

Government Strategies in the Water Transport Sector: A Closer Look at Philippine Ports

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I. Introduction

Transport infrastructure is one of the key elements in achieving a balanced growth within an economy. It facilitates economic development and convergence, eases economic disparities, and fosters territorial cohesion (Bottasso et al. 2014). It also accelerates the integration of a country into the world market through international trade. At large, transport infrastructure helps improve a country's competitiveness in the global market (Aqmarina and Achjar 2017). As global economic activities involve manufacturing processes done in several countries, efficient transport systems are thus needed to ensure the smooth transfer of products from one economy to another (Zhang et al. 2015). To an archipelagic country such as the Philippines, the water transport sector specifically takes on a much larger role given its heavy reliance on port services to move its products within and outside the country. Recent data suggests that almost all domestic commodities (99.9 percent) are being traded through water (Philippine Statistic Authority 2021¹). Hence, the performance of the water transport sector heavily impacts the performance of the whole economy.

Seaports are the main infrastructure in the water transport sector, and they are regarded as economic catalysts in areas where they are located as well as in peripheral areas near the port. In the literature, the contribution of ports to economic growth and regional development has been well-established. Fundamentally, sea conveyance offers the cheapest way of transportation in terms of fuel consumption and investment (Berköz 1999). Railway transportation for instance, requires double the energy consumption while road transportation requires ten times the energy consumption of sea travel (Dwarakish and Salim 2015). According to Fujita and Mori (1996), ports serve as the most convenient location for import and export activities. Industries exporting their goods and importing raw materials often choose to locate near major ports around the world because of cost considerations (Dwarakish and Salim 2015). For many manufacturing and agriculture-related industries, seaports are vital because they act as assembly points and linkage to other transport systems such as road or railway transport (Cong et al. 2020). This practically points out the ports' substantial role in maintaining supply chains that extends from production to distribution of commodities (Aqmarina and Achjar 2017). More generally, a study finds port throughput has a significant impact on a country's gross domestic product and has a strong positive relationship with secondary industries (Cong et al. 2020). Another study (Li 2009) explains that secondary industries thrive near seaports because they are primary consumers of raw materials. Further, Merk (2013) adds that ports do not only act as enabler of trade, but they also offer value-added activities as port infrastructure boosts domestic employment and becomes a nexus for innovation, research, and development. Cong et al. (2020) also concludes that seaport development and operation provides direct economic output by creating employment opportunities and increasing tax collection. Dwarakish and Salim (2015) suggests that apart from its economic role, ports also serve a social role as they provide jobs to the community. Interestingly, Clark et al. (2004) observes that seaports cause greater regional impacts on the hinterland or the area near the port.

Although the economic value of transport infrastructure where seaports are classified, is well-explained in the literature, infrastructure investment has not been a priority in the Philippines for many years. To demonstrate, the allocation for public infrastructure from 1993 to 2010 was only less than 2 percent of GDP.

¹ <https://psa.gov.ph/content/highlights-domestic-trade-statistics-philippines-third-quarter-2021-preliminary> accessed on December 2, 2021

It slightly increased to 3 percent during the period of 2011 to 2016; but both figures are well below the World Bank's recommendation for developing countries of 4.5 percent of GDP. Consequently, years of underinvestment in public infrastructure is very detrimental to the quality of the country's transport infrastructure, including seaports, which is essential in domestic and international trade. In fact, the World Economic Forum's quality of ports ranking for 2017-2018 shows that Philippine ports are perceived to have lower quality when compared with the ports of Singapore, Malaysia, Thailand, Indonesia, and Vietnam. Given that seaports are the main infrastructure in the water transport sector, understanding how they are utilized, managed, and operated is a fundamental step towards improving the performance of the sector. In this study, we aim to look at the performance of Philippine ports through domestic and international lenses, by utilizing previous studies and comparative statistics on ASEAN countries. The main policy question that we seek to address is whether our existing port infrastructure is enough to serve the needs of the country. Additionally, we examine the performance of our ports compared with neighboring countries in ASEAN and review previous and current government strategies and policies in the water transport sector to draw some useful insights. The overall goal of this study is to contribute to the body of knowledge on Philippine ports and water transport sector as well as serve as a useful reference to policymakers in identifying the gaps, issues, and challenges in the water transport sector.

Water transport sector in the Philippines

Domestic trade in the Philippines is heavily reliant on the water transport sector. In 2019, 99.9 percent of the 25.89 million tons of trade was coursed through water while only .03 percent was coursed through air (Philippine Statistics Authority). The top three commodities that was traded through water were food and live animals, manufactured goods classified chiefly by materials and mineral fuels, lubricants, and related materials. Regions with high water trade activities include Central Visayas, Northern Mindanao, National Capital Region and Central Luzon. In terms of trade balance, the National Capital Region (NCR) is mainly a sender of goods as trade outflow through water surpasses trade inflow by 26 percent. Similar with NCR, Eastern Visayas, Central Luzon and Bicol regions are senders of domestic goods through water while the rest of the regions are importers. The top three importer of goods via water transport are Central Visayas, Caraga and Western Visayas. On the hand, water transport is also utilized to travel domestically. In 2019, the top three region of origin of domestic travelers via water are Central Visayas, MIMAROPA and Western Visayas region, accounting for 25 percent, 16 percent, and 15 percent of total travelers, respectively.

II. Literature review

Port performance, efficiency, competition, and issues faced by ports

Studies on port performance, port efficiency and port competitiveness are common in the literature. The quest to achieve high level of efficiency and competitiveness has always sparked interest in researchers since good performing ports equate to greater economic contribution. According to the study of Rajasekar & Malabika (2014) there are several variables that impact port performance; these are operating expenses, operating surplus, rate of return, number of employees, turnaround time, idle time, berth occupancy rate and cargo equipment. Meanwhile, a port's competitiveness is largely influenced by its comparative advantage in terms of infrastructure, products, and services (Heaver (1995). Usually, competitive ports have large market share because they are often chosen over other ports (Merk 2013). Determinants of port competitiveness can be categorized into hard and soft components (De Martino and Morvillo 2008). Hard components are comprised of geographical location, infrastructure, equipment, and logistics platform while

soft components are comprised of services, ICT, safety, and security. On the other hand, port efficiency directly impacts handling and freight costs, making import and export activities either more or less expensive. Less efficient ports tend to impose higher handling cost (Clarke, Dollar and Micco 2004) while more efficient ports charge lower freight cost after controlling for other variables such as type of product, liner services availability, distance, insurance cost (Sánchez et al. 2002). A study finds that a 25-percent improvement in one factor affecting efficiency leads to around 2 percent decrease in total maritime transport cost (Sánchez et al. 2002). Hence, the overall operational efficiency of a port or its ability to utilize its resources to provide good service (Parola et al. 2016), is important in attracting regular users. Liner shipping companies, for example, chooses to stop over more efficient ports because the loading and unloading rates of these ports complements the speed of movement of the liner company (Talley 2006). Inter-modal links to other transport systems are likewise important elements in port choice behavior (Kim 2014) since these facilitate easier local and regional deliveries (Walter and Poist 2003).

A study (Parola et al. 2016) argues that port competitiveness is a multidimensional and multifaceted issue because ports are complex infrastructure that involves many factors, drivers, and stakeholders. Over the years, measuring port performance and competitiveness have evolved due to more intense competition among port managers to attract shipping companies and users, better access to latest technologies, creation of new ports and upgrade of existing ports (Wahyuni et al. 2020). Several other studies highlight some important points to note when dealing with ports. Economic theory tells us that competition drives prices of commodities and services down. However, in the discussion of Helling and Poister (2000), they stressed out that in case of ports, competition does not always lead to lower prices because assets remain fixed in time, constraining how ports can respond to competition. As compared with ports, shipping lines have relatively greater market power because of their ability to influence different ports to compete on rates and services. Generally, price competition benefits the society because it leads to service improvements and reduced prices of port services (Goss, 1998). It also diversifies options for transportation, making an economy less susceptible to shocks to a specific type of transport system. However, price competition means lower revenues for ports. It also creates great uncertainty not only to individual ports but also for the government or ports that subsidizes it (Helling and Poister 2000). Another thing to note is that competition also does not ensure efficiency, especially since most ports are publicly subsidized. If the subsidy is not enough to cover the total investment needed to operate ports, some part of the cost will eventually be passed on to consumers. Service competition on the other hand, could encourage port expansion that could place ports in a difficult financial position especially if they are unable to raise their prices since reducing prices for port service may not always be viable. The United States Maritime Administration (1998) surmises that the common philosophy that “ports promote regional economic development and employment” along with the resulting intense competition among ports often leads to overcapacity and inefficiency. Similarly, De Oliveira and Cariou (2015) note that greater regional port competition leads to port inefficiency.

Meanwhile, investing in the expansion or upgrading of existing port infrastructure is a complicated decision to make. Aside from budget restrictions, this requires a holistic approach that needs to consider port connectivity network and productivity improvement strategies (Lagoudis et al. 2014). Helling and Poister (2000) also discuss that even if the ports engage in a relatively conservative expansion plan, they are still at risk of being left in debt with factors such as changing market, technology and changing political situation. If ports are not upgraded however, they run the risk of being obsolete and eventually becoming too inefficient to operate (Dwarakish and Salim 2015). Government and private sector involvement in port expansion is necessary due to high capital requirements but it also complicates the process further because such arrangements could result to excess port capacity. Boschken (1998) points to the experience of the Pacific and Atlantic coasts wherein upgraded ports ended up becoming uncompetitive and grossly underused because the ports did not achieve the critical mass of load centers. Many Chinese ports similarly

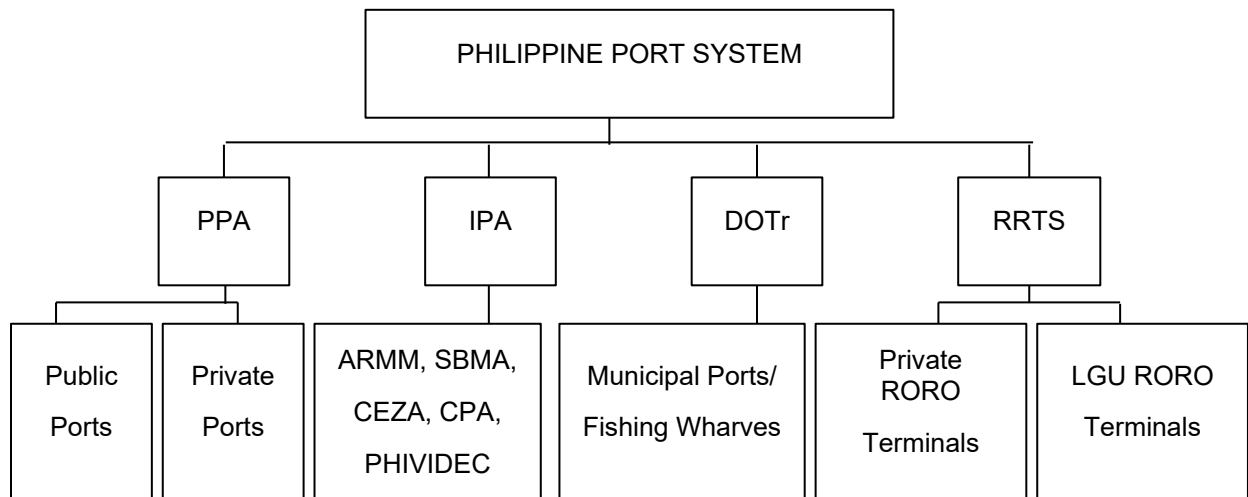
suffer the same fate of overcapacity after years of expansion (Dan et al. 2018, Wen 2016). Helling (1997) explains that economic development does not directly stem from direct public investment in ports. Rather, ports will be able to induce economic development if it is able to affect the ability of areas to create and retain income as well as employment.

III. Philippine ports through domestic lens

Port management structure

The Philippine port system as illustrated in Figure 1, has four categories, 1) mainly dominated by the Philippine Ports Authority (PPA) which consists of the private and public ports, 2) independent port authorities (IPA) separate from the jurisdiction of PPA, 3) municipal ports transferred to and mandated by local government units (LGUs), and 4) the RoRo Ferry Terminal System.

Figure 1. The Philippine Port System



Source: Llanto, Basilio and Basilio 2007

Philippine Ports Authority

The Philippine Ports Authority is the primary government agency responsible for the planning and development of the country’s seaports. It was created in 1974, and has since expanded its functions in regulating finance, operation, and maintenance of ports, including all port construction projects (under its port system). This GOCC has been previously removed under the jurisdiction of DPWH and given financial autonomy as an attached agency of the Department of Transportation (DOTC).

The organizational structure of PPA is influenced by the country’s geography, which also determines the distribution of infrastructure, human resources, and other aspects of its management systems. There are currently 25 Port Management Offices (PMO) and Terminal Management Offices (TMO), strategically located across the country. The port authority earns its revenue from leasing concession fees and other port charges from supervising one of the biggest common-user ports in the Philippines such as the Manila International Container Terminal (MICT), and the North and South Harbors.

Independent Port Authorities

ARMM. The Regional Port Authority - Autonomous Region of Muslim Mindanao manages the Polloc, Jolo and Bongao ports devolved by the PPA.

BCDA. The Bases Conversion and Development Authority is a development corporation engaging in PPPs for the infrastructure of former military bases into economic growth centers. They supervise the ports in San Fernando, La Union, and the former U.S. military air base facility in Clark Field, Pampanga.

CEZA. In 1997, the Cagayan Economic Zone Authority was created to supervise the Cagayan Special Economic Zone and Freeport. The Cagayan Freeport is operated as a separate customs territory.

CPA. The Cebu Ports Authority (CPA) was created in 1992 to govern over all ports located in the Cebu Province, acting separately from the Philippine Ports Authority (PPA) system. The Cebu Port System is composed of the Cebu International Port and the Cebu Baseport - Domestic Zone. Additionally, there are five subports under the jurisdiction of CPA, namely: Mandaue, Danao, Sta. Fe, Toledo and Argao – each subports are smaller ports that are essential to the flow of domestic inter-island commerce.

PIA. Although the Mindanao Container Terminal is officially under the regulation of PHIVIDEC Industrial Authority, it is operated by its own subsidiary – International Container Terminal Services, Inc. (ICTSI).

SBMA. The government of the Philippines created the Subic Bay Metropolitan Authority to operate and oversee the development of the Subic Bay Freeport (SBF) in Zambales.

These port authorities were given independence to decentralize control from the PPA and promote competition, while also giving LGUs more control over their local ports. Most of the ports were devolved from the PPA port system, except for SBF and MCT. IPAs are given the power to set their own rates, although they still normally match the rates of PPA.

Department of Transportation

The DOTr is responsible for funding the construction and development of small quays and fishing/feeder ports. Some of the fishing ports serve as commercial cargo handling set by the PPA and the PFDA. These ports are later transferred back to the by the respective LGUs or the municipal government themselves that built those ports.

RRTS

The Roll-On Roll-Off Terminal System (RRTS) was established in 2003 by the government meant to provide greater access and connectivity between island provinces, while expanding the country's transport system at minimum cost (Francisco, 2017). This was an infrastructure investment that converted existing ports to be parallel to the national highway networks. The RORO policy was aimed to improve travel and logistics efficiency in the country, as well as encourage private sector participation.

To demonstrate the viability of the RRTS, the Strong Republic Nautical Highway System (SRNH) was established, linking the islands Luzon, Visayas and Mindanao. The four main RORO routes are the Western

Nautical Highway, the Central Nautical Highway, the Eastern Nautical Highway, and the Pan-Philippine Highway.

Western Nautical Highway. The oldest most successful route (ADB, 2010), serves as a primary link between Luzon and Mindanao through Visayas. It is a 703-kilometer and 137-nautical mile stretch of the SRNH extending to 10 provinces. Starting at Batangas Port, gateway in Luzon’s connecting to the major islands of Mindoro, Panay, Guimaras, and Negros, Visayas and Mindanao.

Central Nautical Highway. This route was opened in 2008, running parallel to the Western Nautical Highway. It also connects Luzon to Mindanao, but it is the only nautical highway to pass through Masbate and Central Visayas.

Eastern Nautical Highway. Inaugurated in 2009, this route is also parallel to the other networks connecting Luzon to Mindanao via Masbate, Biliran, Leyte and Southern Leyte. It also offers a different efficiency of the transporting of passengers and cargo because with its network of roads that span to utilizing “moving-bridges”. Some of the Eastern Nautical Highway linkages overlap with the Central Nautical Highway, particularly on certain locations in Masbate. They both serve the routes Pilar/ Balud, Sorsogon – Masbate City, Masbate link and Cataingan Port. Although the Eastern Nautical Highway route relatively connects Masbate Province to more destinations, like Biliran Province in Eastern Visayas.

Pan-Philippine Highway. This route was constructed through the funding of various of foreign agencies. It is a network of roads, bridged and Ro-Ro ship connections spanning 2,500-km from Laoag, Ilocos Norte to Zamboanga City. It links the mainlands through the island of Samar and Leyte, with the two (2) routes: Matnog, Sorsogon – Allen, Samar (Luzon to Visayas); Liloan, Southern Leyte – Lipata, Surigao del Norte (Visayas to Mindanao). The Pan-Philippine Highway is the first nautical seaboard of the country and has transported passengers and cargo from Manila to Mindanao alternatively.

Routes	
<i>A. Western Nautical Highway</i>	
(major routes)	(minor routes)
Batangas City, Batangas – Calapan, Mindoro	Lapuz, Iloilo – Jordan, Guimaras
Roxas, Mindoro – Caticlan, Aklan	Tampi, Negros Oriental – Bato, Camarines Sur
Dumangas, Iloilo – Bacolod, Negros	San Carlos, Negros – Toledo/ Cebu
Dumaguete, Negros – Pulauan, Dapitan	
<i>B. Central Nautical Highway</i>	
Pilar/Bulan, Sorsogon – Masbate City, Masbate	Jagna, Bohol – Mambajao, Camiguin
Cawayan/Cataingan, Masbate City – Bogo, Cebu	Benoni, Camiguin – Balingoan, Misamis Oriental
Cebu City, Cebu – Tubigon, Bohol	
<i>C. Eastern Nautical Highway</i>	
Pilar/Bulan, Sorsogon – Masabate City, Masbate	San Ricardo, Southern Leyte – Surigao City,
Cataingan/Esperanza, Masbate – Naval, Biliran	Misamis Oriental

D. Pan-Philippine Highway	
Matnog, Sorsogon – Allen, Samar	Liloan, Southern Leyte – Lipata, Surigao del Norte

Source: PPA

Note: Listed major Ro-Ro routes of the Central Nautical Highway have been updated per PPA Memorandum Circular 07-2017.

Port management models

Port management is the process of organizing and supervising the functions of ports from operations to development. It is an essential part of the port industry to serve the global and regional economy needs of a country. Most studies focus on port governance and efficiency of port operations (Notteboom and Haralambides, 2020). There are four (4) port management models that categorize the participation of the private and public sector in the structure of a port system, and the World Bank (2007) identifies the main models as follows:

Port Models	Infrastructure	Superstructures	Operations	Other Services
Service Port	Public	Public	Public	Public majority
Tool Port	Public	Public	Private	Public/Private
Landlord Port	Public	Private	Private	Public/Private
Private Port	Public	Private	Private	Private majority

Source: Port Reform Toolkit, World Bank

Note: Superstructures are any structure built or constructed above an existing foundation or baseline, usually in the form of storage/warehouse or any fixed equipment in the likes of the port industry.

Service port. This model shows when a port authority is fully responsible for the port overall. These responsibilities include the ownership, maintenance and operation of the infrastructure and superstructures, including cargo handling services executed by labor recruited under the port authority. Other developing countries still use this management structure.

Tool port. The infrastructure and superstructure of ports are owned and managed by the port authority, but the cargo handling is operated by the private companies who use the port facilities through concessions or licenses.

Landlord port. By the definition of “landlord”, the port authority owns the infrastructure or property available for lease of privately operated companies and/or industries. Private port operators also supply and maintain the superstructures (e.g., buildings, terminal equipment, vans, etc.). The role of the port authority is mostly regulatory, while port operations are handled by the private sector. Globally, this model is popularly used for large and medium-sized ports.

Corporatized or fully privatized port. In this model, the port authority has no significant participation. The ownership and regulatory functions are transferred to the private successor, with the port authority as a major shareholder and only maintaining standard regulatory oversight acting as a private enterprise.

According to the World Bank (2007), the landlord model is considered as the most common structure of port administration, used by 80% of ports in the world. This is also because ports are traditionally provided by the government, but port services like inter-island shipping and cargo handling are endorsed to the professional capacity of the private market. The present policy of the Philippine port infrastructure has also shifted its paradigm from government provision to more participation from the private sector, effecting a competitive environment (Llanto, Basilio and Basilio, 2005).

Port System / Port Management Bodies

The role of port authorities has been changing with the challenges of operating different port environments, so the port regulation of the European Commission transformed the term for these entities to a more generic term like ‘managing body of the port’, or more specifically port development company, port ecosystem or cluster manager (De Langen et al., 2020).

According to Verhoeven (2010), the Commission of the European Communities in 2001 explains that port authority has objectives under national law (or regulation), administration and management of the port infrastructures, and oversight on the operational activities proceeding at the port (Notteboom and Haralambides, 2020).

Most of the ports in the Philippines are managed by government port authorities. The general role of port authorities is listed by the World Bank (2007) as follows:

- Approval of port investment proposals;
- Set financial policies such as common financial objectives for ports, determining common infrastructure policies to be funded centrally or locally, and giving advice on loan applications to the government;
- Regulation of tariff policies like rates and charges protecting the interest of the public;
- Specify labor policies on setting recruitment standards, common wage structure and common qualifications for promotion, as well as counsel common labor union procedure;
- Establish grounds for licensing of port employees or agents;
- Facilitate the collection of information and statistics of port activity for general use, and sponsor research and development related to ports as needed; and
- Counsel or serve as legal advisory over local port authorities.

Port Management, Administration, and Safety

Port and vessel capacity management

Managing port operations ultimately aims to improve port efficiency. This is done by reforming and updating port management functions to keep up with global standards. In the Philippines, several of the ports have been expanded to increase interior capability and accommodate more cargoes and containers. But with the rise in cargo volume annually, flow of goods to and from ports limited by port utilization (Lim, 2018). The World Bank Group (2014) identifies some of the following issues with the country’s port and vessel capacity:

- Constraints on competition existing within the domestic shipping market such as barriers to entry and operation of private sectors, which also discourages the inflow of investment in the shipping industry.
- High costs of shipping caused by the small volume capacity in majority of the domestic shipping routes, relatively only contributing to 1 percent of the total domestic seaborne trade.
- One-direction traffic in many routes. For instance, the route Manila to Cebu ships on full capacity, however Cebu to Manila is way below in comparison.

Container/Cargoes Management

For the ports in the Philippines, there are more incoming goods compared to outgoing goods (Lim, 2018). There is also a dearth in on-site capacity for container storage/management, which resulted to the development of cargo address system (an improvised storage management of cargoes in a port operation area).

With the increase in vessel sizes, greater demand for ports to have deeper berths and more efficient cargo handling is necessary. Less time spent on port facilities can reduce the ship-operating costs and generate a competitive advantage over other ports. In a case study by Santos and Virola (2020), port costs can be reduced along with downtime induced worker-injuries during cargo handling operations by using the automatic spreaders as opposed to the traditional wire-sling and hook method. This change in equipment will eliminate the tedious and hazardous process of the wire-sling method where dockworkers manually climb containers to secure the wire slings on to the container corner castings. The report showed that between 2012 and 2015, around 80% of the injuries under port operations of the Manila Port Harbour Incorporated (MNHPI), were related to the utilization of wire-sling resulting in a loss of productivity and incapacity of workers (if not major fatalities). On the other hand, using an automatic spreader in crane cargo handling makes for an efficient alternative. It enables the locking and unlocking of hooks onto containers without assistance, which is much faster and safer compared to the wire-sling method. This method is also promoted by the International Labor Organization (ILO) and has reportedly been an acquired method by the MNHPI back in 2015 (deployed at only 38 percent considering customers and staff cautiousness). The case study (Santos and Virola 2020, p. 46) recommendations follow that port operations should:

- switch to using automatic spreaders to better facilitate operations and cost reduction
- lessen the use of wire sling method during operations to prioritize workers welfare
- conduct continuous training for handling skills to increase productivity of port operatives, as well as reduce accidents
- revise maintenance processes like arranging for equipment to be serviced regularly for improved availability and less downtimes

Workforce Advancements

Efficiency and capacity of port operations also rely on the advancement of its working forces. PPA has adopted technology to accommodate and facilitate transactions with the least processing time for loading and unloading cargoes (Lim, 2018). Although adopting technology has been viewed to threaten the employment of personnel, training of workers is still required and not replacement in the application of technology in the first place.

According to Madrilejo and Javier (2020), the PPA implemented a quality management system to facilitate vessel entrance and clearance processes in several gateway ports across the country – successfully attaining the ISO certification when they expanded the Management System on Port Safety, Health and Environment (PSHEMS). Based on the external audits of certifying bodies, they identified a need to conduct improved

Training Impact Evaluation and Assessment (TIE/A), in order to certify the workers as well. The case study (Madrilejo and Javier 2020, p. 54) recommends to PPA the following actions:

- Updating the TIE/A policy highlighting the “responsibilities, scope, and criteria, as well as predetermined performance/success indicators”, including survey forms which incorporates the PPA’s updated requirements on performance evaluation.
- Creating a single unit that focuses on monitoring and evaluating the effectiveness of training programs of PPA should be created to eliminate the overlapping functions of PPATI and HRMD. TIE/A should be distributed at the level of port management officers which will allow for timely completion of evaluations, and possibly taken online with the help of Information and Communications Technology Department.
- Ensuring the consistent implementation of the TIE/A policy for all the training programs by the PPATI and HRMD.
- Specifically holding impact evaluations during the 6th month and 24th month following the delivery of courses for both internal and external trainings.

Environmental Impact

Port operations have an impact on air and water quality, as well as land use, which is why some ports have shifted to more environmentally friendly practices meeting international standards. In the Philippines, all ports have adopted the Solid Waste Management Program and Clean Air Act (Lim, 2018). A necessary improvement on the maritime sector of the country towards sustainable management, especially helpful as to enable the PPA to form proactive responses to challenges brought about by climate change.

In a study by Mapalo and Javier (2020), the PPA had no systematic process in place for environmental performance to be measured. Additionally, data related to environmental matters were limited for the traditional measures for port performance that were available – making it difficult to be used for sustainable management. From the survey Mapalo found that the PPA was able to assign responsibility for environment issues into its organizational functions, but only major ports have established and formalized the Environmental Management System (EMS) performance of ports. It is necessary to improve the availability of port environmental performance data as this forms the baseline from which the PPA can formulate and implement institutional approaches to improved environmental performance. This will also enable proactive responses to the challenges posed by climate change and bring about more sustainable management within the maritime sector.

There is need to link performance and environmental strategy, and for PPA to achieve this, the following recommendations are:

- Establish an EMS which incorporates the ISO 14001 standards applicable to all ports;
- Create a single Environmental Policy unifying all the existing environmental policy issuances of PPA;
- Adopt the EMS as a measure to assess and report the sustainable environmental management performance on a yearly basis;
- Practice the best environmental/ green port initiatives by the PMOs as the EMS primary standard component E-PAPs, such as “hot-ironing or shore-based power supply for ships; move to renewables for sources of energy; quarterly reporting of air and water quality monitoring results; and create awareness of environmental matters among all staff in PPA” (Mapalo and Javier, 2020, p. 50);

- Organize an Environmental Committee at par with the PPA Board of Directors to push forward the environmental responsibilities in PPA; and
- Publish the environmental performance data in the PPA Annual Report including the environmental performance metrics used, similar to how the financial and operational measures are also reported.

Safety and Security

Port safety and security has been of primary importance to the Authority along with its efforts to meet global challenges on ports competitively. In 2014, the Philippine Coast Guard (PCG) was mandated to enforce the Vessel Traffic Management Systems (VTMS) in the Port of Manila and Batangas, while PPA was tasked to operate and maintain infrastructure to enhance safety of entry and exit of vessels.

And in 2017, Department Order 2017-008 was issued wherein the provision of adopting the International Ship and Port Facility Security (ISPS) Code of the IMO, the PCG was given instruction to control all vessels, seaport, and harbor movements. They were also in-charge of the following tasks:

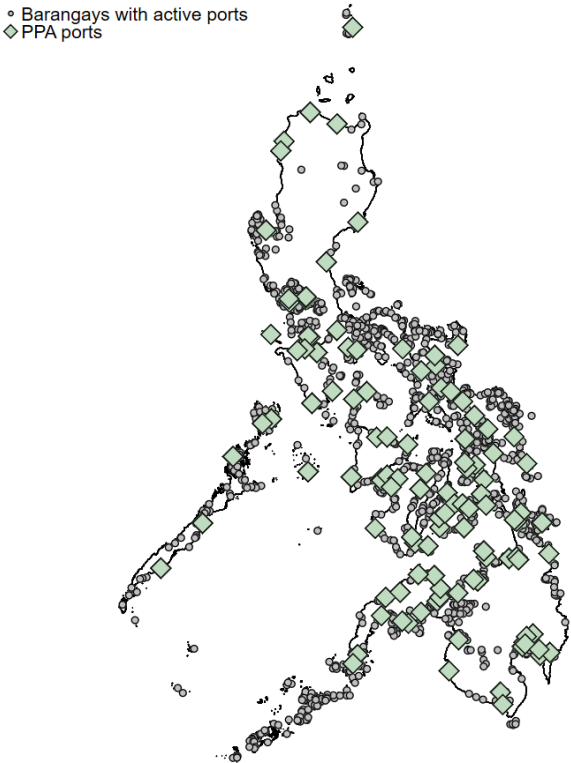
- Designate security zones for maritime security
- Enforce ports and ships identification system
- Regulate access to ports, vessels, and waterfront facilities
- Inspect cargoes to prevent the transport of contraband
- Set and enforce appropriate security levels in all ports in Mindanao.

Despite these efforts, the industry still maintains a high number of maritime accidents, due to the low quality of service and poor safety standards (World Bank, 2014). The PPA remains compliant with the international standards for safety and security and have since invested in security equipment with more baggage x-ray machines, walk-through detectors (airline-standard quality), and even equipped the port police force with security amenities and police mobiles (Lim, 2018).

Trends in domestic port utilization

In 1999, the National Statistical Coordination Board (now Philippine Statistics Authority), in coordination with the Philippine Ports Authority (PPA), Department of Public Works and Highways (DPWH), Philippine Fisheries Development Authority (PFDA), Department of Transportation and Communications/Project Management Office, For Ports Project (DOTC/PMO Ports), National Statistics Office (NSO) released an inventory of ports in the Philippines. Based on this publication the total number of seaports in the country is 1,592, where 57 percent (539) were commercial ports, 29 percent (462) were fishing ports, and 14 percent (224) were feeder ports. Around 92 percent of the total ports were operational. During this time private commercial ports outnumbered public commercial ports. This publication however was discontinued. The next best alternative to trace the number of ports in the country is through the Census. Census 2015 data suggests that the total operational ports in the country has now increased to 1,886 where 328 of these are under the Philippine Ports Authority, the main agency responsible for the operation, development, and regulation of all public ports as well as regulation of private ports.

Figure 2. Map of Philippine Ports



In terms of port utilization, cargo traffic has been increasing in the past years for some ports especially for those in the National Capital Region. The increase in utilization of the Manila International Container Terminal as well as the North and South harbors has been the biggest between 2015 and 2019. Data shown in Figure 3 is aggregated data by port management office.

Figure 3. Top 20 ports by cargo (million) TEU

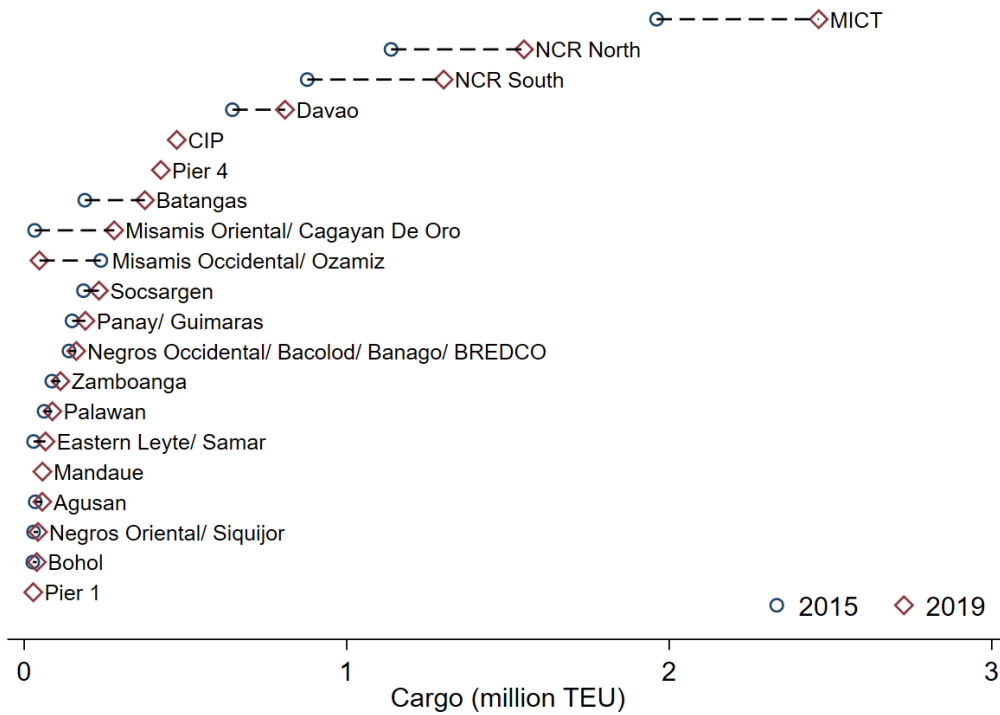
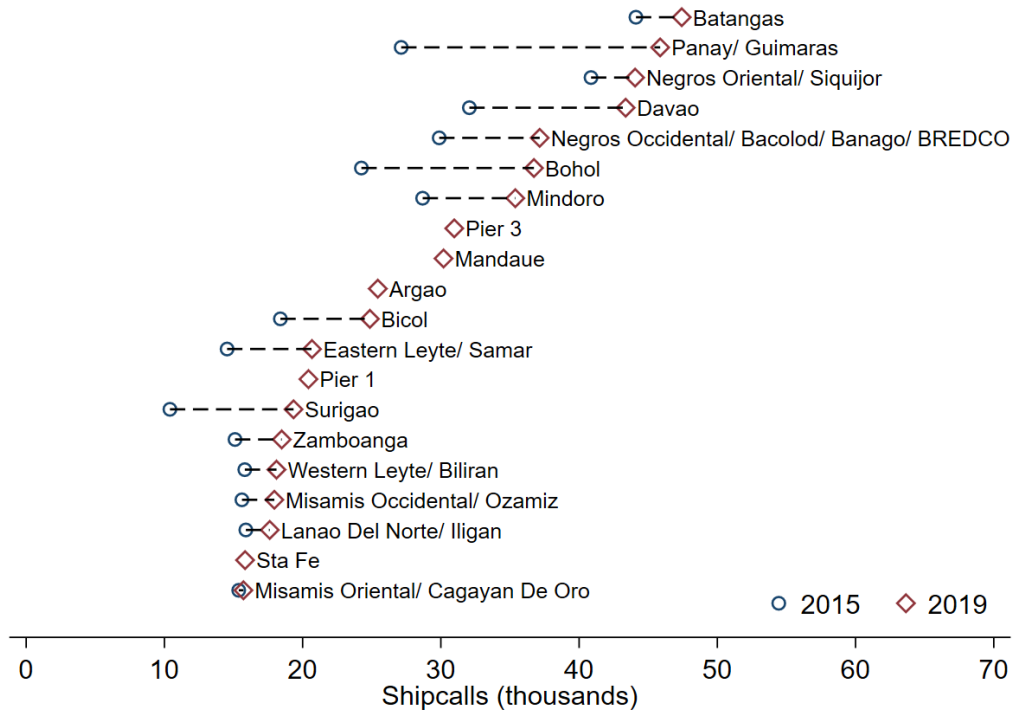


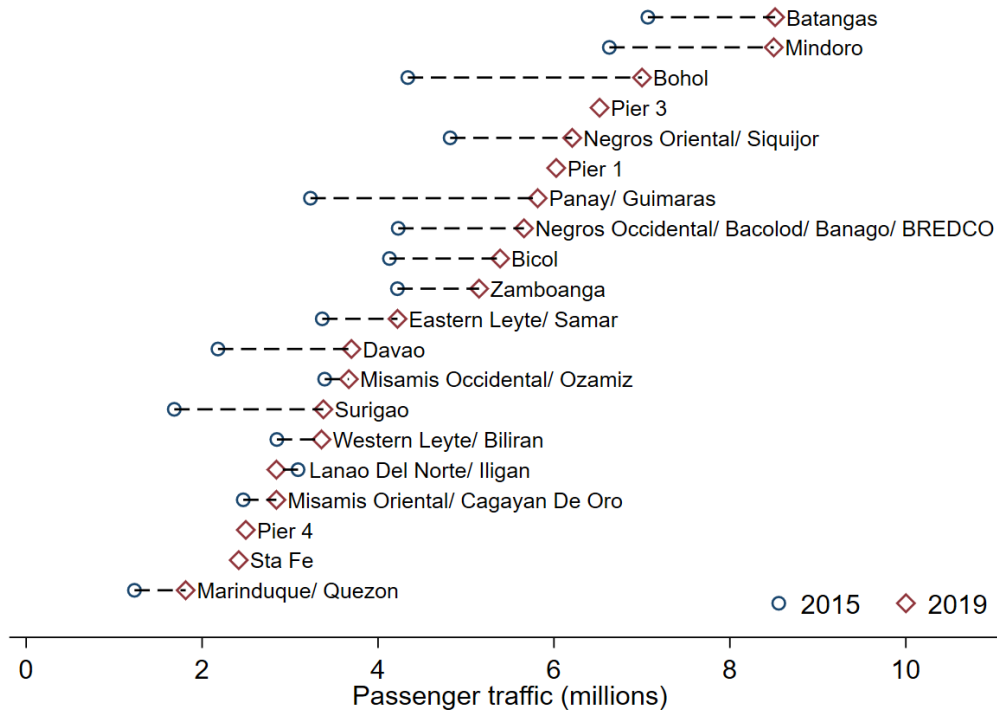
Figure 4 shows that shipcalls, have also been increasing in ports in the Visayas and Mindanao regions between 2015 and 2019. Most shipcalls are done in Panay/Guimaras, Davao and Bohol.

Figure 4. Top 20 Ports by shipcalls (in thousands)



The increase in domestic passenger traffic is also observed to have increased in tourism ports.

Figure 5. Top 20 ports by passenger traffic (in millions)



The number of domestic ports increased over time. So did domestic passenger traffic and domestic sea cargo throughput.

Figure 6. Number of domestic seaports vs domestic passenger traffic

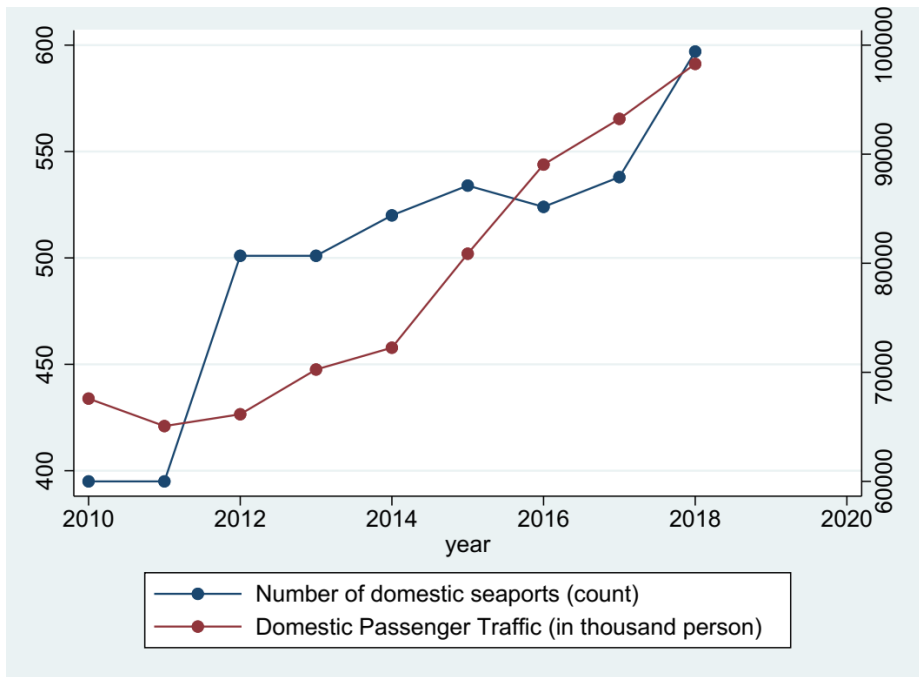
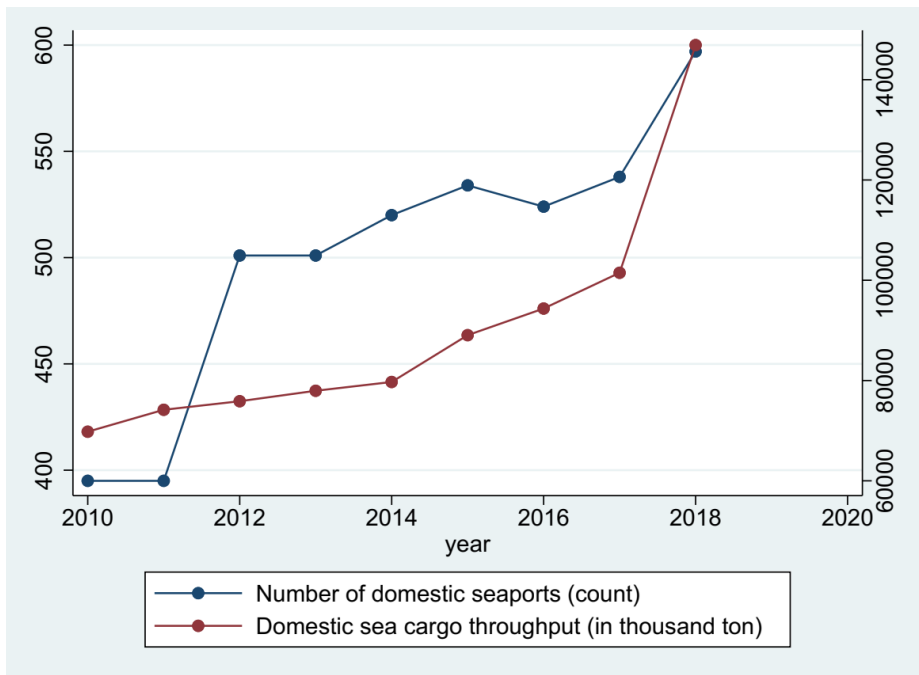


Figure 7. Number of domestic seaports vs domestic cargo throughput



International seaports also increased with passenger traffic, international cargo and container throughput.

Figure 8. Number of international seaports vs international sea passenger traffic

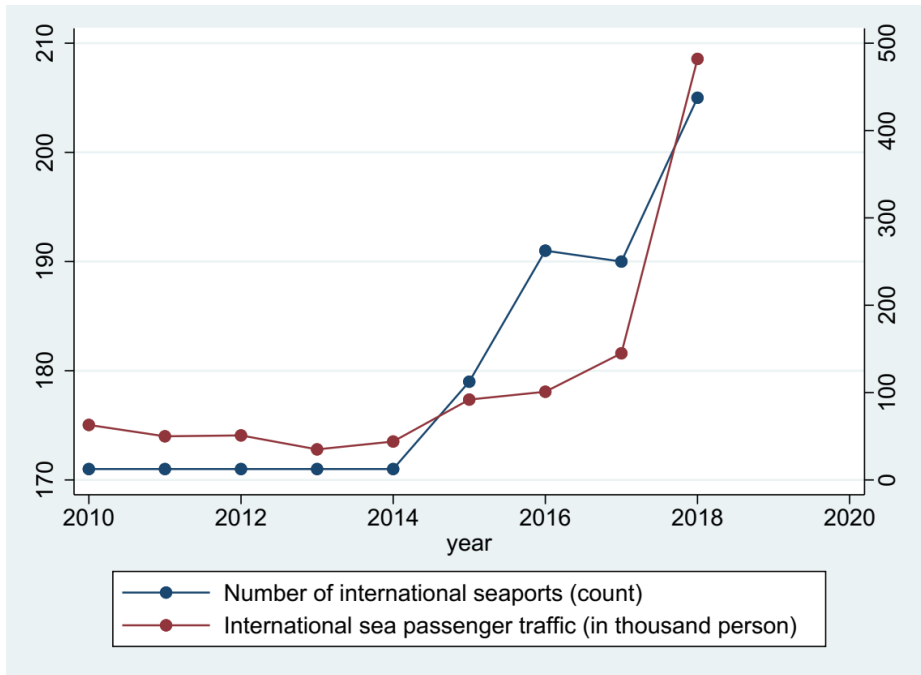


Figure 9. Number of international seaports vs international sea container throughput

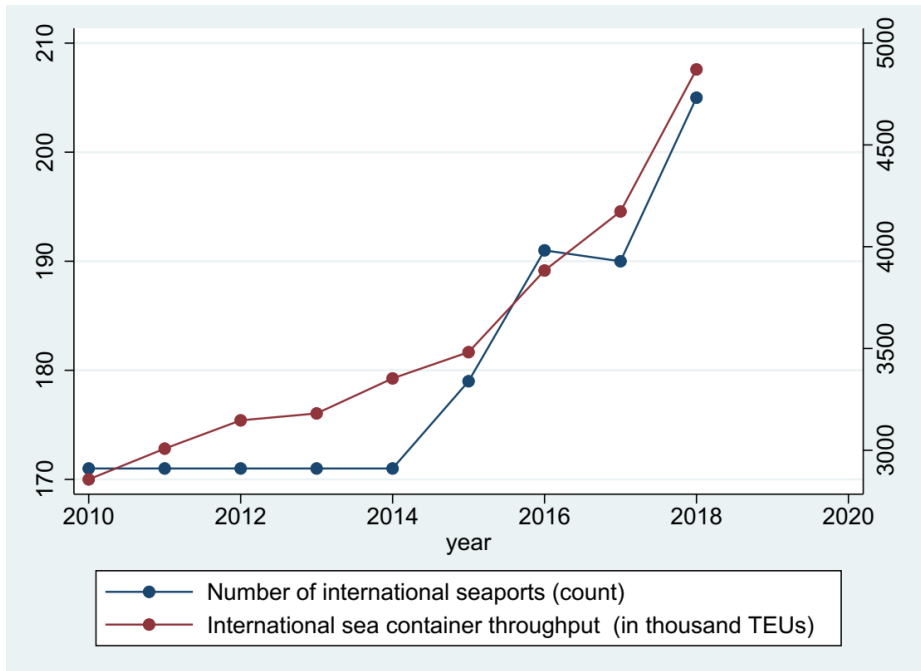
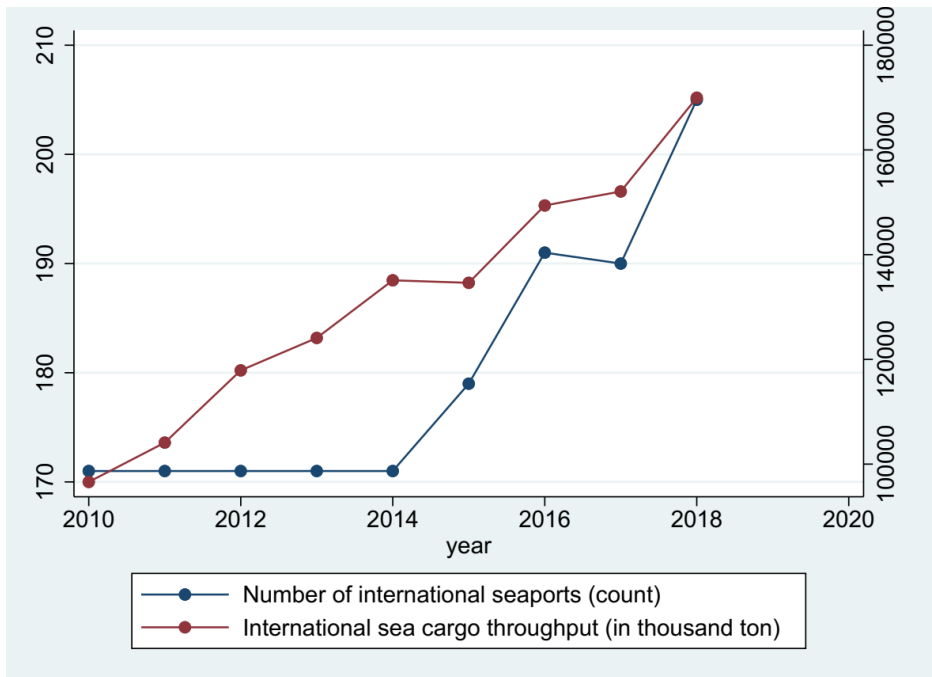


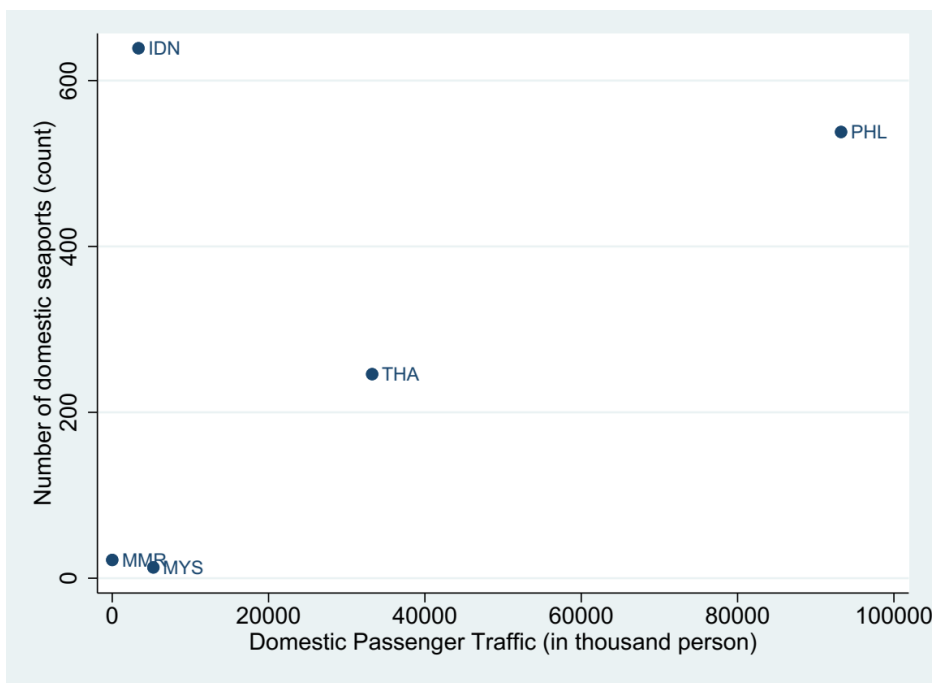
Figure 10. Number of international seaports vs international sea cargo throughput



IV. Philippine ports through international lens

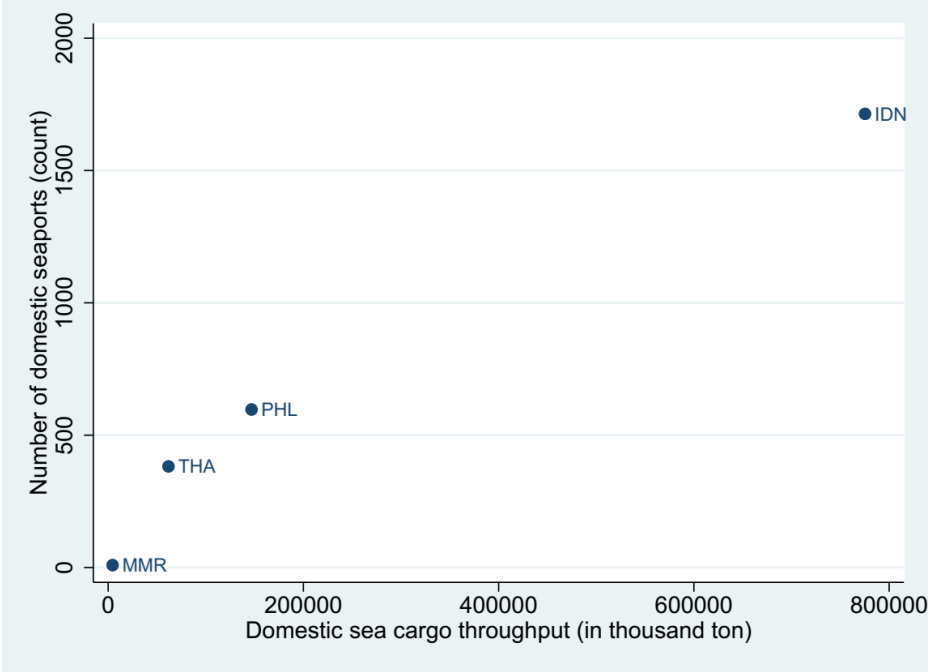
Compared with other ASEAN countries, we heavily utilize our seaports for domestic travel.

Figure 11. Number of domestic sea ports vs domestic passenger traffic in select ASEAN countries



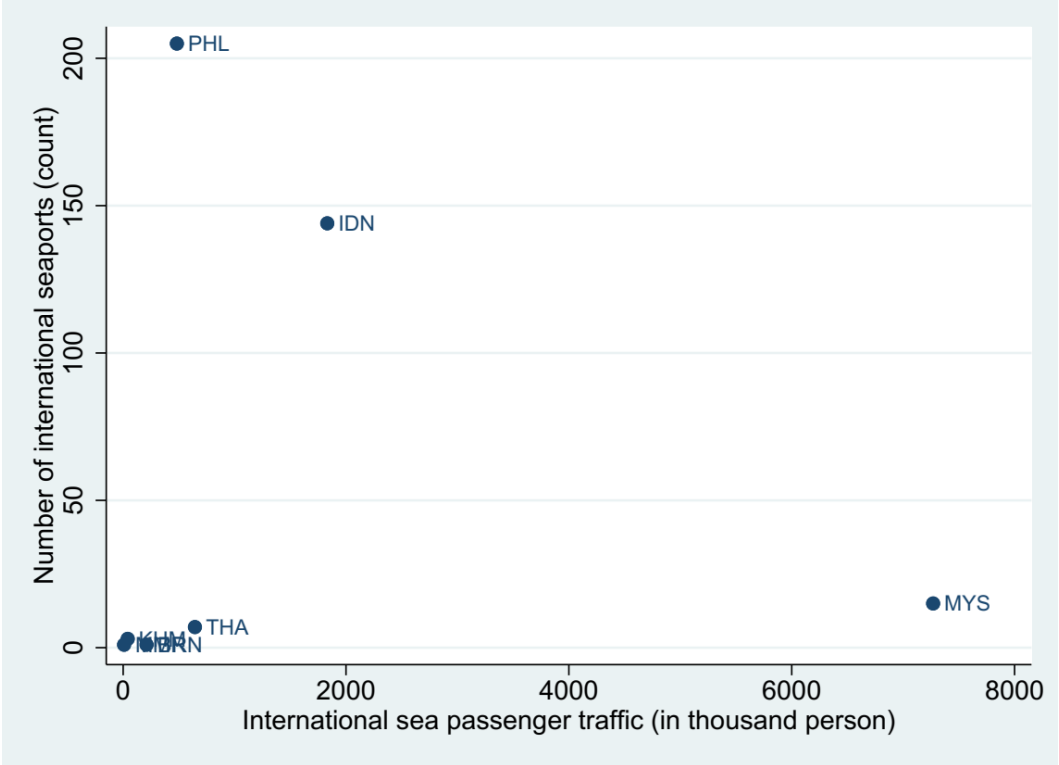
We also use our ports for domestic cargo but not as intense as Indonesia.

Figure 12. Number of domestic sea ports vs domestic sea cargo throughput in select ASEAN countries



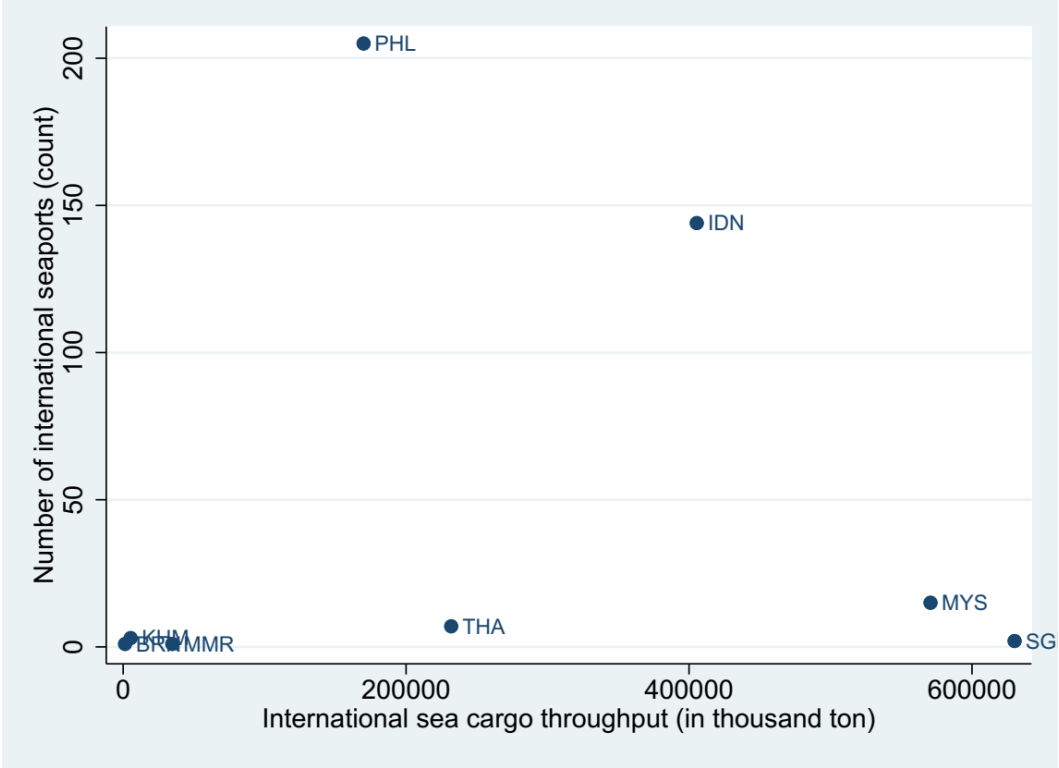
For international seaports however, we don't get as much passenger traffic as Thailand, Indonesia and Malaysia.

Figure 13. Number of international seaports vs international sea passenger traffic in select ASEAN countries



Despite having more international seaports, our cargo throughput is lower compared with Thailand, Indonesia, Malaysia, and Singapore.

Figure 14. Number of international seaports vs international sea cargo throughput in select ASEAN countries



The same is true for sea container throughput. More sea containers traverse the seas of Thailand, Vietnam, Malaysia, and Singapore.

Figure 15. Number of international seaports vs international sea container throughput in select ASEAN countries

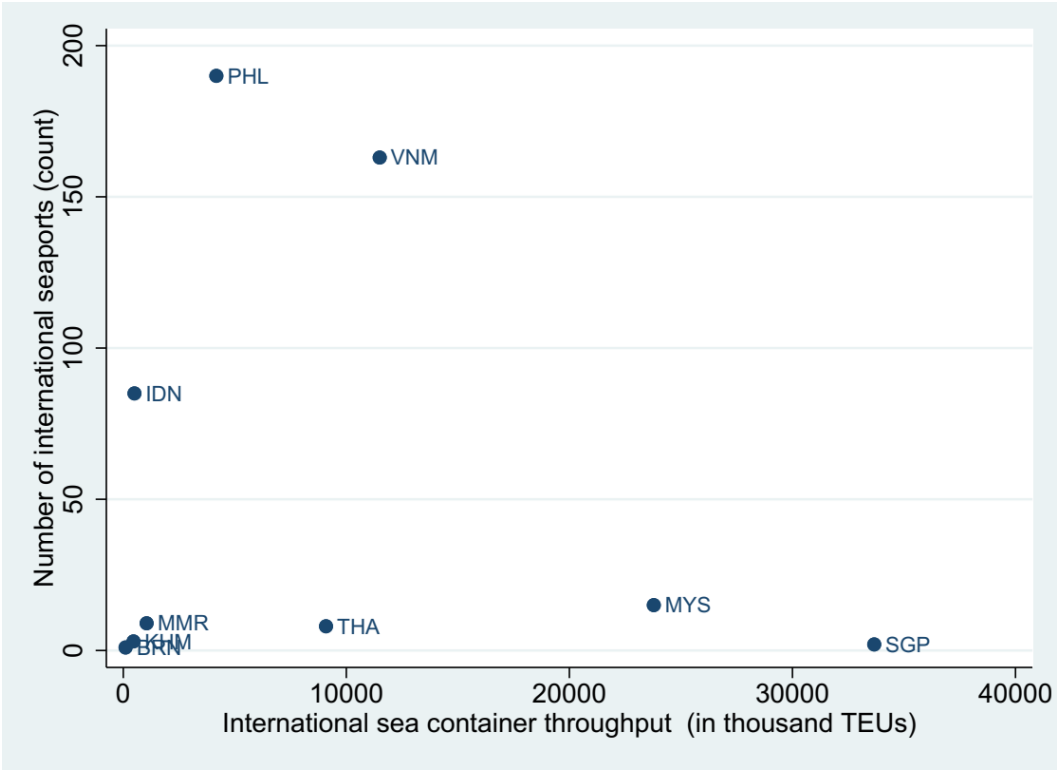
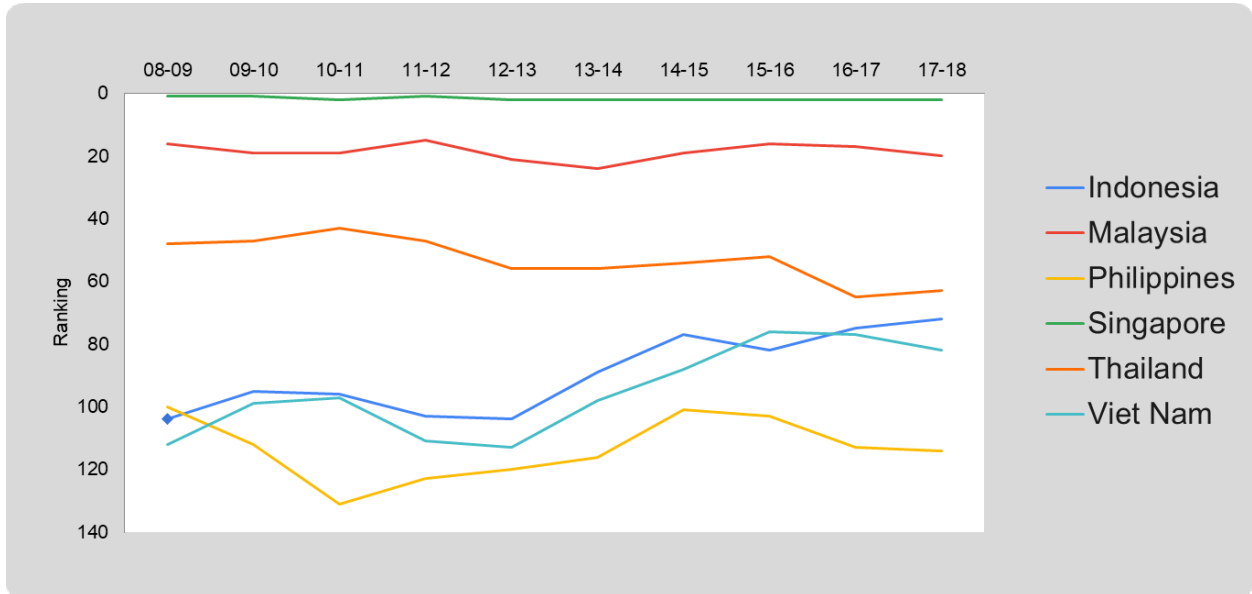


Figure 16 shows that compared to other ASEAN countries; our ports are perceived to have lower quality by users.

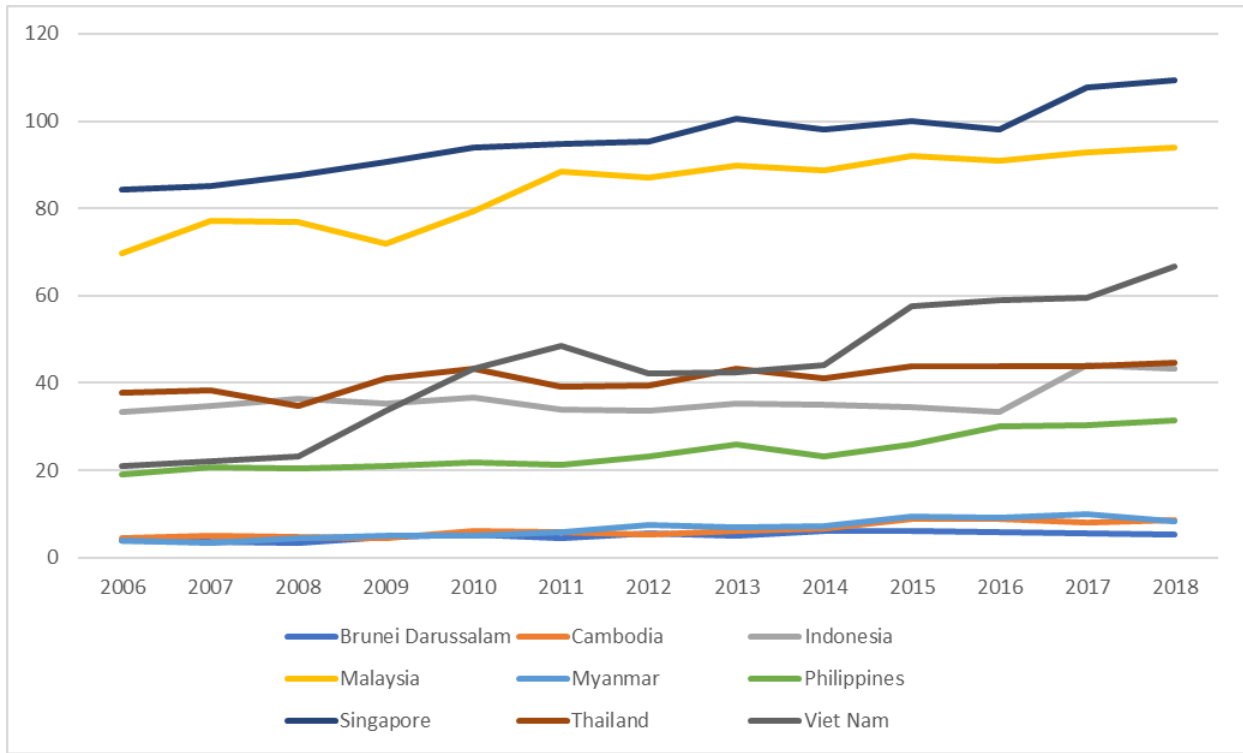
Figure 16. Quality of Ports Rankings ASEAN 6



Source: World Economic Forum

Additionally, our country's liner shipping connectivity index is likewise lower compared to our neighbors in ASEAN. The liner shipping connectivity index (LSCI) indicates a country's integration level into global liner shipping networks as regards regular shipping services for the import and export of manufactured goods. The higher the index, the higher the connectivity.

Figure 17. Liner shipping connectivity index



Source: UNCTAD, Division on Technology and Logistics

Note: Data is for Q4 of each year.

Philippines has underinvested in public infrastructure for several years. It was only in recent years that we were able to increase our infra spending to more than 5 percent of GDP. In the book *Beyond the Gap*, the World Bank specified that developing countries need to invest at least 4.5% of their GDP on new infrastructure every year to achieve the SDG goal on infrastructure.

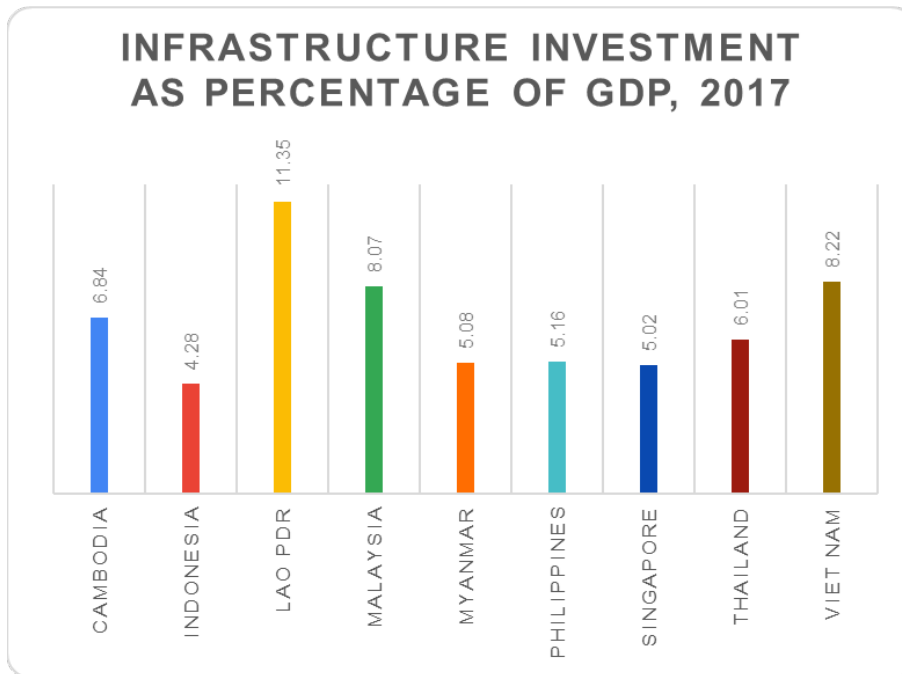
Table 1. Average infrastructure outlays, Philippines

Inclusive years	Average Infrastructure Outlays
1993-1998	1.7
1999-2000	1.8
2001-2010	1.6
2011-2016	3
2017	4.4
2018	5.1
2019	5.2
2020	5.3
2021	6.1
2022	6.3

Sources: 1993-2016 figures from the Department of Budget and Management; 2017-2022 figures are from the IMF.

Recent spending however is at par with our neighbors in ASEAN. However, it will take time for this increase in public infrastructure spending to improve our current infrastructure performance.

Figure 18. Infrastructure investment as percent of GDP, 2017



Source: International Monetary Fund Fiscal Affairs Department

Note: Figures are based on total of general government investment and PPP investment.

V. Government policies and strategies in the water transport sector

1978-1982

The overall goal is to have an integrated and efficient intermodal transport system to facilitate the movement of people, goods and services, at a reasonable cost to support the production of food, farm crops and manufactured goods. For the water transport sector, the focus was on the construction of seaports (national and regional), trunk lines and complimentary services to facilitate inter-island travel.

1984-1987

During this time, the Philippines experienced economic and financial crisis pushing the government to prioritize maintenance over construction of new infrastructure. The focus shifted to the development of feeder road and small ports in poor areas with low road densities. The development of regional fishing port complexes was also pursued to support production and distribution activities of the fishing sector.

1988-1992

The aim is for the transport sector to support agricultural production. To improve access between rural areas and markets, projects were focused on the improvement and rehabilitation of the feeder port system and minor improvements of small ports, fishing ports and lighthouses. Some important achievements during this time are: (1) initial civil works at the Manila International Container Terminal and at the Manila North and South Harbors, (2) studies on roll-on roll-off transport, shipping, ship repair, maritime safety, and bulk terminals, (3) deregulation of shipping passage rates (initiation).

1993-1998

The goal is to strengthen interregional and rural-urban linkages through the transport sector. As in previous years, the maintenance of existing infrastructure was prioritized over the construction of new ones. Feeder ports were developed under the Nationwide Feeder Ports Program and additional ports were constructed through the Nationwide Fishing Ports Program. Some achievements during this period are: (1) the rehabilitation of North and South harbors of Manila Port, (2) completion of Phase I of the Batangas port expansion and modernization program, (3) completion of improvements in the ports of Cagayan de Oro, Davao, General Santos and Surigao, (4) new port complexes in Davao and General Santos, and (5) 33 ports constructed under the Feeder Ports Program.

In 1994, Executive Order 185 was issued to liberalize the domestic water transport industry by opening it to new operators and investors and minimizing government intervention. Additionally, Executive Order 213 was issued to deregulate all domestic shipping rates, except for noncontainerized basic commodities. The Domestic Shipping Consultative Councils were appointed to provide fora negotiations and consultations related to the implementation of deregulated rates.

1999-2001

The overall plan is to improve existing transport services by providing alternative options for travel at competitive rates. Port institutions were also restructured during this time, in preparation for privatization of individual or groups of ports. Commercial decision-making, planning as well as management of port operations were assigned to Port District Offices and Port Management Offices.

Some achievements: Expansion of Batangas port was finished; improvements and expansion of San Carlos, Jolo, Sasa Davao, Virac, Catanduanes, and Pagadian ports; 33 ports completed under the Feeder Ports Program; 1 fishing port complex was finished under Package II of the Nationwide Fishing Ports Program; lighthouses along Manila-Cebu route.

In 1999, the rules and regulations of Executive Order 213 were revised to simplify the adoption of deregulated rates. The implementing guidelines of Executive Order 185 were also revised to expand the liberalization efforts. Under the new guidelines, all routes serviced by an operator for at least 5 years will be open for entry of additional operators (Austria 2002).

2002-2010

Transport infrastructure is envisioned to support the modernization of agriculture, development of tourism, decongestion of traffic, improvement of peace and order, and development of information and communication technology. The main plans for the water transport sector are (1) to modernize the port systems through computerization and (2) further pursue economic liberation and deregulation.

Achievements: construction and rehabilitation of ports of Masbate, Iloilo, Cuasi, Zamboanga, Ozamis; completion of Phase B of the maritime safety improvement project; supply and installation of passenger boarding bridges for the Batangas Port Development Project phase II.

2011-2016

The main government strategy is to heavily invest in infrastructure by increasing spending to at least 5 percent of GDP by end of 2016. The PPP approach was utilized to mobilize private sector participation in infrastructure development. To fast-track the PPP projects and improve check-and-balance mechanisms for infrastructure projects, the implementing rules and regulations of the Build-Operate-Transfer Law (RA 6957 as amended by RA 7718) as well as the guidelines and procedures for joint venture agreements were amended.

Achievements: construction and upgrade of port facilities in Ivana port Batanes, Cagban jetty port in Aklan, Lawigan port in Camiguin, Pangangan Port in Bohol to enhance tourism; the completion of the Central Roll-On/Roll-Off highway to facilitate the movement of passengers, vehicles and goods along the Luzon-Panay-Negros-Cebu-Bohol-Mindanao route.

2017-2021

The main goal is to intensify infrastructure spending while addressing issues and challenges constraining implementation, to achieve the country's long-term vision 2040. Strategic measures to increase

infrastructure spending includes identifying priority infrastructure programs/activities/projects (PAPs) consistent with the goals of the Philippine Development Plan, and adopting the Three-Year Rolling Infrastructure Program (TRIP) to optimize the utilization of agency budget allocations.

Achievements: improvement projects for the port system and Ro-Ro network; conduct of feasibility, masterplan, and engineering studies to prepare the country's port system for regional integration with the rest of the ASEAN and Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP-EAGA).

VI. Existing issues and challenges

The quality of our seaports is low by international standards. Operational efficiency must also be improved. Port congestion resulting from operational inefficiencies are affecting other transport sector (ex. road). On port congestion: it is difficult to encourage operators to use other ports because of factors such as proximity to consolidators; warehouses and availability of carriers, service providers, forwarders and shipping companies; reliability of the shipping schedules; efficient cargo acceptance and release; and affordable rates.

VII. Policy implications

Issues in the water transport sector are related to quality of infrastructure, inefficiencies in operation and congestion. Thus, we must focus our resources on upgrading the capacity, quality and connectivity of our existing ports. Additionally, it is important to adopt a systems approach in designing transport policies. Seaports do not operate in isolation; they must be well-integrated in the transport system (roads, markets, ancillary services)