MEASURING THE OCEAN ECONOMY:
TOWARDS THE COMPILATION OF THE PHILIPPINE OCEAN ECONOMY SATELLITE ACCOUNTS

by

**Lisa Grace S. Bersales, Vivian R. Ilarina John Lourenze S. Poquiz,
Janel Asley Raviz, and Jenny Lou De Las Alas**

For additional information, please contact:

Author's name	Lisa Grace S. Bersales
Designation	University of the Philippines
Author's name	Vivian R. Ilarina John Lourenze S. Poquiz, Janel Asley Raviz Jenny Lou delas Alas
Affiliation	Philippine Statistics Authority
Address	16th Floor Three Cyberpod Centris, EDSA, Diliman, Quezon City
E-mail	v.ilarina@psa.gov.ph l.poquiz@psa.gov.ph, j.raviz@psa.gov.ph

Measuring the Ocean Economy:
Towards the compilation of the Philippine Ocean Economy Satellite Accounts

By Lisa Grace S. Bersales, Vivian R. Ilarina
John Lourenze S. Poquiz, Janel Asley Raviz, and Jenny Lou De Las Alas

Abstract

The Philippines is comprised of about 7,100 islands with a combined coastline stretching for 36,289 kilometres. It would be an understatement to argue that coastal and marine resources play a critical role in the country's overall economy. This study presents experimental estimates of an 'Ocean Economy' Satellite Accounts for the Philippines. The Ocean Economy, in this context, would include economic activities that either take place in the ocean, receive input from the ocean, and/or provide goods and services to the ocean. In this exercise, expands the existing coverage by including industries such as electricity production, accommodation services and recreational services in the estimates. The experimental estimates cover the period 2012 to 2017 by highlighting the contribution of the ocean economy to the Gross Domestic Product (GDP). The estimates show that while the value of goods and services produced ocean-related industries are growing over time, the share of these industries to the overall economy is declining. A discussion of some statistical challenges particularly on framework, data and methodology in the compilation of the ocean economy will be provided.

I. Introduction

The Philippines is comprised of about 7,100 islands with a combined coastline stretching for 36,289 kilometers. It would be an understatement to argue that coastal and marine resources play a critical role in the country's overall economy. This study presents experimental estimates of an Ocean Economy Satellite Accounts for the Philippines. The exercise attempts to answer the question, by how much does the Philippine economy depends on the ocean?

As of the writing of this paper, there is no globally agreed upon definition of the "Ocean Economy." Nevertheless, several national statistics agencies and international organizations have made strides on accounting for the contribution of the marine and coastal resources to the overall economy. The common theme in their exercises was that they covered activities that explore and develop ocean resources, use ocean space, protect the ocean environment, use ocean products as a main input, and provide goods and services to ocean activities (Park & Kildow, 2014). Many of the earlier attempts to estimate the Ocean Economy limits the scope of the accounting space to the market output of ocean-based industries (see Appendix A).

Organization for Economic Co-operation and Development (OECD) takes a broader approach, describing the Ocean Economy as a combination of ocean-based industries and marine ecosystems (OECD, 2016). While the OECD conceptually described the Ocean Economy, they did not provide a measurement framework, nor does it provide a guide for statisticians interested in compiling a set of accounts. The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) is developing a document "The System of Ocean Accounts", which would underscore the role of the ocean to human society (UNESCAP, 2019). The framework being develop is anchored on the System of Environmental and Economic Accounting (SEEA). These developments extend the earlier attempts of measuring the role of

ocean to society by incorporating non-market output such as ecosystem services derived from the oceans.

In response to the global initiatives and the demands of policy makers in the domestic scene, the Philippines have made several efforts to estimate the contribution of ocean-based industries to the Philippine economy. The initial efforts on the compilation of the Ocean Economy of the country was undertaken by the National Statistical Coordination Board (NSCB). The team under the NSCB compiled estimates on the revenues of ocean-based industries. These estimates were presented during the 2009 East Asian Seas Congress. The conference underscored importance of the maritime sector in the socio-economic development of Southeast.

In their estimates, the following industries were identified as part of the *"maritime sector"*: fishery and forestry; mining and quarrying; construction; manufacturing; transport, communication, and storage; trade finance; and services. Based on their estimates, the maritime industry accounts for 1.7 percent of revenue of all industries. It accounts for 1.0 percent of cost (of goods sold) of all industries and accounts for 3.3 percent of employment of all industries.

The following year, the NSCB presented a paper titled "Towards a Satellite Account on the Maritime Sector in the Philippine System of National Accounts: Preliminary Estimates" to the 11th National Convention on Statistics. The estimates they covered the period 2003 to 2006 and presented estimates of gross output, intermediate consumption, gross value added, and employment (local and overseas) of the maritime sector.

In 2015, the Philippine Statistics Authority presented to East Asia Sea Congress in Vietnam updates on the contribution of ocean-related industries to the Philippine economy. He presented estimates of gross output, intermediate consumption, and gross value added of ocean-related industries. The estimates covered only the year 2012.

An updated version of these estimates was presented to the 2017 – Blue Economy Forum in Bangkok, Thailand. This exercise expended the coverage of the ocean sector by included services such as financial intermediation, education, hotel and accommodation, and recreational activities.

In the context of this paper, the Ocean Economy would include economic activities that either take place in the ocean, receive input from the ocean, and/or provide goods and services to the ocean. This definition effectively limits the scope of this exercise to account for the output of ocean-based industries and exclude non-market output such as ecosystem services. While this definition falls short in terms of capturing the relevance of the ocean, our definition captures and integral part of ocean-economy nexus. In particular, the estimates attempt to quantify role of the ocean in producing economic output, income, and jobs.

The experimental estimates in this paper cover the period 2012 to 2018 and highlights the contribution of the Ocean Economy to the Gross Domestic Product (GDP). The estimates were compiled in adherence to the production accounts framework. The estimates show that while the value of goods and services produced ocean-related industries are growing over time, the share of these industries to the overall economy is declining.

The remainder of this paper our be presented as follows: Section II would discuss the scope and coverage of the Ocean Economy, as it is defined in this paper; Section III would discuss the measurement framework employed in the compilation; Section IV would describe in detail the

statistical challenges in the estimation process; Section V would describe the estimation methodology; Section VI would describe the results; and Section VII would describe the future directions in the compilation of Ocean Economy Satellite Accounts.

II.   Scope and coverage

As mentioned earlier, there is no globally agreed upon definition for what constitutes the Ocean Economy. Much of the earlier attempts to frame the Ocean Economy centers around industries with market output. The OECD (2016) defined the Ocean Economy more broadly and more complexly. In a 2016 report, the organization argues that the Ocean Economy should have two components: ocean-based industries and marine ecosystems. Figure 1 describes the relationship between the two components.
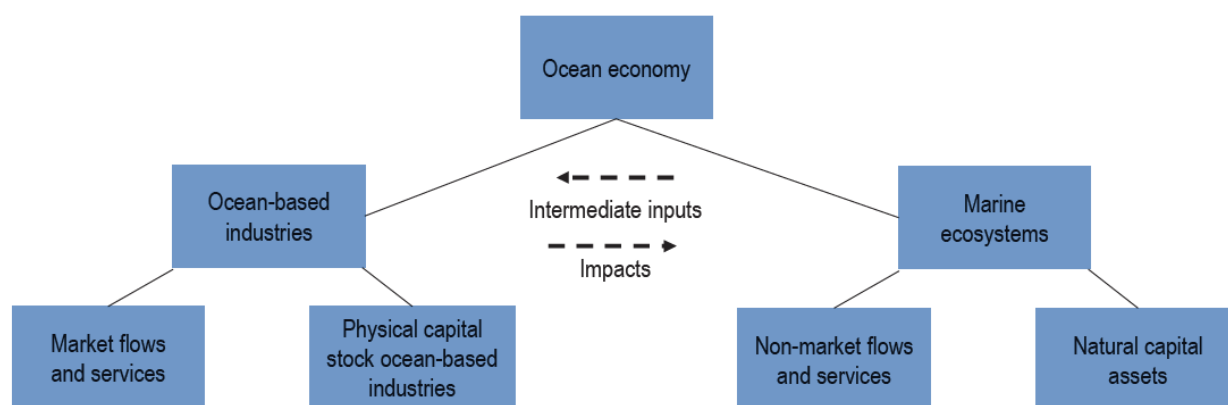

Figure 1: The concept of the ocean economy. This diagram was directly sourced from the OECD's 2016 report *The Ocean Economy in 2030*.

Ocean-based industries generate market output and income for human society. These industries source intermediate inputs from marine ecosystems. They also cause long-lasting impacts to the marine ecosystems in terms depleting existing resources and the flow of residuals. Meanwhile, marine ecosystems are described to be providers of intermediate inputs to ocean-based industries and ecosystem services to society (OECD, 2016).

The characterization of the OECD (2016) of the Ocean Economy is consistent with the framework being developed by the UNESCAP, which is planning to produce a System of Ocean Accounts by 2025. This framework is expected to contain elements of both the Production Accounts from the core System of National Accounts 2008 (SNA) and SEEA (UNESCAP, 2019).

This paper is limited to the accounting the value added of ocean-based industries. Based on the recent developments in the international community, accounting of the output from ocean-based industries constitutes only a segment of this broader framework of the ocean accounts. One cannot deny, however, the relative importance of this approach for policy making. This exercise could also be considered as a starting point in the attempt for the compilation of a broader Ocean Accounts for the Philippines.

In accounting the output of ocean-based industries, it is critical to identify what industries would fall under the Ocean Economy. In a meta-analysis, Park and Kildow (2014) compiled several

definitions employed by different countries in their estimate of the "Ocean Economy". In their summary[1], they identified a common theme in the various definitions they reviewed, and these are:

- Activities that explore and develop ocean resources;
- Activities that use ocean space;
- Activities that protect the ocean environment;
- Activities that use ocean products as a main input;
- Activities that provide goods and services to ocean activities.

Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), an organization advocating for the sustainable development of marine and coastal resources, defined the Ocean Economy as a set of industries that depends heavily on marine and coastal resources. The OECD also identified several industries that falls part of their Ocean Economy. The industries identified by both PEMSEA and the OECD can be categorized to match International Standard Industrial Classification (ISIC), the industry classification system of the UN.

---

[1] A summary of the definitions they compiled are shown in Appendix A while a summary of the industries covered by the countries, they surveyed are shown in Appendix B.

Table 1: Industries proposed for the Ocean Economy

ISIC	Industry	OECD	PEMSEA
A	Fishing	Capture fisheries Marine aquaculture	Fisheries and Aquaculture
B	Mining and Quarrying	Offshore oil and gas (shallow water) Deep- and ultra-deep water oil and gas Marine and seabed mining	Oil and Gas Seabed Mining
C	Manufacturing	Seafood processing Shipbuilding and repair Marine biotechnology	Coastal Manufacturing Marine Biotechnology
D	Construction	Marine manufacturing and construction Dredging	
E	Electricity	Offshore wind energy Ocean renewable energy	Renewable Energy
H	Transport and Storage	Shipping Ports	Ports, Shipping and Marine Transport
K	Financial Intermediation	Marine business services Marine R&D and education	
N- M	Renting and Business Activities	Marine business services	Marine Technology and Environmental Services
O	Public Administration and Defense	Maritime safety and surveillance	
P	Education	Marine R&D and education	
R	Recreation	Maritime and coastal tourism	Tourism, Resorts and Coastal Development
S	Hotels and Accommodations	Maritime and coastal tourism	Tourism, Resorts and Coastal Development

Table 2 shows the industry classification employed for the Philippine Ocean Economy Satellite Accounts. In this exercise, we take reference from the industries identified OECD and PEMSEA as components of the ocean economy. We also took into consideration the industries covered by other country in their attempt to measure the ocean economy.

Table 2: Classification for the Philippine Ocean Economy Satellite Accounts and its coverage

ISIC	Industry	Scope and Coverage
A	Fishing	This industry covers fishing on open ocean and sea-based aquaculture.
B	Mining and Quarrying	This industry covers the offshore oil and gas extraction activities, as well as the mining of salt.
C	Manufacturing	Ocean-based Manufacturing covers the manufacture of sea-based food products, ship building, and the manufacture of machineries and equipment for shipping.
D	Construction	This industry covers the construction of seaports, lighthouses, and other strictures aiding in maritime travels.
E	Electricity	This industry covers the power generation from coastal windfarms and natural gas-fired power plants.
H	Transport and Storage	The Transportation industry, in this context, covers ocean transport and inter-island water transport. It also covers ocean-based shipping and port operations.
K	Financial Intermediation	This industry covers the insurance of ships, passenger of maritime transports, and insurance of freight.
N- M	Renting and Business Activities	This industry covers the renting of boats, ocean-based equipment, and professional activities related to the ocean such as marine research.
O	Public Administration and Defense	This covers the government services aimed at managing the protection, utilization and preservation of marine and coastal resources.
P	Education	The covers the value of output of maritime higher education institutions.
R	Recreation	Covers the sea-based and coastal recreation service activities.
S	Hotels and Accommodations	Covers the rservices for coastal hotels and resorts.

III. Measurement Framework

This paper would employ the Production Accounts from the core SNA 2008 as the measurement framework. This approach would have several key advantages. It removes the danger of double counting, provides a meaningful basis for comparison across industries and it simplifies analysis of regional impacts.

$$Ocean\ Value\ Added = \sum_i [Gross\ Output_i - Intermediate\ Input_i] \qquad (1)$$

where *i* is the index of each ocean-based industry. Gross Value Added (GVA), as defined in the SNA, is "the value of output less the value of intermediate consumption," and the sum of the value added in all industries is the GDP (SNA 2008). We measure the Ocean Economy as the sum of the value added of ocean-based industries.

IV. Issues and Challenges in Measuring Ocean Economy

Considering the specificity of the scope and coverage of the ocean economy, some challengers were met in the attempt to estimate the Ocean Economy Satellite Accounts.

- **Unavailability of the data**

Ideally, all of the sea-based and coastal activities should be covered the Ocean Economy Satellite Accounts. However, data on the output of coastal establishments are not available. Data on the "sun and sea tourism" activities are likewise not available. In addition, there is no record of output/revenues specific to maritime higher educational institutions.

In this exercise, several proxy indicators were used to address some of the data gaps.

- **Disaggregation of data**

The aggregation of data in the industrial classification system makes it difficult to identify and quantify the ocean-based output. Many of the published statistics on economic output (such as the National Accounts), presents estimates at levels of aggregation the does not conform with the requirements of the Ocean Economy Satellite Accounts.

We address this by applying details for survey data and supplemented it with administrative data.

V. Methodology

The measurement of the contribution of the ocean-based activities to the economy will focus on the direct and indirect services rendered by the ocean to the population depending on it. The measurement will be in terms of value added.

a. Fishing

Value added of fishing was directed sourced from the published estimates of the National Accounts of the Philippines (NAP). It is assumed that all commercial and marine municipal fishing activities are conducted either at seas or the ocean.

The complication arises with aquaculture. The NAP does not differentiate between sea-based aquaculture and in-land aquaculture. Indicators from the value of production of specific fishing goods were used as distribution keys to isolate the value added of ocean-based aquaculture. It is assumed that the distribution of the value of production is correlated to, if not identical, of those of value added.

b. Mining and Quarrying

Value added of the extraction of crude oil and natural gas was directed sourced from the published estimates of the National Accounts of the Philippines. As of the writing of this paper, all of the country's commercial hydrocarbons extraction activities are conducted offshore.

A ratio estimator was constructed using the Census of Philippine Business and Industries (CPBI) and Annual Survey of Philippine Business and Industries (ASPBI) to extract the value added of *salt mining* from the *other non-metallic mining*, which is published the NAP. This technique would be explained in detail in a later subsection of the methodology.

c. Coastal construction

The value of construction of ports and structures from the Philippine Coast Guards, the Department of Transportation and Maritime Industry Authority were sourced from the Budget of Expenditures and Sources of Financing published by the Department of Budget and Management. In order to translate the value of construction to value added, the Gross Value Added ratio (GVAr) of public construction was applied to the estimated value of public construction. This assumes that all public construction would have similar ratios of intermediated consumption ratios.

d. Electricity

The Department of Energy (DOE) publishes data on the generation of electricity for per fuel type. This data was utilized as distribution keys to extract the value added generated by wind and natural gas power plants.

$$\textit{GVA of Ocean-related Electricity } = \qquad\qquad (2)$$

Ratio of generation to total electricity x

ratio of Ocean-related generation to total generation x GVA of Electricity

Value added of wind generation was further purified to account for only coastal wind generation by employing the ratio of the dependable capacity of coastal wind farms to the total dependable capacity of wind power plants as distribution keys.

e. Maritime Insurance

Data on the net premiums from Maritime Insurance were sourced from the Insurance Commission. The ratio of Maritime Insurance to the net premiums of all insurance type were used to extract the value added of Maritime Insurance from the value added of Insurance published in the NAP.

$$GVA \ of \ Maritime \ Insurance = \hspace{3cm} (3)$$

GVA of Insurance Services x Ratio of Maritime Net Premiums to Total Net Premiums

f. Public Administration and Defense

The value added of ocean-related government services was estimated as the sum of their aggregate compensation, depreciation, and taxes of identified agencies with ocean-related activities. These agencies are:

- Bureau of Fisheries and Aquatic Resources
- Philippine Council for Agriculture and Fisheries/National Agricultural and Fishery Council
- Philippine Fisheries Development Authority
- National Maritime Polytechnic
- Philippine Navy (Naval Forces)
- Maritime Industry Authority
- Office for Transportation Security
- Philippine Coast Guard

The data were sourced from the Commission on Audit.

g. Maritime Education

The Commission on Higher Education (CHED) provided data on the number of or enrollees from maritime schools. To estimate the value added from maritime education, the total number of enrollees from all grade levels (including higher education enrollees) were sourced from CHED and the Department of Education. The total value added from the education industry was divided to the total enrollment, generated a value added per enrollee.

$$GVA \ of \ Maritime \ Education = \hspace{3cm} (4)$$

GVA of Education per enrollee x Total No. of maritime enrollees

The value added per employee was multiplied to the number of enrollees in maritime schools to derive the GVA of Maritime Education. Each enrollee would generate a particular level of value added for the educational institution they are enrolled in. The estimation procedure also assumes that the value added per employee is more of less homogenous across different types of education providers.

h. Survey-based Industries

Results from various establishment surveys were used to estimate the value added of several ocean-based industries. These industries are Manufacturing, Transportation and Storage, Renting and Business Activities, and Salt Mining.

For these industries, standard ratio estimators were constructed using the Census of Philippine Business and Industries (CPBI) and the Annual Survey of Philippine Business and Industries. The ratio estimators were constructed as follows:

GVA of Ocean-based industries = (5)

Published GVA x

Ratio of the value added ocean-based industries to total value added from the surveys

For years where CBPBI and ASPBI results are not available, the ratio estimators where derived as the moving average from the past years.

i. Ocean Tourism

Ocean-based tourism comprises of two industries: Hotel and Accommodations and Recreational Activities. The main data source for this component is the Philippine Tourism Satellite Accounts and data on Regional Travelers.

The tourism Direct Gross Value Added (TDGVA) for accommodation services and recreation activitie was divided to the total number of tourists from the Regional Travelers data to derive the TDGVA per tourist. This value was multiplied to the number of visitors in identified beach destinations. Data on top beach destinations were sourced from the Department of Tourism and is validated and expanded through tourism websites.

GVA of Ocean-related Accommodation and Recreation = (6)

TDGGVA per tourist x No. of tourists in identified beach destinations

For this approach, it is assumed that each tourist generates a particular level of value added and the ratio of value added per tourist is homogenous for all destinations.

VI.   Results

a. Gross Value Added of Ocean-based Industries

The share of Ocean economy to the Gross Domestic Product (GDP) was estimated at 3.6 percent in 2018. The Ocean economy amounted to Php 622.6 billion in 2018 higher by 7.7 percent compared to previous year's record of Php 578.0 billion.
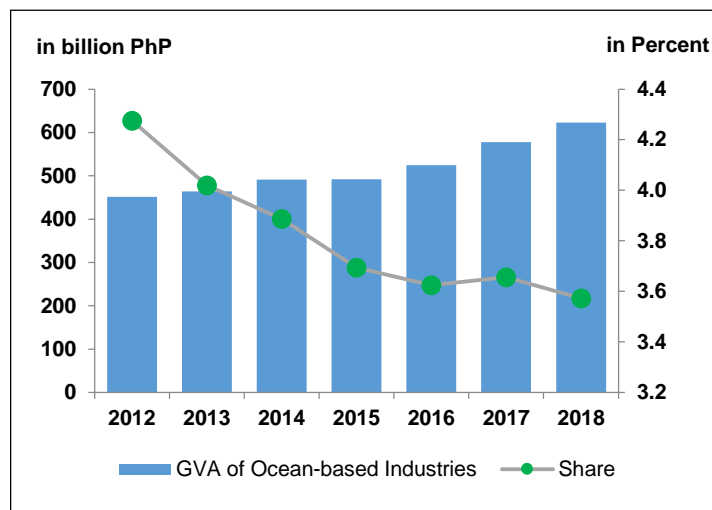
Among the major economic sectors, the services sector accounted for the largest share in 2018 with Php 228.5 billion or 36.7 percent of the total ocean-based activities Gross Value Added. Ocean-based activities in the services sector increased by 7.5 percent. This was followed by the Industry sector at 34.2 percent share and the Agriculture, Hunting, Forestry and Fishing at 29.1 percent share.

Among the industries, Fishing accounted for the largest share in 2018 with Php 181.1 billion or 29.1 percent of the total ocean-based activities Gross Value Added. Ocean-based activities in the Fishing industry increased by 5.5 percent. This was followed by Manufacturing with 100.8 billion or 16.2 percent of the total ocean-based activities Gross Value Added. Ocean-based activities in Hotels and Accommodations accounted for the third largest share with 88.7 billion or 14.2 percent of the total ocean-based activities Gross Value Added. Ocean-based activities in Manufacturing and Hotels and Accommodation grew by 3.5 percent and 12.6 percent, respectively. This was followed by Electricity and Transportation, Storage & Communication with Php 72.2 billion (11.6 percent share) and Php 62.0 billion (10.0 percent share), respectively. Majority of the ocean-based industries posted a positive growth except for Financial Intermediation, Public Administration & Defense, and Education.

Percent Share of the Ocean-based Industries: 2018
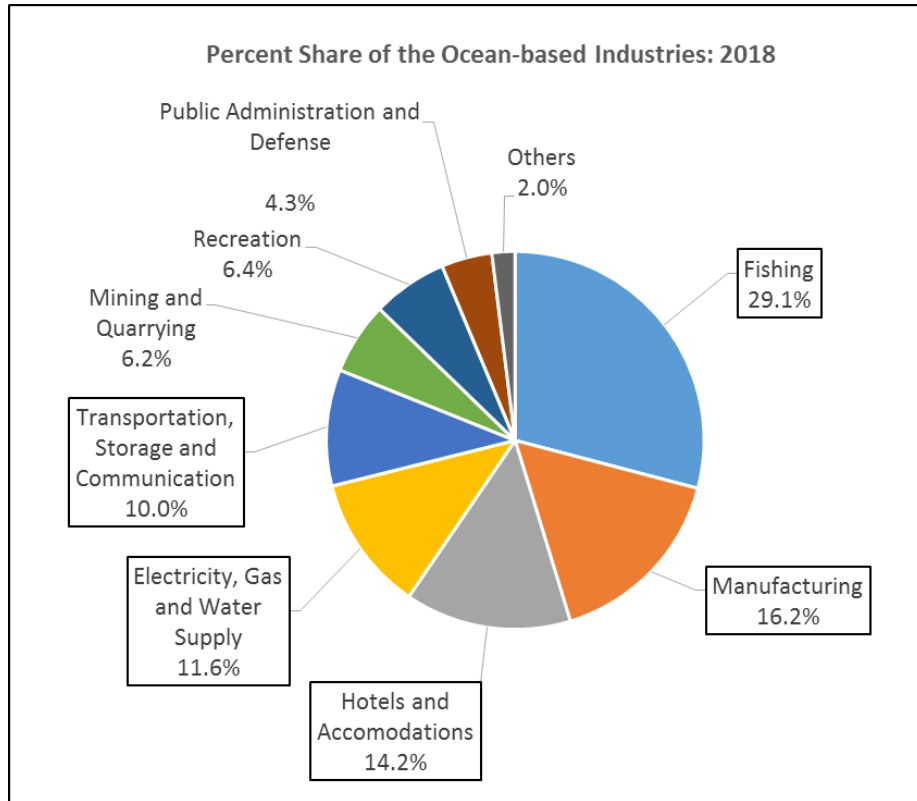
Ocean-based Industries	2017	2018	Percent Total to 2018	Growth Rate 2017 - 2018
a. Fishing	171,589	181,110	29.1	5.5
b.Mining and Quarrying	32,049	38,422	6.2	19.9
c. Manufacturing	97,317	100,767	16.2	3.5
d. Construction	623	1,609	0.3	158.3
e. Electricity, Gas and Water Supply	63,901	72,232	11.6	13.0
f. Transportation, Storage & Communictaion	56,623	62,042	10.0	9.6
g. Financial Intermediation	9,732	8,854	1.4	(9.0)
h. Renting and Business Activities	121	126	0.0	4.0
i. Public Administration & Defense	27,425	27,003	4.3	(1.5)
j. Education	1,728	1,723	0.3	(0.3)
k. Hotels	78,737	88,654	14.2	12.6
l. Recreation	38,123	40,074	6.4	5.1
Total	**577,968**	**622,615**	**100.0**	**7.7**

b. Employment in Ocean-based Industries

Total LFS and Employment in Ocean-based Industries: 2018
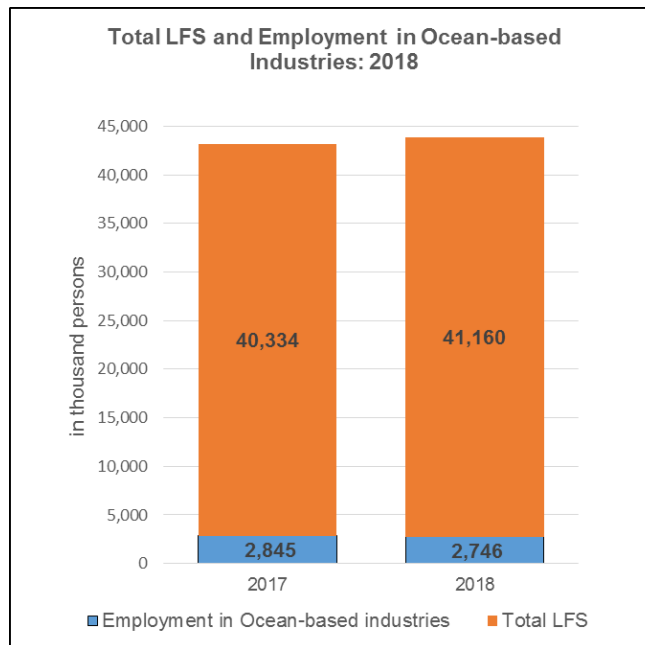
Out of the total employment of 41.2 million in 2018, 2.5 million or 6.0 percent were employed in ocean-based industries. Employment in the said industry declined by 2.4 percent from its 2.5 million level in 2017. The top three industries with the highest employment were in Fishing with 950.0 million (38.4 percent share), Transportation, Communication & Storage with 821.1 million (33.2 percent share), and Hotels and Accommodation with 476.7 million (19.3 percent share).

VII. Way Forward

One cannot understate dependence of the Philippine economy on marine and coastal resources. As such, it is imperative to keep track of by how much of the country's economic output depends on the ocean. This is the motivation for the compilation of the Philippine Ocean Economic Satellite Accounts.

Moving forward, it is imperative to addressed the data gaps by exploring other data sources in our estimation strategy. The estimates are only as reliable as the assumptions they are based on. As discussed earlier, some of the methodologies employed rely on assumptions for the generation of estimates.

As mentioned earlier, the integrated framework for the compilation of the System of Ocean Accounts is currently being developed by the UNESCAP. The Technical Guidelines for the compilation of Ocean Accounts is set for release this year. One direction we, as compilers of the accounts, can take is adopt the recommendations by the international frameworks once they are internationally available. This would likely involve the incorporation of non-market services such as marine ecosystem services as part of the Ocean Economy.

Lastly, in order to provide coordination mechanism, which will allow compilers to regularly dialogue with data producers and data users, it maybe imperative to establish an inter-agency committee that would oversee the compilation of the Philippine Ocean Economy Satellite Accounts.

References

Ebarvia, M. (2018). *Blue Economy: Initiatives in the East Asian Seas*. Retrieved from https://www.unescap.org/sites/default/files/02_04_G_Blue_economy_PEMSEA_1-3Aug2018.pdf

Park, Dr. Kwang Seo and Kildow, Dr. Judith T. (2014). *Rebuilding the Classification System of the Ocean Economy*, *Journal of Ocean and Coastal Economics*: Vol. 2014: Iss. 1, Article 4. DOI: https://doi.org/10.15351/2373-8456.1001

OECD (2016), *The Ocean Economy in 2030*, OECD Publishing, Paris. Retrieved from *http://dx.doi.org/10.1787/9789264251724-en*

Virola, R. A., Talento, R. J., Lopez-Dee, E. P., Romaraog, M. R. S., Bautista, R. A. A., Florande, S. P., & Sandoval, M. B. (2009). Measuring the Contribution of the Maritime Sector to the Philippine Economy. *Tropical Coasts*, *16*(1), 60-70.

Virola, R. A., Talento, R. J., Lopez-Dee, E. P., Romaraog, M. R. S., & Polistico, F. S. (2010, October). Towards a Satellite Account on the Maritime Sector in the Philippine System of National Accounts: Preliminary Estimates. In *11th National Convention on Statistics, October* (pp. 4-5).

Whisnant, R., & Reyes, A. (2015). Blue economy for business in East Asia: Towards an integrated understanding of Blue Economy. *Recuperado de http://www. pemsea. org/sites/default/files/PEMSEA Blue Economy Report*, *11*, 15.

A Appendix: Summary of the Definition of the Ocean Economy from other countries

Country	Definitions
U.S.	The economic activity, which is (a) an industry whose **definition explicitly ties the activity to the ocean**, or (b) which is **partially related to the ocean and is located in a shore-adjacent zip code**.
U.K.	Those activities which involve **working on or in the sea**. Also those activities that are involved in the production of goods or the provision of services that will **directly contribute to activities on or in the sea.**
Australia	Ocean–based activity **("Is the ocean resource the main input? Is access to the ocean a significant factor in the activity?").**
Ireland	Economic activity which **directly or indirectly uses the sea as an input**.
China	The sum of all kinds of activities associated with the development, utilization and **protection of the marine**.
Canada	Those industries that are **based in Canada's maritime zones and coastal communities adjoining these zones**, or are **dependent on activities in these areas for their income**.
New Zealand	The economic activity **that takes place in**, **or uses the marine environment**, or **produces goods and services necessary for those activities**, or **makes a direct contribution to the national economy**.
Japan	Industry exclusively responsible for **the development, use and conservation of the ocean**.
South Korea	The economic activity that takes place **in the ocean**, which also includes the economic activity, which **puts the goods and services into ocean activity** and **uses the ocean resources as an input.**

B Appendix: Summary of the Definition of the Ocean Economy from other countries

USA	UK	France	Australia	Ireland	China	Canada	Spain	New Zealand	South Korea
Construction – marine	Fish	Seafood products	Marine tourism	Shipping and maritime transport	Marine fishery	Seafood	Inland navigation	Offshore minerals	Fisheries
Living resources – marine	Oil and gas	Extraction of marine aggregates	Refining of petroleum	Water-based tourism & leisure	Offshore oil and gas industry	Offshore oil & gas	Marine aggregates	Fisheries and aquaculture	Marine mining
Minerals – offshore	Aggregates	Energy	Fisheries and seafood	International cruise industry	Ocean mining industry	Marine transportation	Marine equipment	Shipping	Ocean renewable energy
Ship & boat building	Ship and boat building and repairs	Shipbuilding and repair	Prioritize	Other marine services	Marine salt industry	Ocean based recreation/ leisure	Maritime services	Government and defense	Marine construction
Tourism & recreation – coastal	Marine equipment and materials	Marine and river civil engineering	Shipbuilding	Sea fisheries	Shipbuilding industry	Marine construction	Maritime works	Marine tourism and recreation	Shipping industry
Transportation – marine	Marine renewable energy	Submarine cables	Port-based industries	Aquaculture	Marine chemical industry	Manufacturing	Navy and coastguard	Marine services	Marine equipment and materials industry
	Construction	Offshore oil and gas-related industry		Seafood processing	Marine biomedicine industry	Services	Offshore supply	Research and education	Ship and offshore plant building industry
	Shipping operations	Coastal tourism		Oil & gas exploration and production	Marine engineering building Industry	Federal government	Recreational boating	Manufacturing	Marine technical services
	Ports	Maritime and river transport		Marine manufacturing	Marine electric power industry	Provincial /territorial government	Seaports	Marine construction	Marine research and development
	Navigation and safety	Maritime insurance		High tech marine products and services	Seawater utilization industry	Universities and research	Shipbuilding		Marine public administration and education
	Cables	French navy		Marine commerce	Communications & transportation industry	NGOs	Shipping		Seafood processing
	Business services	Public intervention		Marine biotechnology and bio-products	Coastal tourism		Coastal tourism		Marine bio industry
	License and rental	Coastal & marine environmental protection		Marine renewable energy			Cruise tourism		Port industry
	Research and development	Marine research					Fisheries		Marine tourism and leisure industry
		Marine environment							
		Defense							
		Leisure and recreation							
		Education and training							

C Appendix: Provisional Estimates of the Philippine Ocean Economy Satellite Accounts

Table 1B. GROSS VALUE ADDED OF OCEAN-BASED ACTIVITIES BY INDUSTRIAL ORIGIN
2012-2018
AT CONSTANT PRICES (2012=100)
Unit: In million pesos

INDUSTRY/YEAR	2012	2013	2014	2015	2016	2017	2018
I. AGRICULTURE, HUNTING, FORESTRY & FISHING	**167,681**	**168,795**	**168,033**	**164,723**	**159,662**	**157,134**	**151,942**
a. Fishing	167,681	168,795	168,033	164,723	159,662	157,134	151,942
II INDUSTRY SECTOR	**174,992**	**166,853**	**176,600**	**173,642**	**186,956**	**242,648**	**212,862**
a. Mining and Quarrying	41,999	40,175	41,795	34,255	33,479	34,194	38,039
b. Manufacturing	75,066	72,047	77,467	80,647	91,810	144,284	105,802
c. Construction	663	1,117	1,817	1,262	553	547	1,342
d. Electricity, Gas and Water Supply	57,263	53,514	55,521	57,478	61,115	63,623	67,679
III SERVICE SECTOR	**108,899**	**120,129**	**139,317**	**147,700**	**170,067**	**190,315**	**196,737**
a. Transportation, Storage & Communication	41,813	41,859	44,241	46,861	50,765	53,862	57,371
b. Financial Intermediation	7,071	7,954	7,675	7,706	8,052	8,524	7,384
c. Real Estate, Renting & Business Activities	61	68	77	84	97	106	110
d. Public Administration & Defense	18,941	19,411	21,014	21,409	21,520	24,171	22,771
e. Other Services	**41,012**	**50,837**	**66,310**	**71,639**	**89,634**	**103,652**	**109,100**
Education	2,246	2,390	2,470	2,542	2,110	1,530	1,511
Hotels and Accomodations	25,400	32,581	43,006	46,489	58,284	66,906	71,306
Recreation	13,365	15,866	20,834	22,608	29,241	35,216	36,283
OCEAN-BASED ACTIVITIES GROSS VALUE ADDED	**451,571**	**455,776**	**483,950**	**486,065**	**516,686**	**590,097**	**561,541**

Table 1A. GROSS VALUE ADDED OF OCEAN-BASED ACTIVITIES BY INDUSTRIAL ORIGIN
2012-2018
AT CURRENT PRICES
Unit: In million pesos

INDUSTRY/YEAR	2012	2013	2014	2015	2016	2017	2018
I. AGRICULTURE, HUNTING, FORESTRY & FISHING	**167,681**	**172,476**	**170,007**	**168,170**	**162,254**	**171,589**	**181,110**
a. Fishing	167,681	172,476	170,007	168,170	162,254	171,589	181,110
II INDUSTRY SECTOR	**174,992**	**167,891**	**174,904**	**166,742**	**178,201**	**193,890**	**213,030**
a. Mining and Quarrying	41,999	37,743	39,517	27,294	27,227	32,049	38,422
b. Manufacturing	75,066	74,898	75,403	80,119	91,267	97,317	100,767
c. Construction	663	1,164	1,961	1,374	614	623	1,609
d. Electricity, Gas and Water Supply	57,263	54,085	58,023	57,955	59,093	63,901	72,232
III SERVICE SECTOR	**108,899**	**123,448**	**146,110**	**157,254**	**184,399**	**212,489**	**228,475**
a. Transportation, Storage & Communication	41,813	42,312	44,931	47,880	51,986	56,623	62,042
b. Financial Intermediation	7,071	8,185	8,228	8,379	8,911	9,732	8,854
c. Real Estate, Renting & Business Activities	61	70	83	93	109	121	126
d. Public Administration & Defense	18,941	20,071	21,507	22,177	23,334	27,425	27,003
e. Other Services	**41,012**	**52,809**	**71,362**	**78,725**	**100,058**	**118,588**	**130,451**
Education	2,246	2,466	2,618	2,721	2,326	1,728	1,723
Hotels and Accomodations	25,400	34,122	47,063	52,230	66,556	78,737	88,654
Recreation	13,365	16,221	21,681	23,774	31,175	38,123	40,074
OCEAN-BASED ACTIVITIES GROSS VALUE ADDED	**451,571**	**463,815**	**491,022**	**492,166**	**524,854**	**577,968**	**622,615**
GROSS DOMESTIC PRODUCT	**10,561,089**	**11,538,410**	**12,634,187**	**13,322,041**	**14,480,349**	**15,807,596**	**17,426,202**
OCEAN-BASED ACTIVITIES SHARE TO GDP	**4.3**	**4.0**	**3.9**	**3.7**	**3.6**	**3.7**	**3.6**

Table 2A. GROSS VALUE ADDED OF OCEAN-BASED ACTIVITIES BY INDUSTRIAL ORIGIN
2012-2018
PERCENT DISTRIBUTION, CURRENT PRICES
Unit: In million pesos

INDUSTRY/YEAR	2012	2013	2014	2015	2016	2017	2018
I. AGRICULTURE, HUNTING, FORESTRY & FISHING	**37.1**	**37.2**	**34.6**	**34.2**	**30.9**	**29.7**	**29.1**
a. Fishing	37.1	37.2	34.6	34.2	30.9	29.7	29.1
II INDUSTRY SECTOR	**38.8**	**36.2**	**35.6**	**33.9**	**34.0**	**33.5**	**34.2**
a. Mining and Quarrying	9.3	8.1	8.0	5.5	5.2	5.5	6.2
b. Manufacturing	16.6	16.1	15.4	16.3	17.4	16.8	16.2
c. Construction	0.1	0.3	0.4	0.3	0.1	0.1	0.3
d. Electricity, Gas and Water Supply	12.7	11.7	11.8	11.8	11.3	11.1	11.6
III SERVICE SECTOR	**24.1**	**26.6**	**29.8**	**32.0**	**35.1**	**36.8**	**36.7**
a. Transportation, Storage & Communication	9.3	9.1	9.2	9.7	9.9	9.8	10.0
b. Financial Intermediation	1.6	1.8	1.7	1.7	1.7	1.7	1.4
c. Real Estate, Renting & Business Activities	0.0	0.0	0.0	0.0	0.0	0.0	0.0
d. Public Administration & Defense	4.2	4.3	4.4	4.5	4.4	4.7	4.3
e. Other Services	**9.1**	**11.4**	**14.5**	**16.0**	**19.1**	**20.5**	**21.0**
Education	0.5	0.5	0.5	0.6	0.4	0.3	0.3
Hotels and Accomodations	5.6	7.4	9.6	10.6	12.7	13.6	14.2
Recreation	3.0	3.5	4.4	4.8	5.9	6.6	6.4
OCEAN-BASED ACTIVITIES GROSS VALUE ADDED	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 2B. GROSS VALUE ADDED OF OCEAN-BASED ACTIVITIES BY INDUSTRIAL ORIGIN
2012-2018
PERCENT DISTRIBUTION, CONSTANT PRICES (2012=100)
Unit: In million pesos

INDUSTRY/YEAR	2012	2013	2014	2015	2016	2017	2018
I. AGRICULTURE, HUNTING, FORESTRY & FISHING	**37.1**	**37.0**	**34.7**	**33.9**	**30.9**	**26.6**	**27.1**
a. Fishing	37.1	37.0	34.7	33.9	30.9	26.6	27.1
II INDUSTRY SECTOR	**38.8**	**36.6**	**36.5**	**35.7**	**36.2**	**41.1**	**37.9**
a. Mining and Quarrying	9.3	8.8	8.6	7.0	6.5	5.8	6.8
b. Manufacturing	16.6	15.8	16.0	16.6	17.8	24.5	18.8
c. Construction	0.1	0.2	0.4	0.3	0.1	0.1	0.2
d. Electricity, Gas and Water Supply	12.7	11.7	11.5	11.8	11.8	10.8	12.1
III SERVICE SECTOR	**24.1**	**26.4**	**28.8**	**30.4**	**32.9**	**32.3**	**35.0**
a. Transportation, Storage & Communication	9.3	9.2	9.1	9.6	9.8	9.1	10.2
b. Financial Intermediation	1.6	1.7	1.6	1.6	1.6	1.4	1.3
c. Real Estate, Renting & Business Activities	0.0	0.0	0.0	0.0	0.0	0.0	0.0
d. Public Administration & Defense	4.2	4.3	4.3	4.4	4.2	4.1	4.1
e. Other Services	**9.1**	**11.2**	**13.7**	**14.7**	**17.3**	**17.6**	**19.4**
Education	0.5	0.5	0.5	0.5	0.4	0.3	0.3
Hotels and Accomodations	5.6	7.1	8.9	9.6	11.3	11.3	12.7
Recreation	3.0	3.5	4.3	4.7	5.7	6.0	6.5
OCEAN-BASED ACTIVITIES GROSS VALUE ADDED	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 3B. GROSS VALUE ADDED OF OCEAN-BASED ACTIVITIES BY INDUSTRIAL ORIGIN
2012-2018
GROWTH RATES, CONSTANT PRICES (2012=100)

INDUSTRY/YEAR	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
I. AGRICULTURE, HUNTING, FORESTRY & FISHING	**0.7**	**(0.5)**	**(2.0)**	**(3.1)**	**(1.6)**	**(3.3)**
a. Fishing	0.7	(0.5)	(2.0)	(3.1)	(1.6)	(3.3)
II INDUSTRY SECTOR	**(4.7)**	**5.8**	**(1.7)**	**7.7**	**29.8**	**(12.3)**
a. Mining and Quarrying	(4.3)	4.0	(18.0)	(2.3)	2.1	11.2
b. Manufacturing	(4.0)	7.5	4.1	13.8	57.2	(26.7)
c. Construction	68.4	62.6	(30.6)	(56.2)	(1.0)	145.3
d. Electricity, Gas and Water Supply	(6.5)	3.8	3.5	6.3	4.1	6.4
III SERVICE SECTOR	**10.3**	**16.0**	**6.0**	**15.1**	**11.9**	**3.4**
a. Transportation, Storage & Communication	0.1	5.7	5.9	8.3	6.1	6.5
b. Financial Intermediation	12.5	(3.5)	0.4	4.5	5.9	(13.4)
c. Real Estate, Renting & Business Activities	10.5	13.5	9.6	14.8	9.4	3.6
d. Public Administration & Defense	2.5	8.3	1.9	0.5	12.3	(5.8)
e. Other Services	**24.0**	**30.4**	**8.0**	**25.1**	**15.6**	**5.3**
Education	6.4	3.4	2.9	(17.0)	(27.5)	(1.2)
Hotels and Accomodations	28.3	32.0	8.1	25.4	14.8	6.6
Recreation	18.7	31.3	8.5	29.3	20.4	3.0
OCEAN-BASED ACTIVITIES GROSS VALUE ADDED	**0.9**	**6.2**	**0.4**	**6.3**	**14.2**	**(4.8)**

Table 3A. GROSS VALUE ADDED OF OCEAN-BASED ACTIVITIES BY INDUSTRIAL ORIGIN
2012-2018
GROWTH RATES, CURRENT PRICES

INDUSTRY/YEAR	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
I. AGRICULTURE, HUNTING, FORESTRY & FISHING	**2.9**	**(1.4)**	**(1.1)**	**(3.5)**	**5.8**	**5.5**
a. Fishing	2.9	(1.4)	(1.1)	(3.5)	5.8	5.5
II INDUSTRY SECTOR	**(4.1)**	**4.2**	**(4.7)**	**6.9**	**8.8**	**9.9**
a. Mining and Quarrying	(10.1)	4.7	(30.9)	(0.2)	17.7	19.9
b. Manufacturing	(0.2)	0.7	6.3	13.9	6.6	3.5
c. Construction	75.5	68.4	(29.9)	(55.3)	1.4	158.3
d. Electricity, Gas and Water Supply	(5.5)	7.3	(0.1)	2.0	8.1	13.0
III SERVICE SECTOR	**13.4**	**18.4**	**7.6**	**17.3**	**15.2**	**7.5**
a. Transportation, Storage & Communication	1.2	6.2	6.6	8.6	8.9	9.6
b. Financial Intermediation	15.8	0.5	1.8	6.3	9.2	(9.0)
c. Real Estate, Renting & Business Activities	14.5	17.5	12.7	17.4	10.9	4.0
d. Public Administration & Defense	6.0	7.2	3.1	5.2	17.5	(1.5)
e. Other Services	**28.8**	**35.1**	**10.3**	**27.1**	**18.5**	**10.0**
Education	9.8	6.2	3.9	(14.5)	(25.7)	(0.3)
Hotels and Accomodations	34.3	37.9	11.0	27.4	18.3	12.6
Recreation	21.4	33.7	9.7	31.1	22.3	5.1
OCEAN-BASED ACTIVITIES GROSS VALUE ADDED	**2.7**	**5.9**	**0.2**	**6.6**	**10.1**	**7.7**