacture and Repair of Furniture**

For the sub-sector manufacture and repair of furniture, the following are occupations: production supervisors and general foremen; accounting and bookkeeping clerks; production clerks; quality inspectors; decorators and commercial designers; cabinet/furniture makers and related workers; rattan, bamboo and other wicker furniture workers; upholsterers and related workers; and wood products machine operators.

### ***B. Core Occupations***

Table 13 outlines the various professions or occupations involved in the manufacturing sector. Observably, those employed as trades and related workers (38.28%), unskilled laborers (22.45%), and managers (10.75%) comprise a significant percentage of all those who are employed. Professionals, on the other hand, merely take up a meager share of 1.98% of total employment. The current distribution of occupations/professions in the manufacturing industry remains

to be one suited for low-value output and labor-intensive processes.

**Table 7- Employment level in various occupations**

<b>Profession/Occupation</b>	<b>Employment Level (in thousands)</b>	<b>Percentage</b>
<b><i>Officials of Government and Special Interest-Organizations, Corporate Executives, Managers, Managing Proprietors, and Supervisors</i></b>	<b>326</b>	10.75
Officials of Government and Special-Interest Organizations	-	
Corporate Executives and Specialized Managers	33	
General Managers or Managing Proprietors	220	
Supervisors	74	
<b><i>Professionals</i></b>	<b>60</b>	1.98
Physical, Mathematical and Engineering Science Professionals	35	
Life Science and Health Professionals	4	
Teaching Professionals	-	
Other Professionals	21	
<b><i>Technicians and Associate Professionals</i></b>	<b>74</b>	2.44
Physical Science and Engineering Associate Professionals	45	
Life Science and Health Associate Professionals	3	
Teaching Associate Professionals	-	
Related Associate Professionals	26	
<b><i>Clerks</i></b>	<b>136</b>	4.48
Office Clerks	120	
Customer Service Clerks	16	
<b><i>Service Workers and Shop and Market Sales Workers</i></b>	<b>33</b>	1.09
Personal and Protective Services Workers	8	
Models, Salespersons and Demonstrators	25	
<b><i>Farmers, Forestry Workers and Fishermen</i></b>	<b>21</b>	0.69
Farmers and Other Plant Growers	-	
Animal Producers	-	
Forestry and Related Workers	21	
Fishermen	-	

Hunters and Trappers	-	
<b>Trades and Related Workers</b>	<b>1,161</b>	38.28
Mining, Construction and Related Trades Workers	38	
Metal, Machinery and Related Trades Workers	196	
Precision, Handicraft, Printing and Related Trades Workers	90	
Other Craft and Related Trades Workers	837	
<b>Plant and Machine Operators and Assemblers</b>	<b>532</b>	17.55
Stationary-Plant and Related Operators	49	
Machine Operators and Assemblers	423	
Drivers and Mobile-Plant Operators	60	
<b>Laborers and Unskilled Workers</b>	<b>681</b>	22.45
Sales and Services Elementary Occupations	82	
Agricultural, Forestry, Fishery and Related Laborers	6	
Laborers in Mining, Construction, Manufacturing and Transport	593	
<b>Special Occupations</b>	<b>7</b>	0.23
Armed Forces	-	
Other Occupations not Classified	7	

*Source: Bureau of Labor and Employment Statistics.*

### ***C. In-demand and the hard-to-fill occupations***

Hard-to-fill occupations in the manufacturing sector are those that involve managers and professionals. This is primarily caused by the emigration of professionals who seek higher pay abroad, poorly designed and outdated recruitment strategies, and low initial pay due to resource constraints faced by many firms (World Bank, 2010). In addition, the lack of individuals with adequate and appropriate general skills (e.g. problem solving, critical thinking) and specific skills (e.g. technical and vocational skills for managers and professionals) has also made it difficult for manufacturing firms to fill positions may

require higher-than-average levels of the aforementioned skills.

Besides professionals and managers, several manufacturing firms have also found it challenging to fill vacancies for skilled production workers. Not only is this caused by the sheer absence of supply but also by questionable quality of several technical vocational education and training (TVET) schools. Adding to the problem is the presence of outdated curricula that render graduates unable to perform certain tasks in more technologically advanced fields.

Table 14 (?) shows the changes in employment levels of different occupations from 2002 to 2010. Reinforcing the previous discussion, employment of professionals, general managers, and plant operators have expanded significantly during the relevant time period – a trend suggestive of increasing demand for such occupations within the manufacturing industry. It is also interesting to note the increased demand for clerks, farmers, forestry workers, fishers, and unskilled laborers (in mining, construction, and transport). Meanwhile, there has been a marked decrease in the employment levels of technicians and association professionals, service and sales workers, as well as trades related workers.

**Table 8. Employment Levels by Occupation in the Manufacturing Sector, Philippines: 2002-2010 (in thousands)**

<b>Profession/Occupation</b>	<b>2002</b>	<b>2004</b>	<b>2006</b>	<b>2008</b>	<b>2010</b>
<i>Officials of Government and Special Interest-Organizations, Corporate Executives, Managers, Managing Proprietors, and Supervisors</i>	251	290	286	315	326

Officials of Government and Special-Interest Organizations	2	-	-	-	-
Corporate Executives and Specialized Managers	38	35	30	32	33
General Managers or Managing Proprietors	143	181	184	208	220
Supervisors	69	74	72	75	74
<b>Professionals</b>	<b>57</b>	<b>59</b>	<b>58</b>	<b>58</b>	<b>60</b>
Physical, Mathematical and Engineering Science Professionals	28	33	32	32	35
Life Science and Health Professionals	5	3	4	3	4
Teaching Professionals	2	*	-	-	-
Other Professionals	23	22	22	24	21
<b>Technicians and Associate Professionals</b>	<b>85</b>	<b>67</b>	<b>75</b>	<b>75</b>	<b>74</b>
Physical Science and Engineering Associate Professionals	52	42	49	50	45
Life Science and Health Associate Professionals	4	1	1	2	3
Teaching Associate Professionals	-	-	-	-	-
Related Associate Professionals	28	24	25	23	26
<b>Clerks</b>	<b>121</b>	<b>120</b>	<b>140</b>	<b>128</b>	<b>136</b>
Office Clerks	104	108	126	116	120
Customer Service Clerks	17	12	15	12	16
<b>Service Workers and Shop and Market Sales Workers</b>	<b>63</b>	<b>29</b>	<b>36</b>	<b>33</b>	<b>33</b>
Personal and Protective Services Workers	24	15	12	8	8
Models, Salespersons and Demonstrators	39	14	25	24	25
<b>Farmers, Forestry Workers and Fishermen</b>	<b>1</b>	<b>15</b>	<b>20</b>	<b>20</b>	<b>21</b>
Farmers and Other Plant Growers	-	-	-	-	-
Animal Producers	-	-	-	-	-
Forestry and Related Workers	1	15	20	20	21
Fishermen	-	-	-	-	-
Hunters and Trappers	-	-	-	-	-
<b>Trades and Related Workers</b>	<b>1,453</b>	<b>1,422</b>	<b>1,347</b>	<b>1,191</b>	<b>1,161</b>
Mining, Construction and Related Trades Workers	65	35	35	38	38

Metal, Machinery and Related Trades Workers	244	229	202	206	196
Precision, Handicraft, Printing and Related Trades Workers	123	117	122	100	90
Other Craft and Related Trades Workers	1,022	1,042	987	847	837
<b><i>Plant and Machine Operators and Assemblers</i></b>	<b>395</b>	<b>489</b>	<b>521</b>	<b>506</b>	<b>532</b>
Stationary-Plant and Related Operators	51	52	50	47	49
Machine Operators and Assemblers	288	385	415	406	423
Drivers and Mobile-Plant Operators	56	53	57	53	60
<b><i>Laborers and Unskilled Workers</i></b>	<b>436</b>	<b>561</b>	<b>560</b>	<b>597</b>	<b>681</b>
Sales and Services Elementary Occupations	78	69	78	73	82
Agricultural, Forestry, Fishery and Related Laborers	16	1	4	6	6
Laborers in Mining, Construction, Manufacturing and Transport	342	492	478	518	593
<b><i>Special Occupations</i></b>	<b>9</b>	<b>10</b>	<b>8</b>	<b>3</b>	<b>7</b>
Armed Forces	-	*	-	-	-
Other Occupations not Classified	9	9	8	3	7
<b>ALL OCCUPATIONS</b>	<b>2,869</b>	<b>3,061</b>	<b>3,053</b>	<b>2,926</b>	<b>3,033</b>

\* no available information

Source: Bureau of Labor and Employment Statistics.

#### ***D. Basic educational/training/skill requirements on the identified occupations in the sub-sector***

Educational requirements in the manufacturing sector vary based on the size of the hiring firm (World Bank, 2010). This implies some degree of heterogeneity of human resource needs within the industry. Larger firms have been shown to prefer employees that possess post-secondary vocational

skills appropriate while smaller firms are more amenable to hiring individuals that possess only a secondary degree.

The distribution of employees has also been changing across firms of different sizes (World Bank, 2010). Small firms appear to have reduced employment of individuals with undergraduate and postgraduate degrees as they increased employment of new hires with secondary degrees. This can be explained by cost-cutting motives and the very nature of small firms requiring less specialized business expertise and managers due a flatter organizational structure. Unlike small firms, medium firms have begun to rely more on individuals that have acquired secondary and technical education and less on those that procured vocational education. Large firms, on the other hand, have been shown to prefer hiring individuals with college degrees and those who have undergone vocational courses.

Such trends seem to explain the inability of the country's manufacturing sector to move up the value-chain. The lack of capacity to absorb employees with higher levels of education has inhibited innovation and capital formation, thus constricting activity to labor-intensive processes.

Besides firm-sponsored training, those employed within the manufacturing sector derive external training mostly from government institutes and less from private institutes and industry associations. The sector is also less reliant on public vocational education and training (VET) schools and universities. In addition, training in the manufacturing sector is usually concentrated on highly skilled employees.

### ***E. Professional Licensure Requirements***

Given that most professionals working in the manufacturing sector comprise of those who specialize in physical, mathematical and engineering sciences, the following professional licensure requirements may be of relevance (PRC, 2012):

- Aeronautical Engineering
- Civil Engineering
- Chemistry
- Chemical Engineering
- Electronic Engineering
- Electronics Technician
- Fisheries Technologist
- Naval Architecture and Marine Engineering
- Metallurgical Engineering
- Mechanical Engineering
- Agricultural Engineering
- Mining Engineering
- Forestry
- Agriculture

### ***F. Personal Qualities***

Aside from the training that workers incurred from formal education and previous job experience, they also have to possess qualities that will make them stay longer in the job and be more productive. These qualities may be manifested in skills acquired over time, through education or experience.

Based on di Gropello's (2010) discussion on the skills for the labor market in the Philippines, employers value more the ability of the individual to work independently, good communication skills, and problem-solving skills above other skills.

Most of the occupations mentioned in the previous section involve managers and production or sales workers. Di Gropello (2010) highlights the top three skills for managers and this include

problem solving, leadership, and communication skills. For production workers, the top three skills are independent work, teamwork, and communication skills. The least important skills for both occupations are writing, language, and computer skills. Communication skills are deemed to be important to prevent misunderstandings and conflicts from happening in the workplace. Language skills are not as important as communication skills because it is a given that most workers are adept with the English language.

In general, di Gropello (2010) identifies three important core skills for the manufacturing sector and this includes independent work, teamwork, and problem solving skills. These skills are applicable to most of the occupations mentioned in the previous section. Since the manufacturing sector is concerned with a product or output, these qualities or skills are essential in coming up with high quality products.

The common occupations in the sub-sectors mentioned above such as production clerks and supervisors, quality inspectors, and engineers should possess these personal qualities.

Below are specific examples of occupations and their important personal qualities:

Accounting and bookkeeping clerks

- Highly organized, keen on details and accuracy, team player, pleasant personality, and with good analytical and presentation skills

Production clerks

- Attention to detail, accuracy, and the ability to work in an ever-changing environment

Production supervisors and general foremen

- Strong organizational and team-building skills; Exceptional communication skills, both written and verbal

#### Plant and machine operators

- highly-motivated and good team-player;
- Ability to physically push, pull and lift heavy loads

#### Quality inspectors

- Responsible, accurate and thorough, with a sharp eye for detail methodical and willing to work within set procedures and time constraints

#### Chemical engineers

- Analytical, creative, and innovative

#### Mechanical engineers

- Organized, with good project-management skills

#### Chemical engineering technicians

- Pay close attention to detail have good problem-solving skills

#### Mechanical engineering technicians

- Able to make decisions quickly and work well under pressure

#### Assemblers

- Efficient, accurate, and with an eye for detail; practical skills for working with machines, and materials such as aluminum or wood

## ***G. Terms of Employment***

### **Full-time employment**

Most occupations in the manufacturing sector are hired on a full-time basis and are eventually offered tenure status in the company after fulfilling the requirements satisfactorily. Professionals in the manufacturing sector such as engineers and chemists, technicians and associate professionals, and clerks are usually offered a full-time contract. Based on the Labor Code of the Philippines (DOLE, 2013), people working full-time are required to work not more than 8 hours a week. Work performed beyond 8 hours is called overtime work and should be given additional compensation - that is his regular wage plus at least 25 percent thereof (DOLE, 2013).

### **Part-time employment**

Occupations that devote less than 40 hours a week are considered part-time employment. This include technicians and associate professionals, trades and related workers such as those who are engaged in metal, machinery and related trade workers; precision, handicraft, printing and related trades workers; and other craft and related trades workers. Plant and machine operators and assemblers; and production staff/crew are also working less than 40 hours a week. The usual number of hours per work day is 4 hours or two full days per week. For some plants/factories which production relies on demand and availability of raw materials, working hours are very volatile. Examples are garment workers and food processing workers.

Some plants or factories engaged in the production of goods, offer flexible working arrangements as a cost reduction measure. For instance, during peak season, workers are required to work the full shift and otherwise during offseason.

# Chapter 3

## Industry Occupations

### A. Working Conditions

#### *i. Nature of Employment in the said sub-sectors*

Jobs in the manufacturing sector, though diverse in roles and functions, mostly offer full-time employment contracts. This is unsurprising given the need for continuous production and assembly in most sub-sectors operating within the industry. This implies that factory workers, engineers, and production supervisors/managers alike will be expected to work on a full-time basis so as to minimize supply disruptions.

Those employed in the manufacturing sectors may also be required to accept shift work. Shift work is defined as employment policies that require employees during pre-specified shift schedules aside from the conventional/standard day shift (e.g. 8 a.m. to 5 p.m.). Doing so allows for continuity of operations of firms that operate within sub-sectors that face high levels of product demand. Shift schedules are determined by product demand fluctuations and human resource constraints ii. Working Hours.

Based on 2010 figures, those seeking employment in the manufacturing industry should expect to work for an average of 44.4 hours weekly. Average weekly work hours in the manufacturing industry have exhibited only slight fluctuations within the 43 to 45 hours range over the past ten years. Such figures have consistently been higher than that of the national average.

It is also suggests heterogeneity between different occupational groups with significant presence within the manufacturing industry. For instance, individuals classified

under “Technicians and Associate Professionals” and “Laborers and Unskilled Workers” worked for an average of 37-39 hours weekly while those classified under “Plant and Machine Operators and Assemblers” worked for an average of 48-49 hours per week. This can be explained by the nature of work accomplished by the aforementioned occupation groups. Plant managers/ supervisors and assembly-line workers constitute a core function of most manufacturing businesses while technicians and unskilled labor merely serve complementary and peripheral functions.

### *iii. Working Environment*

Based on the Occupational Safety and Health system in the Philippines , the following are the duties of the employers: (1) furnish safe and health working conditions; (2) give job safety instruction; and (3) use approved safety devices  
[http://www.google.com.ph/url?sa=t&rct=j&q=&esrc=s&source=web&cd=17&cad=rja&ved=0CGQQFjAGOAo&url=http%3A%2F%2Fwww.freewebs.com%2Fjerjae%2Fbfp%2Foccu%2520safety%2520hazard%2F14\\_OSH%2520System%2520in%2520RP.ppt&ei=1C6TUvOgBsyViAftqYHIBw&usg=AFQjCNFhQ52O66PjTw\\_tH8qvQRG4I7MaA&sig2=Bqnow-ND17I82MPMZNDa-w&bvm=bv.56988011,d.aGc](http://www.google.com.ph/url?sa=t&rct=j&q=&esrc=s&source=web&cd=17&cad=rja&ved=0CGQQFjAGOAo&url=http%3A%2F%2Fwww.freewebs.com%2Fjerjae%2Fbfp%2Foccu%2520safety%2520hazard%2F14_OSH%2520System%2520in%2520RP.ppt&ei=1C6TUvOgBsyViAftqYHIBw&usg=AFQjCNFhQ52O66PjTw_tH8qvQRG4I7MaA&sig2=Bqnow-ND17I82MPMZNDa-w&bvm=bv.56988011,d.aGc).

The manufacturing industry is exposed to various hazardous workplaces. Examples are construction work, manufacture or handling of explosives and pyrotechnic products, and exposure to biological agents such as bacteria, etc. Given this, every employer is required to perform the following tasks: (1) provide a health and safety committee to develop an accident prevention program; (2) keep records of accidents/or illnesses; (3) control of physical and chemical agents: and (4) provide personal protective equipment

### *iv. Benefits*

As mandated by the Philippine Labor Code and special laws, employees are entitled to the following provisions and employee benefits:

- Minimum wage = P426 per day
- 13th month pay (after 1 month of service) = 1/12 of the total basic salary earned by an employee within a calendar year
- Overtime pay= 25% premium on hourly rate
- Night shift differential if work between 10:00 PM to 6:00 AM = 10% premium on hourly rate
- Special non-working day = 30% premium if worked
- Regular holiday pay: 100% premium if worked, paid if unworked
- Service incentive leave = 5 days after 1 year of service
- Maternity leave = daily maternity benefit equivalent to one hundred percent (100%) of her average salary credit for sixty (60) days or seventy-eight (78) days
- Paternity leave = 7 days leave with pay (married only)
- Parental leave for solo parents= 7 days leave with pay
- Social Security System contribution (based on salary)
- Pag-IBIG contribution (based on salary)
- PhilHealth contribution (based on salary)

Meanwhile, the following benefits can be granted to employees at the discretion of the employer:

- Housing and accommodation allowances and subsidies
- Expense accounts
- Vehicle of any kind
- Household personnel (maid, driver, etc.)

- Interest on loans at less than the market rate (12%) to the extent of the difference between the market rate and the interest rate the employee assumed
- Membership fees, dues and other expenses paid by the employer for the employee in social and athletic clubs and organizations
- Expenses for foreign travel
- Educational assistance to the employee or his dependents
- Life or health insurance and other non-life insurance premiums or similar amounts greater than what is allowed by law

Per the Revenue Regulation (RR) 5-2011 dated March 16, 2011 further amending Revenue Regulations No. 2-98 and Revenue Regulations No. 3-1998, as last amended by RR 5-2008, the following benefits, also known as the minimim benefits, are exempted from taxes (Abrugar, 2011):

- Monetized unused vacation leave credits of private employees not exceeding 10 days during the year
- Monetized value of vacation and sick leave credits paid to government officials and employees;
- Medical cash allowance to dependents of employees not exceeding P750.00 per employee per semester or P125 per month;
- Rice subsidy of P1,500.00 or one (1) sack of 50-kg rice per month amounting to not more than P1,500.00;
- Uniforms and clothing allowance not exceeding P4,000 per annum;
- Actual medical assistance, e.g. medical allowance to cover medical and healthcare needs, annual medical/executive check-up, maternity assistance, and routine consultations, not exceeding P10,000 per annum;

- Laundry allowance not exceeding P300 per month;
- Employees achievement awards, e.g., for length of service or safety achievement, which must be in the form of a tangible personal property other than cash or gift certificate, with an annual monetary value not exceeding PhP10,000.00 received by the employee under an established written plan which does not discriminate in favor of highly paid employees;
- Gifts given during Christmas and major anniversary celebrations not exceeding P5,000 per employee per annum; and
- Daily meal allowance for overtime work and night/graveyard shift not exceeding 25% of the basic minimum wage on a per region basis.

#### ***v. Occupational Hazards***

The following occupational hazards exist within the manufacturing industry:

- Exposure to hazardous chemicals and compounds that can endanger the employees' health
- Machine error that can cause physical injuries
- Exposure to high levels of machine noise that can damage hearing capacities
- Excessive manual handling that can induce overexertion which causes occupational overuse syndrome (OOS)

## **B. Earnings**

### ***i. Average Salary per Occupation***

Table 16 shows the average monthly wage rates of selected benchmark occupations across the complete set of sub-sectors

operating within the manufacturing industry. These benchmark occupations were chosen to provide readers a general sense of compensation levels across different sub-sectors. Accounting and bookkeeping clerks may be representative of jobs that require at least tertiary education (skilled and semi-skilled) while unskilled workers may be representative of jobs that require secondary education or less. The latest information available was published in 2012.

For the whole manufacturing industry, skilled/semi-skilled workers earn PhP 14,267 monthly whereas unskilled workers receive an average of only PhP 9,561 per month – roughly 30 percent less. The highest paid skilled/semi-skilled workers can be found in the following sub-sectors: (1) Manufacture of Tobacco Products, (2) Manufacture of Coke and Refined Petroleum Products, (3) Manufacture of Transport Equipment except Building and Repairing of Ships and Boats, (4) Manufacture of Chemicals and Chemical Products, and (5) Manufacture of Other Non-metallic mineral products. Meanwhile, the highest paid unskilled workers can be found in the following sub-sectors: (1) Manufacture of Paper and Paper Products, (2) Manufacture of Electrical Equipment, (3) Manufacture of Chemicals and Chemical Products, (4) Manufacture of Coke and Refined Petroleum Products, and (5) Manufacture of Basic Metals. Observably, the chemicals and petroleum products manufacturing sub-industries pay relatively higher wages to both skilled/semi-skilled and unskilled workers.

**Table 9. Average Monthly Wage Rates of Benchmark Occupations by Sub-Sector in the Manufacturing Industry, Philippines: July 2012**

	<b>Accounting and Bookkeeping Clerks</b>	<b>Unskilled Workers except Janitors, Messengers and</b>
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		<b>Freight Handlers</b>
<b>Manufacturing</b>	<b>14,267</b>	<b>9,561</b>
Manufacture of Food Products	14,113	10,116
Manufacture of Beverages	14,959	8,180
Manufacture of Tobacco Products	35,504	6,469
Manufacture of Textiles	14,444	9,853
Manufacture of Wearing Apparel	11,832	8,361
Manufacture of Leather and Related Products	11,624	8,754
Sawmilling and Planing of Wood	10,833	8,003
Manufacture of Products of Wood, Cork, Straw and Plaiting Materials	11,481	8,654
Manufacture of Paper and Paper Products	13,892	11,750
Printing and Reproduction of Recorded Media	12,367	9,522
Manufacture of Coke and Refined Petroleum Products	18,448	11,310
Manufacture of Chemicals and Chemical Products	17,904	11,541
Manufacture of Basic Pharmaceutical Products and Pharmaceutical Preparation	14,653	10,786
Manufacture of Rubber Products	13,880	9,468
Manufacture of Plastic Products	13,786	9,433
Manufacture of Other Non-Metallic Mineral Products	17,309	9,476
Manufacture of Basic Metals	14,615	10,888
Manufacture of Fabricated Metal Products except Machinery and Equipment	14,493	9,456
Manufacture of Computer, Electronic and Optical Products	15,132	9,231
Manufacture of Electrical Equipment	13,454	11,641
Manufacture of Machinery and Equipment, n.e.c.	13,768	9,694

Manufacture of Motor Vehicles, Trailers and Semi-Trailers	15,056	9,132
Manufacture of Other Transport Equipment except Building of Ships and Boats	18,309	7,843
Building of Ships and Boats	15,839	10,082
Manufacture of Furniture	10,671	7,564
Other Manufacturing; Repair and Installation of Machinery and Equipment	13,351	7,975
Manufacture of Food Products	14,113	10,116
Manufacture of Beverages	14,959	8,180
Manufacture of Tobacco Products	35,504	6,469
Manufacture of Textiles	14,444	9,853
Manufacture of Wearing Apparel	11,832	8,361
Manufacture of Leather and Related Products	11,624	8,754
Sawmilling and Planing of Wood	10,833	8,003
Manufacture of Products of Wood, Cork, Straw and Plaiting Materials	11,481	8,654
Manufacture of Paper and Paper Products	13,892	11,750
Printing and Reproduction of Recorded Media	12,367	9,522
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Manufacture of Basic Pharmaceutical Products and Pharmaceutical Preparation	14,653	10,786
Manufacture of Rubber Products	13,880	9,468
Manufacture of Plastic Products	13,786	9,433
Manufacture of Other Non-Metallic Mineral Products	17,309	9,476
Manufacture of Basic Metals	14,615	10,888
Manufacture of Fabricated Metal Products except Machinery and Equipment	14,493	9,456

Manufacture of Computer, Electronic and Optical Products	15,132	9,231
Manufacture of Electrical Equipment	13,454	11,641
Manufacture of Machinery and Equipment, n.e.c.	13,768	9,694
Manufacture of Motor Vehicles, Trailers and Semi-Trailers	15,056	9,132
Manufacture of Other Transport Equipment except Building of Ships and Boats	18,309	7,843
Building of Ships and Boats	15,839	10,082
Manufacture of Furniture	10,671	7,564
Other Manufacturing; Repair and Installation of Machinery and Equipment	13,351	7,975

Source: BLES 2012 Occupational Wages Survey.

### *ii. Average Revenue per sub-sector*

According to the preliminary results of the 2010 Annual Survey of Philippine Business and Industry, total revenue of the entire industry amounted to PhP 3.5 billion. The top three sub-sectors that contributed to the industry's overall revenue were the manufacture of basic chemical (15% of total), manufacture of footwear (11%), and manufacture of refined petroleum products (5%). The table below shows the total revenue of each sub-sector for the year 2010.

**Table 10. Total Revenue by Sub-Sector in Manufacturing Industry, Philippines: 2010**

Industry Description	Total Revenue
<b>PHILIPPINES</b>	<b>3,546,726,922</b>
Manufacture of basic chemicals	529,821,083

Manufacture of footwear	398,319,791
Manufacture of optical instruments and photographic equipment	192,073,236
Manufacture of refined petroleum products	154,902,714
Sawmilling and planing of wood	154,824,479
Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	147,572,767
Manufacture of furniture	133,142,631
Manufacture of products of wood, cork, straw and plaiting materials	123,459,021
Manufacture of vegetable and animal oils and fats	112,376,973
Manufacture of prepared animal feeds	104,137,938
Spinning, weaving and finishing of textiles	93,769,247
Repair of fabricated metal products, machinery and equipment	84,693,906
Manufacture of domestic appliances	82,473,398
Manufacture of motor vehicles	77,662,462
Manufacture of communication equipment	77,619,302
Custom tailoring and dressmaking	75,282,351
Processing and preserving of fish, crustaceans and mollusks	68,641,451
Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	64,728,191
Manufacture of weapons and ammunition	61,136,561
Manufacture of other electrical equipment	60,005,659
Manufacture of special purpose machinery	56,950,901

Manufacture of transport equipment, n.e.c.	56,204,471
Manufacture of glass and glass products	55,923,070
Manufacture of pharmaceuticals, medicinal chemical and botanical products	44,929,863
Processing and preserving of meat	41,841,832
Manufacture of other fabricated metal products; metal working service activities	40,296,729
Manufacture of games and toys	39,807,929
Manufacture of batteries and accumulators	36,672,913
Reproduction of recorded media	36,191,048
Casting of metals	30,998,379
Manufacture of paper and paper products	29,537,191
Manufacture of wiring and wiring devices	28,760,845
Manufacture of grain mill products, starches and starch products	24,111,744
Manufacture of tobacco products	20,727,712
Processing and preserving of fruits and vegetables	20,049,097
Manufacture of medical and dental instruments and supplies	18,184,161
Manufacture of dairy products	16,552,076
Manufacture of structural metal products, tanks, reservoirs and steam generators	14,652,678
Manufacture of other chemical products, n.e.c.	13,794,516
Manufacture of general purpose machinery	13,176,123
Manufacture of knitted and crocheted apparel	11,178,358
Building of ships and boats	10,833,719

Manufacture of measuring, testing, navigating and control equipment; watches and clocks	9,692,124
Manufacture of jewelry, bijouterie and related articles	9,434,539
Manufacture of air and spacecraft and related machinery	8,806,142
Manufacture of musical instruments	8,139,664
Manufacture of beverages	6,871,819
Printing and service activities related to printing	6,255,846
Manufacture of electronic components	5,566,958
Manufacture of wearing apparel, except fur	5,433,775
Manufacture of sports goods	4,876,872
Manufacture of computers and peripheral equipment and accessories	4,181,818
Manufacture of other textiles	4,090,091
Manufacture of electric lighting equipment	3,266,001
Manufacture of other food products	2,470,928
Manufacture of non-metallic mineral products,	2,255,831
Manufacture of rubber products	1,667,993
Tanning and dressing of leather; manufacture of luggage and handbags	1,217,123
Manufacture of plastic products	1,159,266
Manufacture of basic iron and steel	1,054,695
Manufacture of consumer electronics	1,027,527
Other manufacturing, n.e.c.	924,987

### **C. Training and Advancement**

Di Gropello, Tan, and Tandon (2010) report that a substantial percentage of small and medium manufacturing firms (40 to 90 percent) and almost all large manufacturing firms in the country offer in-house training programs to its employees.

Internal training programs are usually offered during the initial stages of employment where new hires are acquainted with company policies, the production process, and specific tasks that they are expected to accomplish. Some in-service training programs are also designed to teach new workers a set of practical skills that are not taught in the formal educational system (Di Gropello, Tan, and Tandon, 2010). Existing workers also undergo periodical training programs when (1) new technologies and equipment are integrated within the production process or when (2) quality-control policies are being updated. Some firms also offer in-house general training programs that hone employees' leadership, communicational, and technical skills. As an employee, one must be conscious of such opportunities usually offered by the firm's human resource department.

In-service training can be classified as either being formal or informal. Formal programs that follow specifically designed curricula and pedagogies usually combine classroom-based seminars and lectures with

practical training in the production floor. Informal programs, on the other hand, come in the form of on-the-job training where a more senior employee supervises the trainee.

Other points that the reader might find relevant include:

- Incidence of training is reportedly higher for lower level staff in the manufacturing sector (as opposed to the services sector).
- Export-oriented firms have reported higher incidence of training when compared to non-exporter firms.
- Manufacturing firms' in-house training programs are usually run by managers, supervisors, and outside consultants.

Employees who seek to upgrade their technical skills can choose to enroll in short-courses offered by the Technical Education and Skills Development Authority (TESDA).

The management of TVET systems in the country is handled by the TESDA. As of 2009, out of 4,041 TVET providers that were present in the country, 89.8 percent were public institutions and 10.2 percent were privately-run (TESDA, 2009). Public TVET providers included 121 TESDA Technology Institutions composed of 57 schools, 15 Regional Training Centers, 45 Provincial Training Centers and 4 Specialized Training Centers. Other public TVET institutions include State Universities and Colleges (SUC) and Local Government Colleges that offer certificate or non-degree programs, schools supervised by the

Department of Education, as well as other government agencies.

TVET education in the Philippines is delivered through varying modes. Programs classified under *institution-based* delivery are completed primarily through attending classroom-based instruction in schools (TESDA-administered schools, SUCs, government agencies) or TESDA training centers. Programs offered by schools often require one to three years to complete while those offered in TESDA training centers can be completed in three to six months (Péano et al., 2008). Given the need for training in actual workplace skills, TVET programs can also be offered through *company-based* delivery. In recognition of the need for companies' involvement in training the country's future workforce, partners may participate in three different company-based training programs (TESDA, n.d.):

- Apprenticeship Program – A training and employment program involving a contract between an apprentice and an employer on an approved apprenticeable occupation.
- Learnership Program – An on-the-job training program for approved learnable occupations that last for a period that does not exceed three months.
- Dual Training System – Programs where learning takes place in schools and in a company in order to balance theoretical and applied knowledge.

Community-based programs that target poor communities, underprivileged individuals (i.e. out-of-school youth, unemployed adults), marginalized sectors (i.e. subsistence farm workers, fisher folks), and

economic groups (i.e. informal sector) are also conducted on a regular basis. These types of programs simply focus on basic skills and thus last for only one week to three months.

Besides enrolling in TESDA-offered courses, individuals can also seek for training from professional organizations (e.g. Production Management Association of the Philippines, Philippine Institute of Chemical Engineers, Philippine Society of Mechanical Engineers) that offer short-courses and seminars on a regular basis. Likewise, one can also enroll in programs offered by private training centers and institutions of higher education (e.g. colleges and universities).

Several manufacturing firms have expressed the need to increase leadership and communicational skills. Individuals that specialize in highly technical jobs tend to underinvest in skills such as personnel management, oral and written articulation, and business management. Such skills will be crucial to progress and advancement within the firm's hierarchy. These must complement existing technical skills given a globalizing business landscape.

#### **D. Specific Occupations**

This section focuses on job description, basic educational/ training/ skill requirements, professional licensure requirements, work environment, training and advancement, and earnings of various occupations in the manufacturing sector. Most of the information is presented in tables below.

## Accounting and Bookkeeping Clerks<sup>7</sup>

<b>Job Description</b>	<ul style="list-style-type: none"> <li>▪ Complete and submit tax forms and returns, workers' compensation forms, pension contribution forms, and other government documents;</li> <li>▪ Maintain inventory records;</li> <li>▪ Perform personal bookkeeping services;</li> <li>▪ Compute deductions for income and social security taxes;</li> <li>▪ Prepare purchase orders and expense reports;</li> <li>▪ Classify, record, and summarize numerical and financial data in order to compile and keep financial records, using journals and ledgers or computers; and</li> <li>▪ Compile statistical, financial, accounting or auditing reports and tables pertaining to such matters as cash receipts, expenditures, accounts payable and receivable, and profits and losses</li> </ul>
<b>Basic Educational/ Training/ Skill Requirements</b>	<p><b>Minimum:</b> 3-4 year business-related degree  <b>Ideal:</b> Bachelor of Science in Accountancy;          Computer literate with high competency skills on MS Excel</p>
<b>Professional Licensure Requirements</b>	None
<b>Work Environment</b>	Bookkeeping, accounting, and auditing clerks work in offices.
<b>Training and Advancement</b>	Accounting and bookkeeping clerks obtain additional training while on the job. More experienced employees and supervisors facilitate the learning of specialized tasks (e.g.

<b>Earnings</b>	<p>double-entry bookkeeping) not taught in school. Likewise, formal classroom training that imparts knowledge on specialized computer software and accounting principles may also be offered.</p> <p>Procurement of additional education, certification, or work experience allows clerks to become accountants or auditors.</p> <p>Accounting and bookkeeping clerks who worked in the Philippines in August 2010 earned a monthly income of PhP12,715</p>
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<http://job-descriptions.careerplanner.com/Bookkeeping-Accounting-and-Auditing-Clerks.cfm>  
<http://www.bls.gov/ooh/office-and-administrative-support/bookkeeping-accounting-and-auditing-clerks.htm#tab-4>

<b>Production Clerks<sup>4</sup></b>	
<b>Job Description</b>	<ul style="list-style-type: none"> <li>▪ Compile and record production data for industrial establishment to prepare records and reports on volume of production, consumption of raw material, quality control, and other aspects of production;</li> <li>▪ Calculate factors, such as types and quantities of items produced, materials used, amount of scrap, frequency of defects, and worker and department production rates, using adding machine or calculator;</li> <li>▪ Write production reports based on data compiled, tabulated, and computed, following prescribed formats; and</li> <li>▪</li> <li>▪ Compile from customer orders and other specifications detailed production sheet or work tickets for use by production workers as guides</li> </ul>

<sup>4</sup>Online source of information:

<http://dot-job-descriptions.careerplanner.com/PRODUCTION-CLERK.cfm>

	<p>in assembly or manufacture of product.</p> <ul style="list-style-type: none"> <li>▪ .</li> </ul>
<b>Basic Educational/Training/ Skill Requirements</b>	<p><b>Minimum:</b> Vocational Diploma / Short Course Certificate, Bachelor's/College Degree in any field</p> <p><b>Ideal:</b> Bachelor of Science in Business Management or Operations Management; With 1-2 years work experience; Computer literate with high competency skills on MS Excel</p>
<b>Professional Licensure Requirements</b>	None
<b>Working Environment</b>	Most material recording clerks spend significant time in warehouses.
<b>Training and Advancement</b>	Procurement of additional education, certification, or work experience allows production clerks to advance to various positions including but not limited to purchasing agents, supply-chain managers, and production supervisors.
<b>Earnings</b>	Production clerks who working in the Philippines in August 2010 earned an average monthly income of PhP10,231.
<b>Quality Inspectors<sup>5</sup></b>	
<b>Job Description</b>	<ul style="list-style-type: none"> <li>▪ Audit and monitor quality requirements in accordance with the company quality assurance policies and customer specifications;</li> <li>▪ File incoming component device history records;</li> <li>▪ Conduct inspections at First Article, in-process, in-coming and completes the final inspections;</li> <li>▪</li> </ul>

<sup>5</sup>Online sources of information:

- [www.humanresources.hrvinet.com/quality-inspector-job-description/](http://www.humanresources.hrvinet.com/quality-inspector-job-description/)
- <http://www.bls.gov/ooh/production/quality-control-inspectors.htm#tab-4>

	<ul style="list-style-type: none"> <li>▪ Document and report inspection findings and results and monitors corrective actions to inspection findings;</li> <li>▪ Perform accurate mechanical, physical and visual inspection of raw materials, components, and sub-assemblies as per Inspection Plans and Specification Requirements;</li> <li>▪ Perform first article inspections to support the component qualification process;</li> <li>▪ Perform material kit audits to insure accuracy and integrity of the kitting process;</li> <li>▪ Perform product identification and traceability activities, as required;</li> <li>▪</li> <li>▪ Communicate with project engineers to ensure schematics are in compliance with the final product; and</li> <li>▪</li> <li>▪ Conduct various tests and quality checks on finished products. Insure that all products have been tested and fall within standards, measured to specifications and within tolerances, readability of labels, etc.</li> <li>▪</li> </ul>
<b>Basic Educational/Training/ Skill Requirements</b>	<b>Minimum:</b> Secondary Diploma and Vocational Diploma / Short Course Certificate <b>Ideal:</b> Bachelor's/College Degree in any field; With 3-4 years work experience;
<b>Professional Licensure Requirements</b>	None
<b>Work Environment</b>	<ul style="list-style-type: none"> <li>▪ Work environments vary, depending on industry-type and establishment size.</li> <li>▪ Some quality inspectors examine similar products for the duration of their entire shift while others examine a variety of items.</li> </ul>

	<ul style="list-style-type: none"> <li>▪ In the manufacturing industry, most quality-control inspectors are positioned at one workstation. Some will have to remain standing for their entire shift while others may be required to engage in physical activity (e.g. lifting heavy objects).</li> <li>▪ Workers in heavy-manufacturing plant risk exposure to excessive noise and grime of machines and equipment. Meanwhile, in other plants, inspectors work in clean, air-conditioned environments suitable for testing products.</li> </ul>
<b>Training and Advancement</b>	<ul style="list-style-type: none"> <li>▪ New quality inspectors often undergo training while on the job. This involves familiarizing oneself with the use of special meters, gauges, computers, and other instruments; quality-control techniques; blueprint reading; product safety and durability standards; and reporting requirements.</li> <li>▪ With a transition to more automated/high-technology processes that may need less manual inspection, quality inspectors may need to learn how to operate and program more sophisticated equipment and software applications. This can be obtained through formal education (e.g. TVET or tertiary education)</li> </ul>
<b>Earnings</b>	Quality inspectors who worked in the Philippines in August 2010 earned an annual average income of PhP11,410.
<b>Production Supervisors and General Foremen<sup>6</sup></b>	
<b>Job Description</b>	<ul style="list-style-type: none"> <li>▪ Oversee production process, drawing up a production schedule;</li> <li>▪</li> <li>▪ Work out the human and material</li> </ul>

	<p>resources needed;</p> <ul style="list-style-type: none"> <li>▪ Estimate costs and setting the quality standards;</li> <li>▪ Monitor production processes and adjusting schedules as needed;</li> <li>▪ Selection and maintenance of equipment; and Monitor product standards and implementing quality-control programs. Liaise among different departments, e.g. suppliers, managers.</li> </ul>
<b>Basic Educational/Training/ Skill Requirements</b>	<p><b>Minimum:</b> Bachelor's/College Degree in any field</p> <p><b>Ideal:</b> Substantial work experience and specialization in any of the following fields:</p> <ul style="list-style-type: none"> <li>▪ mechanical engineering</li> <li>▪ food science/technology</li> <li>▪ process engineering</li> <li>▪ business management</li> <li>▪ electrical and electronic engineering</li> <li>▪ materials science/technology</li> <li>▪ transport/distribution/logistics</li> <li>▪ chemistry</li> <li>▪ physics</li> <li>▪ biochemistry</li> </ul>
<b>Professional Licensure Requirements</b>	None
<b>Working Environment</b>	Most manufacturing foremen must divide time between their offices and the production areas.
<b>Training and Advancement</b>	Procurement of additional education (e.g. Bachelor of Science in Management/Operations Management), certification, or work experience allows production supervisors to advance to management positions with more decision-making/executive powers.

<b>Earnings</b>	Production supervisors and general foremen who worked in the Philippines in August 2010 earned an average monthly income of PhP19,550.
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[http://www.prospects.ac.uk/production\\_manager\\_job\\_description.htm](http://www.prospects.ac.uk/production_manager_job_description.htm)

<b>Plant and Machine Operators<sup>7</sup></b>	
<b>Job Description</b>	<p>Plant operator</p> <ul style="list-style-type: none"> <li>• control plant equipment such as loaders, drills, tractors, trucks, crushers, excavators, forklifts, bulldozers and crane;</li> <li>• handle materials and cargo used at the construction site;</li> <li>• carry out preventive and routine maintenance of the plant and equipment at a construction site; and</li> <li>• move and handle equipment at the project site while also carrying out safety checks on equipment daily</li> </ul> <p>Machine operators</p> <ul style="list-style-type: none"> <li>• Setters: prepare the machine for operation by equipping it with the appropriate tools and making sure those tools are in good working condition.</li> <li>• Tenders: run and monitor the machine while it is working; inspect machines periodically throughout the shift and may adjust machine speeds or load machines with materials.</li> </ul>

<sup>7</sup>Online sources of information:

- [http://www.ehow.com/about\\_6079883\\_machine-operator-job-description.html](http://www.ehow.com/about_6079883_machine-operator-job-description.html)
- [http://www.ehow.com/about\\_6570737\\_plant-operator-job-description.html](http://www.ehow.com/about_6570737_plant-operator-job-description.html)

<b>Basic Educational/ Training/ Skill Requirements</b>	<b>Minimum:</b> Vocational Diploma / Short Course Certificate, <b>Ideal:</b> Bachelor of Science in any field
<b>Professional Licensure Requirements</b>	None
<b>Working Environment</b>	Plant and machine operators often work in production areas. This exposes them to various risks such as physical injury and substance exposure. As such, employees are required to strictly follow company policies, wear protective gear at all times, and exercise due caution.
<b>Training and Advancement</b>	New operators typically receive training on the job as they acquaint themselves with plant operations and machines/equipment used in the production process.  Plant and machine operators who possess higher levels of leadership skills, personnel management skills, communicational skills, and in-depth knowledge of plant/machine operations may advance to supervisory positions. Additional education (TVET, tertiary) may also be of importance.
<b>Earnings</b>	Plant and machine operators who worked in the Philippines in August 2010 earned average monthly income of PhP11,058.

<b>Chemical Engineers<sup>8</sup></b>	
<b>Job Description</b>	<p>Typical activities are extremely diverse, depending on the role and the sector in which he/she works, but may include:</p> <ul style="list-style-type: none"> <li>▪ Work closely with process chemists and control engineers to ensure the process plant is set up;</li> <li>▪ Design plant and equipment configuration;</li> <li>▪ Assess options for plant expansion or reconfiguration by developing and testing process simulation models;</li> <li>▪ Design, install and commissioning new production plants, including monitoring developments and troubleshooting; and</li> <li>▪ Analyze processes and compiling de-bottleneck studies.</li> </ul>
<b>Basic Educational/Training/ Skill Requirements</b>	<p><b>Minimum:</b> Bachelor of Science in Chemical Engineering  <b>Ideal:</b> Master of Science in Chemical Engineering</p>
<b>Professional Licensure Requirements</b>	Chemical Engineering Licensure Exam
<b>Work Environment</b>	Chemical Engineers spend most of their time in offices and laboratories. Those employed within the manufacturing industry may spend a significant amount of time in industrial plants, refineries, and other locations, where they survey, monitor, and direct operations or provide

<sup>8</sup>Online sources of information:

- [http://www.prospects.ac.uk/chemical\\_engineer\\_job\\_description.htm](http://www.prospects.ac.uk/chemical_engineer_job_description.htm)
- <http://www.bls.gov/ooh/architecture-and-engineering/chemical-engineers.htm#tab-4>

	technical/troubleshooting assistance to solve onsite problems.
<b>Training and Advancement</b>	<p>Additional training for chemical engineers come in the form of (1) procuring higher degrees from formal educational institutions or (2) obtaining work experience in various fields of specialization. Earning a graduate degree will allow for collaborative research work with senior faculty while work experience hones decision-making capacities.</p> <p>Entry-level engineers usually work closely with more senior engineers during which they gain knowledge and experience. Large companies offer formal classroom-based lectures and seminars. Soon, the chemical engineer is assigned to more difficult projects (developing designs) and is given more decision-making powers.</p> <p>Eventually, chemical engineers advance to a supervisory/management position where he/she leads a team of engineers and technicians.</p>
<b>Earnings</b>	Chemical engineers who worked in the Philippines in August 2010 earned an average monthly income of Php22,706.

<b>Mechanical Engineers<sup>9</sup></b>	
<b>Job Description</b>	<ul style="list-style-type: none"> <li>▪ Design and implement cost-effective equipment modifications to help improve safety, reliability and throughout;</li> <li>▪ Develop a project specification with colleagues;</li> <li>▪ Develop, test and evaluate theoretical</li> </ul>

<sup>9</sup>Online sources of information:

- [http://www.prospects.ac.uk/mechanical\\_engineer\\_job\\_description.htm](http://www.prospects.ac.uk/mechanical_engineer_job_description.htm)
- <http://www.bls.gov/ooh/architecture-and-engineering/chemical-engineers.htm#tab-4>

	<p>designs;</p> <ul style="list-style-type: none"> <li>▪ Discuss and solve complex problems with manufacturing departments, sub-contractors, suppliers and customers;</li> <li>▪ Manage projects using engineering principles and techniques;</li> <li>▪ Plan and design new production processes;</li> <li>▪ Recommending modifications following prototype test results; and</li> <li>▪ Monitoring and commissioning plant and systems.</li> </ul>
<b>Basic Educational/Training/ Skill Requirements</b>	<p><b>Minimum:</b> Bachelor of Science in Mechanical Engineering</p> <p><b>Ideal:</b> Master of Science in Mechanical Engineering</p>
<b>Professional Licensure Requirements</b>	Mechanical Engineering Licensure Exam
<b>Work Environment</b>	Most mechanical engineers work in professional office settings. However, their work may entail periodical visits to worksites (production plant, warehouses) in order to survey machinery, implement upgrades, troubleshoot problems, and engage in research and development.
<b>Training and Advancement</b>	<p>Mechanical engineers can choose to obtain graduate degrees in order to enhance their engineering expertise/keep up-to-date with new methods or technologies and increase business acumen.</p> <p>Many become administrators or managers after obtaining a graduate degree.</p>
<b>Earnings</b>	Mechanical engineers who worked in the Philippines in August 2010 earned an average monthly income of PhP20,818.

<b>Chemical Engineering Technicians<sup>10</sup></b>	
<b>Job Description</b>	<ul style="list-style-type: none"> <li>▪ Apply chemical engineering principles and technical skills to assist the Chemical Engineer in developing, improving, and testing chemical-plant processes, products, and equipment: Prepare charts, sketches, diagrams, flow charts, and compiles and records engineering data to clarify design details or functional criteria of chemical processing and physical operation units;</li> <li>▪ Participate in fabricating, installing, and modifying equipment to ensure that critical standards are met;</li> <li>▪ Test developmental equipment and formulates standard operating procedures;</li> <li>▪ Test processing equipment and instruments to observe and record operating characteristics and performance of specified design or process;</li> <li>▪ Writes technical reports and submits findings to the Chemical Engineer; and</li> <li>▪ Performs preventive and corrective maintenance of chemical processing equipment.</li> <li>▪</li> </ul>
<b>Basic Educational/Training/ Skill Requirements</b>	<p><b>Minimum:</b> Bachelor's/College Degree in any field</p> <p><b>Ideal:</b> Bachelor of Science in Chemical Engineering; With work experience</p>
<b>Professional Licensure Requirements</b>	None
<b>Work Environment</b>	Chemical engineering technicians spend substantial amounts of time in laboratories in

	order to assist chemical engineers and to conduct experiments. They also work in manufacturing facilities (e.g. plants and refineries) where they provide technical support to staff and monitor production processes.
<b>Training and Advancement</b>	Training for chemical engineering technicians usually come in the form of on-the-job training. More experienced technicians mentor new hires on proper methods of experimentation of machine operation. Procurement of additional education, certification, or work experience allows chemical engineering technicians to become chemical engineers or chemists.
<b>Earnings</b>	Chemical engineering technicians who worked in the Philippines in August 2010 earned an average monthly income of PhP12,780.

<b>Mechanical Engineering Technicians<sup>11</sup></b>	
<b>Job Description</b>	<ul style="list-style-type: none"> <li>▪ Prepare parts sketches and write work orders and purchase requests to be furnished by outside contractors;</li> <li>▪ Draft detail drawing or sketch for drafting room completion or to request parts fabrication by machine, sheet or wood shops;</li> <li>▪ Review project instructions and blueprints to ascertain test specifications, procedures, and objectives, and test nature of technical problems, such as redesign;</li> <li>▪ Review project instructions and</li> </ul>

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<sup>11</sup>Online source of information:  
<http://job-descriptions.careerplanner.com/Mechanical-Engineering-Technicians.cfm>

	<p>specifications to identify, modify and plan requirements fabrication, assembly and testing;</p> <ul style="list-style-type: none"> <li>▪ Devise, fabricate, and assemble new or modified mechanical components for products, such as industrial machinery or equipment, and measuring instruments;</li> <li>▪ Set up and conduct tests of complete units and components under operational conditions to investigate proposals for improving equipment performance;</li> <li>▪ Inspect lines and figures for clarity and return erroneous drawings to designer for correction;</li> <li>▪ Record test procedures and results, numerical and graphical data, and recommendations for changes in product or test methods;</li> <li>▪ Estimate cost factors, including labor and material for purchased and fabricated parts and costs for assembly, testing, and installing;</li> <li>▪ Set up prototype and test apparatus and operate test controlling equipment to observe and record prototype test results;</li> <li>▪ Operate drill press, grinders, engine lathe, or other machines to modify parts tested or to fabricate experimental parts for testing; and</li> <li>▪ Test equipment, using test devices attached to generator, voltage regulator, or other electrical parts, such as generators or spark plugs.</li> </ul>
<p><b>Basic Educational/ Training/ Skill</b></p>	<p><b>Minimum:</b> Bachelor's/College Degree in any field  <b>Ideal:</b> Bachelor of Science in Mechanical Engineering; With work experience</p>

<b>Requirements</b>	
<b>Professional Licensure Requirements</b>	None
<b>Work Environment</b>	Mechanical engineering technicians divide their time spent in laboratories for research development phases prior to the manufacturing process and in shop floors where they assist production processes.
<b>Training and Advancement</b>	Procurement of additional education (e.g. Bachelor of Science in Mechanical Engineering/Master of Science in Mechanical Engineering), certification, or work experience allows mechanical engineering technicians to become mechanical engineers.
<b>Earnings</b>	Mechanical engineering technicians who worked in the Philippines in August 2010 earned an average monthly salary of PhP16,688.

<b>Assemblers<sup>12</sup></b>	
<b>Job Description</b>	<ul style="list-style-type: none"> <li>▪ Operate production line machinery and computers;</li> <li>▪ Troubleshoot production line machinery;</li> <li>▪ Perform equipment change-over;</li> <li>▪ Responsible for quality control. Make adjustments as necessary to produce product within specifications;</li> <li>▪ Operate forklift to maintain raw material supply for the production line;</li> </ul>

	<ul style="list-style-type: none"> <li>▪</li> <li>▪ Perform preventive maintenance (PMs) on production line machinery;</li> <li>▪</li> <li>▪ Assist mechanics and machinists in repair work;</li> <li>▪ Perform back-up for warehouse; and</li> <li>▪ Order raw materials. Maintain material supply adhering to just in time manufacturing principles.</li> </ul>
<b>Basic Educational/ Training/ Skill Requirements</b>	<p><b>Minimum:</b> Secondary Diploma and Vocational Diploma / Short Course Certificate</p> <p><b>Ideal:</b> Bachelor's/College Degree in any field; With 3-4 years of work experience;</p>
<b>Professional Licensure Requirements</b>	None
<b>Work Environment</b>	Assemblers spend their work hours in manufacturing plants. Their work may involve long periods of standing or sitting in a stationary area. Risks are not as grave as those faced by plant and machine operators but remain existent.
<b>Training and Advancement</b>	Assemblers who seek to advance in their careers may either (1) obtain additional technical expertise through TVET programs or (2) aim for supervisory positions within the same field by enhancing their leadership, communicational, and relational skills.
<b>Earnings</b>	Assemblers who worked in the Philippines in August 2010 earned an average monthly salary of PhP9,341.

<http://www.hrvillage.com/hrjobdesc/Assembler.htm>



## Chapter 4

# Job Outlook and Prospects

### A. Growth Potentials

#### *i. Dynamism of the Industry*

One opportunity that our manufacturing sector could tap into is the reorganization and relocation of China's manufacturing sector. MasterCard Nationwide Global Economic Adviser Dr. Yuwa Hedrick-Wong believes that as China's labor force becomes more educated (in terms of college degree holders), wages costs will increase and there will be less of them willing to work in the manufacturing sector (Diokno, 2012). If this happens, the Philippines could position itself as a recipient of China's manufacturing sector. But we would have to compete with other neighboring countries such as Vietnam, Indonesia, Thailand, and Cambodia.

Aside from the shift from China to other countries such as the Philippines, the integrated markets of ASEAN countries through the global production network can also contribute to the growth of the Philippine manufacturing sector. With globalization and the development of markets all over the world, the role and contribution of the manufacturing sector in economic growth and employment will continue to expand.

#### *ii. Technological Innovations*

Based on the 2011-2012 Global Competitiveness Report, the Philippines ranked 62 (out of 142) in terms of

availability of latest technology. This implies that the country's technological preparedness could still be improved by adopting existing technologies to enhance productivity of industries and to improve capacity to fully leverage information and communication technologies in the production process (Global Competitiveness Report, 2012). In the Regional Economic Development Plan report of the Bangko Sentral ng Pilipinas (2012), the National Telecommunication Commission plans to promote network interconnection between Globe Telecom and the Philippine Long Distance Telephone, Co. in Regions I, III, and CAR.

In addition, the Philippines ranked 52<sup>nd</sup> in the area of firm-level technology absorption in the 2011-2012 Global Competitiveness Report. This was made possible by our skilled labor force that is highly trainable and resourceful.

### *iii. Developments in Business Practices*

The Philippine Environment Partnership Program (PEPP) is also a way for manufacturers to improve on sustainable business practices. It seeks to improve environmental practices with a set of incentives if the company chooses to adhere to pollution prevention. In addition, the Revised Industrial Ecowatch System (RIES) rates companies based on their compliance with environment regulations set by DENR. These programs will compel local companies to develop their sustainable business practices.

In August 2013, the Philippines is set to apply for duty-free exportation to the European Union (EU). The two requirements for eligibility are that the exports must

compromise less than 2% of total EU imports and more importantly, must abide by 27 conventions including environment, governance, labor rights and sustainability. This trade agreement would be beneficial especially for the tuna and garments industry of the country (De Vera, 2013). The development of international trade incentives for sustainability will prompt the government to create more programs and policies that reward such practices.

The eligibility for application to duty-free exportation and the emergence of environmentally sustainable programs have created avenues for business practices to be increasingly sustainable.

#### ***iv. Government Regulations***

To facilitate faster flow of investments as well as increase the competitiveness of the manufacturing sector, government regulations should be more conducive. The Fiscal Incentives Bills aims to rationalize and simplify the administration of fiscal and non-fiscal incentives to promote domestic and foreign investment in the country (PCCI, 2012). The Philippine Chamber of Commerce and Industry advocates the bill which is currently being deliberated in the Senate and is keen on passing it before the year ends. If passed into law, it would grant tax breaks to export-oriented enterprises that export at least 70 percent of their production. Moreover, it would grant incentives to strategic domestic enterprises identified under the annual Investments Priority Plan, enterprises located in Mindanao as well as in the thirty (30) poorest provinces in the country (PACC, 2012). If this would be

implemented, it could positively affect the manufacturing sector and help attract more investors to the country.

## **B. Employment Prospects**

Once the fiscal incentives bill is implemented coupled with improvements in infrastructure, it would help in attracting foreign investors in the country and lead to the creation of more manufacturing enterprises. Moreover, the program on private-public partnership will also help create employment opportunities in the manufacturing sector. Another factor that could lead to the more employment opportunities is the transfer of investments from China to other countries such as the Philippines due to the increase in the real wage of workers. If the Philippines is able to set in place the policies conducive for foreign investment, it could attract Chinese investors to transfer their business in the country. The government is preparing an integrated manufacturing industry roadmap to strengthen the sector. This could help contribute to employment opportunities.

Employment prospects in the international market remain weak because of the sluggish recovery of the US economy as well as the sovereign debt crisis in Europe. This has implication on overseas Filipino workers. The only way to stay competitive is to continue upgrading one's skills and training.

With the slow recovery of the US economy, there will still be a continuing demand for our exports of manufactured goods, particularly that of durable goods such as electronic gadgets and appliances and machines. Occupations in the highly skilled category will still be in demand in the next

decade which includes electrical engineers, electrical engineering technicians (in the manufacture of electrical machinery and apparatus sub-sector), electronics and telecommunications engineers and technicians, chemical engineers, and food technologists, among others.

## Chapter 5

# Challenges and Recommendations

The Philippine manufacturing sector could benefit more if we could work more on building our competitiveness. The following are the areas in the 2011-2012 Global Competitiveness Report where we ranked the highest:

<b>Pillar Of Competitiveness</b>	<b>Rank</b>
Infrastructure: Available airline seat kms/week, millions	28
Higher education and training: extent of staff training	34
Good market efficiency:	
○ degree of customer orientation	46
○ intensity of local competition	47
○ trade tariffs, % duty	47
Labor market efficiency: reliance on professional management	50
Financial market development:	
○ affordability of financial services	42
○ financing through local equity market	44
○ soundness of banks	46
○ availability of financial services	50
Market size:	
○ domestic market size index	31
○ foreign market size index	40
Business sophistication	
○ willingness to delegate authority	33
○ extent of marketing	40
○ control of international distribution	47

One area where we have to improve on is our institutions, particularly business cost of terrorism, public trust, and

diversion of public funds. Moreover, our infrastructure needs more attention as we have poor port and air transport infrastructure (Global Competitiveness Report, 2012). The quality of our roads is poor such that transportation cost becomes high which is a disincentive for investors.

There are external factors that could negatively affect the growth of the Philippine manufacturing sector. First is the economic performance of developed countries such as the US and the European Union. The sluggish recovery of the US economy and the lingering sovereign debt crisis in some European countries could affect the demand for manufactured goods, especially those coming from them. The Philippine manufacturing sector could be vulnerable to such shocks but the demand from other trading partners such as Japan, China, and Republic of Korea could offset the negative effects. The DTI in its Roadmap 2011-2013, identified possible external threats (DTI, 2012). One is the possible spill-over of geopolitical conflict between China and the Philippines. Second, our ASEAN neighbors are becoming more competitive in terms of their investment incentives and streamlined investments policies and better infrastructure. Third is the strong peso which is hurting our exporter and the world prices of petroleum products (DTI, 2012).

The Philippine manufacturing sector has to deal also with internal factors such as the following:

- High power rates – there is an increase cost of power in regions such as Bicol and Central Luzon. Despite Bicol being a major geothermal energy supplier in the country, it still is experiencing high power rates (Bangko Sentral ng Pilipinas, 2012). In addition, the power shortage problem in

Mindanao region due to inadequate supply coming from hydroelectric power plants is also a concern.

- Strikes and other mass actions – investors are wary about such activities that could disrupt productive activities of firms and lead to higher cost or a loss in output.
- High corporate tax – the Philippines’ corporate tax is relatively high compared to ASEAN neighbors. It has to be reviewed and reduced at a more competitive level. Among the list of countries in the table below, the Philippines has the highest corporate income tax with 32 percent. Hong Kong’s low corporate income tax coupled with a more open market is one of the countries with the most number of investments. Other countries such as Indonesia, Thailand, and Singapore also have lower corporate income tax.

The Philippine manufacturing sector is a dynamic and growing industry that has to be supported with sound fiscal and monetary policies, infrastructure, and information and communication technology. This goes without saying that the political environment has to be conducive for investors. Moreover, regional development should be prioritized to make the growth of the manufacturing sector more inclusive.

The following steps are recommended for the improvement of the manufacturing industry:

- Speed up the Private-Public Partnership Program of the government in improving infrastructure particularly quality of port and air transport, and roads linking the cities to nearby provinces. Though several projects have been lined up, the implementation and completion of

these projects have yet to be started. If successful, this would send a positive signal to foreign investors. For instance, the north rail project that plans to link Metro Manila to nearby provinces such as Bulacan and Pampanga.

- Enact the Fiscal Incentives Rationalization bill. The House Bill 4935, better known as the Fiscal Incentives Rationalization bill, will help boost investor confidence and increase revenue for projects that will help improve the manufacturing sector.
- Improve the quality and relevance of post-secondary technical and vocational education to address the needs of the manufacturing sector. In the study of di Gropello (2010), there were problems seen such as the quality of facilities, curriculum alignment with industry needs, and links with industry. Moreover, di Gropello (2010) adds that there is lack of coordination among providers of the technical and vocational education, lack of coverage, unreliable information on effectiveness and quality of programs, and insufficient funding. Di Gropello (2010) suggested that the post-secondary technical and vocational, as well as the higher education institution be benchmarked with other international institutions.
- Strengthen life skills in the curricula of all education and training levels. This was suggested by di Gropello (2010) which could be very effective in shaping work habits through various pedagogical approaches.

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