Technical Assistance Consultant's Report

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Democratic Socialist Republic of Sri Lanka: National Port Master Plan

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The National Port Directions – Volume 1 (Part 2)

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Asian Development Bank

Figure 1-25: Connectivity Trincomalee Port

Industrial Development & Logistics

SLPA has two potential areas of both in this picture of 160 ha to be designated to either logistics and more probably large-scale industries. The road connectivity will ensure good access to the areas.

Figure 1-26: Options Accommodation Phosphate Industry

Hambantota port directions

> Hambantota has ample industrial areas and combined with deep-water, the port is ideally suited for large voluminous products such as liquid bulk, cars, project cargoes and containers. It will act as anchor project for heavy and medium manufacturing industries port bounded industries which are not suitable for the heavy urbanised areas like the Western Province.

It is expected that Hambantota will encompass a bunker hub for vessels and emerge as an industrial port for Sri Lanka. The industrial value added activities can lead to economic gains to the region and Sri Lanka as a whole, if Sri Lankan labour will be trained and employed in the facilities.

Summary Conclusions

The following table provides a summary of the analyses done in part B for the port of Hambantota followed by priority projects.

Table 1-41 Hambantota Summary Table

Commodity	Demand 2016	Demand 2050 (Base Case)	CAGR	Capacity 2016
Containers ('000 TEU)				
Gateway	-	336	-	-
Transhipment	-	-	-	-
Total	**-**	**336**	**-**	**3,116**
Dry Bulk ('000 Tons)				
Coal	-	-	-	-
Wheat / Maize / Corn	-	228	-	-
Cement / Clinker / Gypsum	-	1,556	-	-
Fertiliser	-	-	-	-
Biomass	-	-	-	-
Ilmenite	-	-	-	-
Total	**-**	**1,784**	**-**	**-**
Liquid Bulk ('000 Tons)				
Crude Oil	-	5,007		-
Refined Oil	21	905	11.7%	-
LNG	-	1,994	-	-
Total	**21**	**7,906**	**19.1%**	**-**
General Cargo				
Non-containerised General Cargo	399	1,054	2.9%	750
RoRo ('000 Vehicles)				
RoRo	182	434	2.6%	515
Cruise				
Vessels	No data	10	-	-

Priority Projects Hambantota

In order to remedy the most severe issues identified, the following short-term priority projects have been identified for the port of Hambantota:

SP1. **Container Terminal Concession -** A clear concession contract should be swiftly developed, after which operations should be handed over to the terminal operator.

SP2. **Break Bulk Terminal Concession -** A clear concession contract should be swiftly developed, after which operations should be handed over to the terminal operator.

SP3. **Industrial zone development plan -** A clear development plan sould be made to attract new businesses

SP4. **A dockyard development plan -** A feasibility plan for the development of a dock yard for large commerical vessels should be made.

SP5. **The refinery development plan** should be prepared - A feasibility plan for the development of a refinery should be made.

SP6. **SLPA Role** - The role of the SLPA/Customs/Navy in Hambantota port has been clarified and institutionalized under the concession contract and have to be implemented. These roles are important and comprise (i) the harbour master function; (ii) port safety and security; (iii) tugging and pilotage; and (iv) customs activities by Customs and (v) Navy should have a permanent base with mooring facilities for their largest ships.

Under the long term development the following additional elements are envisaged:

LP1. Develop a refinery in the industrial area near the port;

LP2. Should demand exists a Container terminal development (phase II) of additional 3960m quays;

LP3. An artificial island of 42ha for real estate commercial project development;

LP4. LNG operations and development on 110ha of land;

LP5. Small boat harbour (marina);

LP6. Additional industrial zones for the port.

Hambantota development plan

Short term development plan

The short term development focusses on:

- RoRo;
- Bunkering and LNG;
- Establishment of Dockyard and repair of large commercial ships;
- Development of Industrial zone;
- Concession of the conventional break bulk quays;
- Concession of the container terminal (phase I);
- Prepare for a refinery development.

RoRo operations

Sind 2012 when the RoRo was diverted from the Port of Colombo to the Port of Hambantota, the transshipment and local RO-RO operations have grown fast by utilizing its inherent features of land availability and well developed road network. In the short term development plan, priority has been given for this business by allocating wide yard space of 25 ha for RO-RO operation. Further measures have been identified to improve the quality, safety, security and efficiency of operation.

Bunkering/LPG/LNG and oil storage

Bunkering facility and tank farm in Hambantota will increase business after low utilisation during start-up periods. The private party offers bunker services, LNG and LPG. Further oil storage facilities (on total of 61 ha) has been established at some distance from the berths.

Dockyard for commercial ships

Establishment of a dockyard on 85ha of land for repair and building of ships has been considered in the short term business plan as a private investment project. It is envisaged to generate considerable employment opportunities in addition to the port income out of the project.

Industrial zone development

Utilizing the extensive land area available and the dedicated and integrated infrastructure, setting up of a planned industrial zone has been identified as a major development proposal in short term business plan. Successful bidders under RFPs will be given lands to establish their businesses and fresh RFPs will be invited for more investors to establish industries. Cement manufactures will be one of the first tenants for the zone.

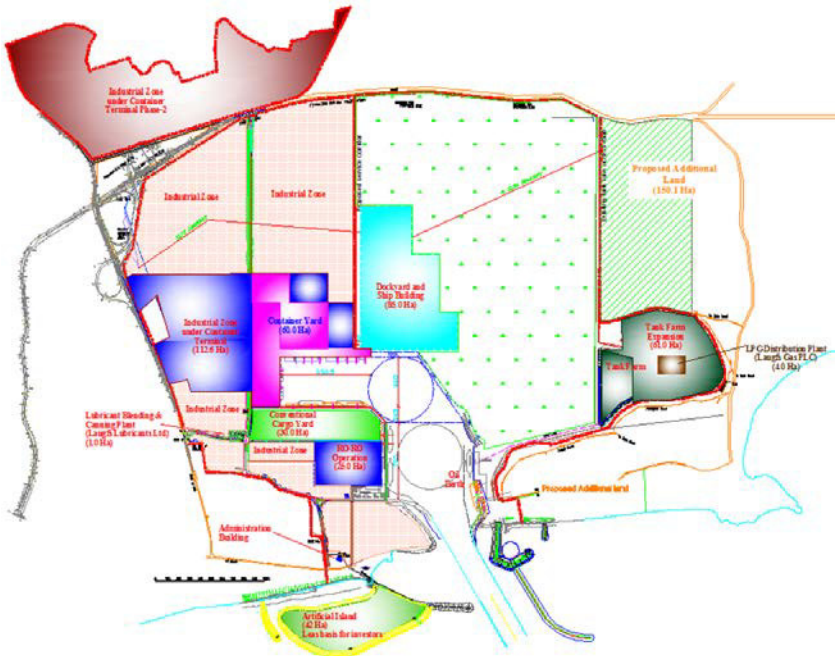
Conventional cargo

Conventional cargo or break bulk can be handled at the new facility. The total area is 30ha and has a berth length of 835m. A private operator shall be attracted to operate on this new facility. Cement and steel products are expected one of the first commodities.

Container terminal

The container terminal Phase I developed under Phase-II of the Port Development Project has been identified to develop and operate as a public-private partnership business. The new container terminal is planned to comprise 60ha. Currently only the feeder yard has been developed, the container yard at the back of the container apron has not yet been developed. The private investor will be offered land to establish industries and an area large 112.6 ha on the opposite site of the port road. This container terminal will facilitate importing raw materials and exporting finished products generated in the industrial zone.

Figure 1-27: Hambantota Short Term development



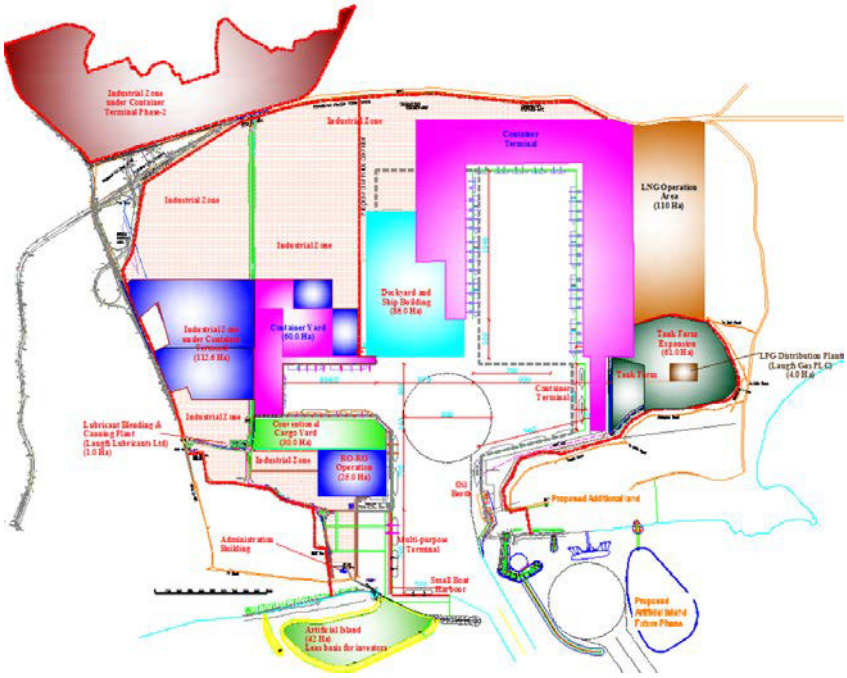
Long term development

Under the long term development the following additional elements are envisaged:

LP1. Develop a refinery in the industrial area near the port;
LP2. Should demand exists a Container terminal development (phase II) of additional 3960m quays;
LP3. An artificial island of 42ha for real estate commercial project development;
LP4. LNG operations and development on 110ha of land;
LP5. Small boat harbour (marina);
LP6. Additional industrial zones for the port.

This is illustrated in the picture below.

Figure 1-28: Hambantota Long Term development



Galle Port Directions

Galle port future is drafted around the touristic attraction of the heritage of the port. It is well suited for a cruise berth and additional touristic attraction including hotels. Galle's beaches; cultural heritage and future resorts can be a prime location for cruise and yacht vessels. The cement operations in Galle does not nicely combine with the tourism function. However, under strict conditions the facility may actually be able to upgrade and expand.[6] The ports Out Port Limit Services (OPL) consisting of crew changes services, supplying goods and spare parts shall remain acting in competition to possible new services from Hambantota. The marina for yachts is nicely combined with the tourisms attraction of the city and is rightly positioned.

Currently there are out of port limit services being performed at Galle which requires customs and immigration presence at the port. These businesses should be sustained as long there is a sustainable and profitable business model to the port. The passenger vessels or cruise vessels is a growing market for Galle port. Galle has a number of attractions including, the old fort and city heritage, world heritage rain forests Singharaja and

[6] The cement expansion plans came in after the submission of the first draft and hence not yet incorporated into the forecast.

Kanneliya, natural beaches (Unawatuna, Rumassala, corals and underwater attractions for divers. Galle is well connected to the national highway and daytrips are be planned frequently.

Combining the touristic values of Galle (Boating industry and cruise) with the existing cement manufacturing is not an ideal combination. However, modernisation of the cement plant with proper dust prevention through belt systems and green segregation between the facility and the port under a new concession with clear environmental criteria's could make the facility sustainable. It remains however advisable to discuss alternatives for settlements before approval is given on the modernisation plans.

Summary Conclusions

The table below provides an overview of the cargo flowing to Galle followed by a summary of the priority projects.

Table 1-42 Galle Summary Table

Port / Commodity	Demand 2016 ('000 Tons)	Demand 2050 ('000 Tons)
Galle		
Cement / Clinker / Gypsum	771	778
Non-containerised General Cargo	36	28
Cruise Vessels	no data	29 vessels

- It is expected that the cement facility in Galle will remain after major rehabilitation, resulting in ongoing cement handling operations in the port. It remains however advisable to discuss alternatives for settlements before approval is given on the modernisation plans.
- Galle is expected to have some local general cargo throughput.
- Galle is an attractive location for cruise passengers. A dedicated cruise berth can service demand; it is not foreseen that a dedicated passenger terminal is required.

Priority Projects Port of Galle

In order to remedy the most severe issues identified, the following short-term priority projects have been identified for the port of Galle:

SP1. An improved **Vessel Monitoring System (VMS)**and communication system should be implemented.
SP2. **Power Barge** – The plans for a power barge should be further discussed and developed in cooperation with the Ceylon Electricity Board (CEB).
SP3. **Existing Marina extension under PPP** to about 100 berths (15m at 3m draft).
SP4. **Boat building and repair PPP facility** to be accommodated in the port.
SP5. **Decision by SLPA on modernisation of cement manufacturer at the port.**
SP6. **OPL additional mooring facilities** at breakwater under PPP.
SP7. **Breakwater works,** rehabilitation existing and creating a new outer breakwater.
SP8. **Customs and Immigration to be located at one building.**
SP9. **New offices** for deputy harbour master and regional manager.
SP10. **SLPA Land ownership** outside the port needs to be mapped and development options identified.

Following long term developments has been identified:

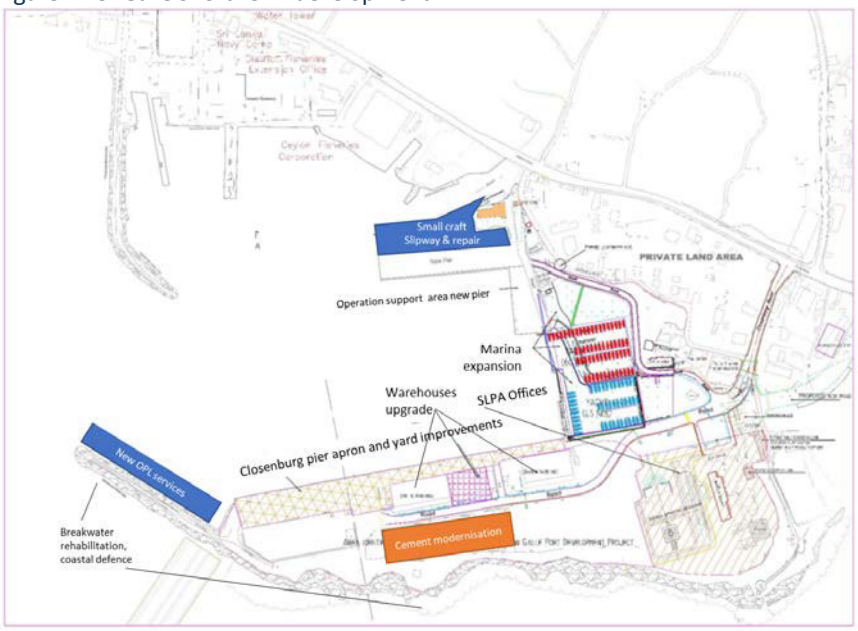
LP1. **Marina (phase II)** – Marina extension (phase II), close to Galle Ancient city, berthing for 100 yachts of 15m at 3m draft. The project would be under BOT terms.
LP2. **Marina (phase III)** – Marina extension (phase III) closer to Rumassala Hill as demand rises, berthing for approx. 100 yachts of 15m at 3m draft. The project would be under BOT terms.

LP3. **Cruise Berth** – A cruise berth should be developed in the long term to cater to the growing number of cruise vessel arrivals.

Galle development plan

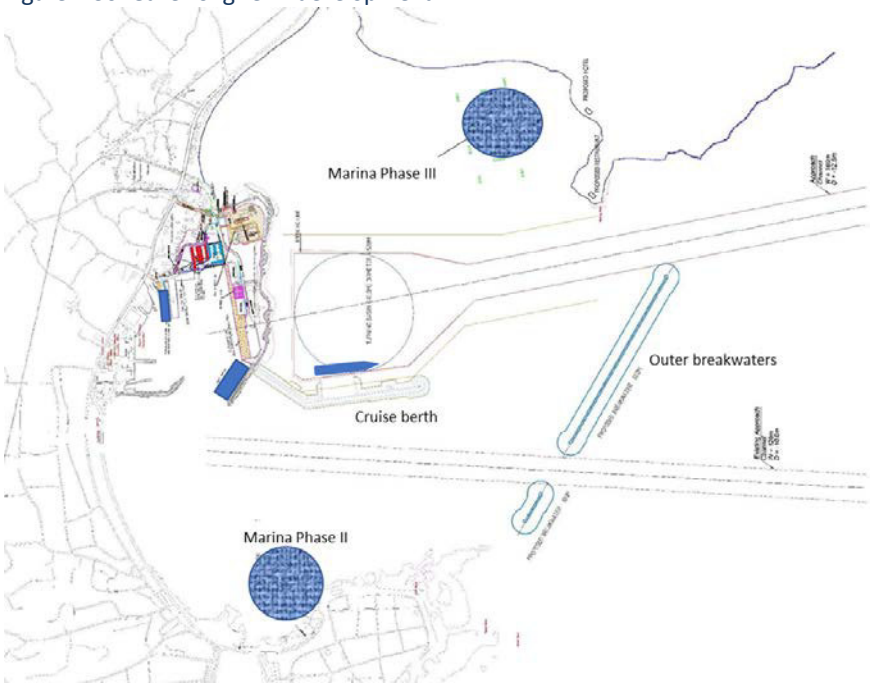
Galle development plan is illustrated in the picture below.

Figure 1-29: Galle Short Term development



Long term developments are displayed in the next picture, including the short term outer breakwater.

Figure 1-30: Galle Long Term development



Kankesanthurai (KKS) Port Directions

Kankesanthurai has a high development potential due to its proximity to a densely populated area and its (cultural) connection to India. The SLPA has several development options regarding the enabling of passenger transport and of the food and agriculture sector. Regarding port development, a need for a multi-purpose is apparent to service the region, but further studies should go into detail about the need for the railway line for cargo transport and passenger transport. The estimation in the SLPA master plan assumes 500 passengers per day in both ways which is an estimation of before 1984. The passenger estimation thus needs an update. Three piers will be revamped, one dedicated for the navy.

KKS can retain its navy presence for security and other auxiliary functions should be developed per demand.

Summary Conclusions

The table below provides an overview of the cargo flowing to KKS followed by a summary of conclusions.

Table 1-43 Kankesanthurai Summary Table

Port / Commodity	Demand 2016 ('000 Tons)	Demand 2050 ('000 Tons)
KKS		
Non-containerised General Cargo	31	277

- KKS is envisioned to fulfil a major role in Sri Lanka's northern regions' throughput of general cargo to and from India.

Priority Projects Kankesanthurai

In order to remedy the most severe issues identified, the following short-term priority projects have been identified for the port of Kankesanthurai:

SP1. **VMS –** An improved Vessel Monitoring System and communication system should be implemented.
SP2. **Port Planning** – A comprehensive port development plan should be prepared, including a demand study for passengers and cargo activities. Three piers will be revamped, one dedicated for the navy.
SP3. **Development of two small multi purpose warehouses**.
SP4. **Gate and gatehouse development**.
SP5. **Breakwater rehabilitation.**
SP6. **Pier I extension** to 120m at 6m waterdepth.
SP7. **Port road** connecting facilities at the breakwater to the main road outside the port.
SP8. **Develop economic zone near the port.**
SP9. **New Multi-Purpose feeder berth** – A multi-purpose berth should be developed under an to be granted Indian credit line.

The long term plans are:

LP1. Rail connectivity at the port through rail extension of 1.2km.

KKS development plan

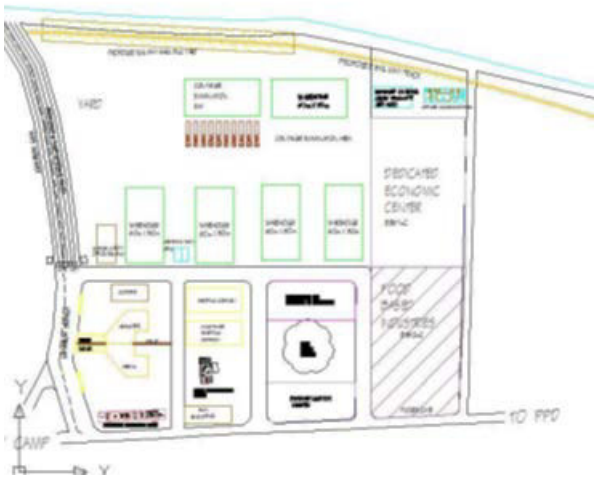
Kankesanthurai developments are illustrated in next pictures.

Figure 1-31: Kankesanthurai port developments

Under the short term an Economic zone development of about 9ha in planned for:

- Warehousing
- Container depot
- Mineral depot
- Rail shunting yard
- Dedicated economic centre
- Food based industries
- Customs inspections
- Offices

Figure 1-32: Kankesanthurai Economic Zone and Railway connection



Oluvil Port Directions

Oluvil will be a small port serving local, mainly fishery, needs. The port is not near an Expressway or any planned Expressway and therefor remains a small regional focussed (fishery-) port. SLPA plans to expand commercial operations for the food processing industry at Oluvil alongside the development of the fishery sector to allow for a mechanised fishing fleet and increased fish processing. The agricultural hinterland of Oluvil is expected to generate 25% of the nation's maize production and paddy production which is mainly processed locally and transported by truck. The agriculture sector generates also some fertilisers and storage facilities and packing facilities can be a target area. Also, the livestock sector is a possible market sector in which this port may become active. The eastern region contributes to 17% of the national milk production and possess 14% of the cattle population and 11.7% of the goat/sheep population and 11% of the buffalo population of the country. Hence it is viable to develop livestock related industries in the region such as meat processing and production of dairy products like Milk/Yogurt/Curd. These would require additional cold storage facilities.

Hence in the proximity of the port a FTZ/ EPZ zone should created with the focus to accommodate the industrial value added activities, processing and warehouse services for the following sectors:

- Fish industry (fish processing and canning)
- Agri sector (maize, paddy)
- Livestock sector (meat and dairy products)
- Agro chemical sector (warehousing and packaging of fertilisers).

The majority of the output of the region is for national consumption but export oriented processing can be developed through sea transportation. Also, some domestic feeder vessel can be expected in the future connecting to main ports of Colombo, Trincomalee and Hambantota.

Summary Conclusions

The table below provides an overview of the cargo flowing to Oluvil, followed by a summary of conclusions.

Table 1-44 Oluvil Summary Table

Port / Commodity	Demand 2016 ('000 Tons)	Demand 2050 ('000 Tons)
Non-containerised General Cargo	no data	28

- Oluvil is expected to have some local general cargo throughput.

Priority Projects Oluvil

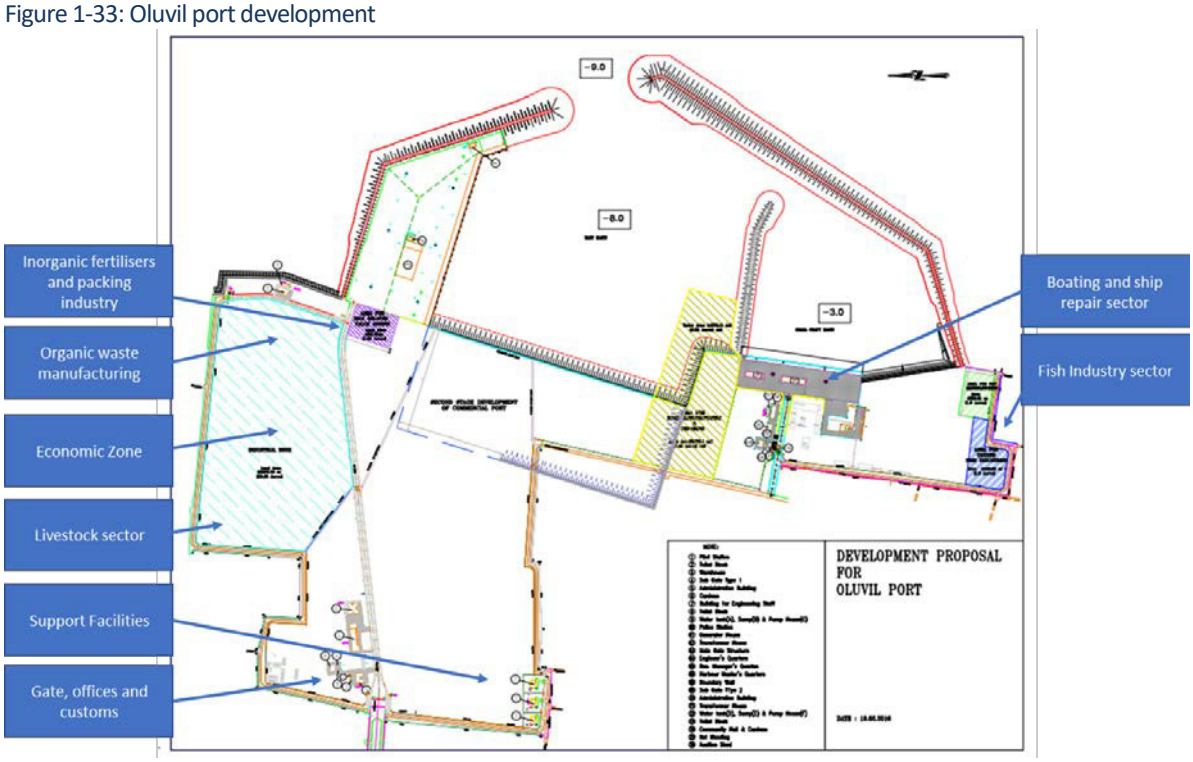
The following short term priority projects have been identified:

SP1. **VMS –** An improved Vessel Monitoring System and communication system should be implemented.
SP2. **Solve Siltation and Erosion** - Solve siltation issues in the port, protect coast from erosion
SP3. **Develop the fishery sector** – Attract fish processing and net manufacturing.
SP4. **Develop the agri sector** – Attract processing and warehousing for maize and paddy.
SP5. **Develop the organic waste –** Attract organic waste producer which utilise waste from fish manufacturing.
SP6. **Develop the inorganic fertiliser packing industry –** Attract packing and fertiliser processing industry.
SP7. **Develop livestock sector** – Attract cluster for dairy and meat processing.
SP8. **Develop the shiprepair industry for small boats and fishery vessels –** Attract shiprepair industry

Oluvil development plan

The following picture shows the proposed developments near the port.

Figure 1-33: Oluvil port development



Puttalam Directions

They jetty in Puttalam is used to barge coal to the stockpile next to the Norochcholai power plant. The jetty cannot be operated during Monsoon season leading to high stockpiles of coal, which add to storage and purchasing costs of coal. The solution is found in rail transport of coal through Trincomalee. The latter already takes place but rail connection onto the power station is lacking.

Summary Conclusions

The table below provides an overview of the cargo flowing to Puttalam followed by a summary of conclusions.

Table 1-45 Puttalam Summary Table

Port / Commodity	Demand 2016 ('000 Tons)	Demand 2050 ('000 Tons)
Coal	1,836	2,280

- Puttalam is to retain its function as import facility for the power plant.

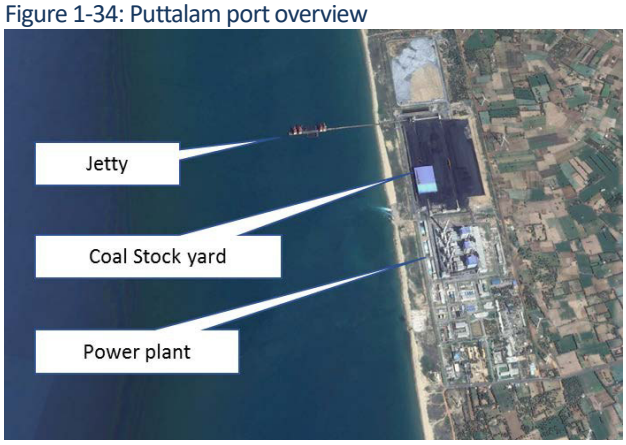
Priority Projects Puttalam coal jetty

No priority projects have been identified for Puttalam.

Puttalam development plan

The Puttalam coal fired power station stay an important contributor to the energy sector.
Developments on the jetty are focussed around maintenance. No major changes are expected except for the option that local cement manufacturers should explore the possibility to co-use the coal facility for their supply.

Figure 1-34: Puttalam port overview



Recommendations on other matters

Recommendations are given on other matters than direct port developments, these recommendations related to; **national connectivity roads and rail, coastal shipping, inland water transport, Dry Ports or logistic hub concepts, Innovation-Technology- IT and Port Community Systems, warehousing, trade facilitation, Customs, Navy and Auxiliary functions**. The numbering is done to provide clarity on the numerous recommendations and their topics. For detailed observations, assessments, international best practice and examples the reader is invited to read the respective sections.

Recommendations on National Road Connectivity

The national highway structures should provide connectivity to all major ports and connect between them through nodal points near the Western region.

R1. Development of the Port Access Elevated Highway, 5.2km (Fort to 2nd New Bridge Project).
R2. Development of improving Colombo port roads and connectivity to PAEH.
R3. Development of 2nd New Kelani Bridge project with connection to PAEH and E03
R4. Development connection 2nd New Kelani Bridge to E02.
R5. Development of the E04 Expressway, which connects Colombo to Kandy.
R6. Development of E01 Expressway extension from Matara to Hambantota.
R7. Proposed Central Expressway from Colombo to Trincomalee (partly using E04).

Recommendations on National Rail Connectivity for cargo transportation

For the improvement of cargo rail transport, the following development projects recommendations have been identified:

R1. A rail track reservation in the Port of Colombo with extension to south port will enable direct rail handling near the terminals. The future rail cargo transportation according to the national rail masterplan towards newly developed inland dry ports can then be accommodated.
R2. Extension of network from China Bay station to Ashroff jetty – like the development of a rail connection between Maho junction and Puttalam, an extension of the rail network to the Ashroff jetty would reduce transhipment costs from truck to rail (at China Bay station), making rail transport from the port of Trincomalee more competitive.
R3. Extension of network from Maho junction to Puttalam – currently, coal for the Puttalam cement factory is shipped to Trincomalee, trucked to China Bay station, transported by rail from China Bay to Maho Junction, and then trucked to Puttalam cement factories. A direct rail connection to the Puttalam facility would substantially improve the cost-efficiency of coal transport to the cement plants, as it removes the need for the last transhipment from rail to truck. A more cost-efficient connection between Trincomalee and Puttalam could also make coal transport to the Puttalam power plant more attractive.

R4. Extension of network from Matara to Hambantota – it is envisioned that Hambantota port will handle several types of gateway cargo for Sri Lanka; currently, the port already handles vehicle imports, which are mainly destined for the Colombo area. A rail connection between Hambantota port and Colombo could substantially reduce land transport costs.

R5. Extension of network from Kankesanthurai to Kankesanthurai port – the city of Kankesanthurai is already connected to the national rail network; through a short extension of the existing network, the port of Kankesanthurai can be included in the network.

Recommendations on coastal shipping transportation

There are five types of coastal shipping opportunities which are recommended to be developed:

R1. Development of coastal Container feeder transportation development

R2. Development of coastal Bulk transportation

R3. Development of coastal Liquid bulk transportation

R4. Development of Passenger transportation

R5. Development of Cruises for Multiple ports in Sri Lanka

Recommendations on inland waterways passenger transportation

On inland water transportation the following recommendations are made:

R1. Perform feasibility studies for the inlandwaterways passenger transportation (taxi, cruising and crossing) on the three identified rivers in the Colombo district (Kelani, Beira lake and Wellawatta – Battaramulla Line)

R2. Create a national overview for the development of the boating industry at river estuaries/ lagoons taking into account the development to touristic centra, local geography and attractiveness of nature and/or wildlife. Some place would be ideal for (speed)boating whlist other should be developed for ecotourism.

Recommendations on Logisctics Hubs – Dry Port – FTZ

The container handling and Logistic activities in the port hinterland are dispersed and in heavily urban areas with little room for expansion.

R1. New logistics areas have to be assigned to complement the Port of Colombo and to facilitate the export strategy of Sri Lanka. Zoning for this should cover an area of about 450 ha in the first phase with options for further expansion.

R2. A case for centralisation of dry port areas should be made and less inhabited land seems available West of the E03. This would create optimal location to connect to New North Port development with dedicated cargo roads and linking the existing highways. Rail connection should be planned for in line with Sri Lankan rail Authority rail cargo transportation plans. Operational and financial feasibility studies with an underlying transport plan which includes the PAEH could offer further guidance.

R3. It is recommended to assign SLPA as land lord of the single or multiple dry ports to enable to maintain a close connection with port planning.

Recommendations on Colombo – Trincomalee Corridor

The Colombo - Trincomalee corridor is recommended to be supported by at least five elements on infrastructure:

R1. Connectivity to central region and industrial hinterland, proposed nodes and urban centres: A central Expressway along corridor spine A01-A06 with a 50km influence area on either side. Further multimodal strengthening of rail connectivity of trincomalee to dambulla and direct connectivity to Kurunegala would improve rail connectivity for Bulk-users near Colombo

R2. Urban infrastructure to support increase in urbanisation and enhanced quality of life. The Eastern corridor region infrastructure is one of the least developed with low road density and low level of urban infrastructure.

R3. Efficiency and effectiveness of water and power supply to support the competitiveness of industrial activity.
R4. Support infrastructure for Dry ports & inland terminals: Domestic container handling at the port could move inland to FTZ zones to reduce congestion at the port and to incentivize value added services along nodes at the corridor. These logistics hubs need warehouses and basic infrastructure on roads, watersupply and electricity (power) including waste managementplant and waste treament plants.
R5. Gateway capacity and efficiency: Port of Colombo will continue to remain the primary gateway for goods as well as for passeger traffic expansion with BIA and a second runway and Colombo Port is set to expand capacity and bring efficiency improvements.

Recommendations on IT and Port Community system

Following IT system introductions are recommended to increase business efficiency and introduce paperless business environment:

R1. MIS – develop MIS information system linked to single window
- Management Information Dashboard - With functions to drill down and compare projected vs actual. Provide warnings for action, emails and alerts for action, division specific for quick action.
- Inter Port Information - To provide statistics and utilization, demands, productivity and performances. Other technical and business information that needs only to be shared between terminals, will be resident here.
- Internal procedure manuals, circulars, process flow diagrams, handbooks, business information, notices boards are enabled.
- Rental & Lease Agreements
- Business Intelligence for management decision making

R2. TOS – Upgrade Navis Sparcs to N4
- Intelligent Yard, Equipment, Shifts Planning and Gate Automation
- Operation & Utilization - of the Quay, Yard, Equipment, Storage, Business Intelligence, his allows pre-planning of the yard, assigning of cranes, and other handling equipment, manpower planning for optimum throughput.
- For billing information to be generated without human interference, instead to run as a procedure, and process based.
- Reservation and Priority services

R3. Warehouse Management System
- Introduction of a fully automated warehouse system that will systematically receive the cargo, and store in the pre-defined space. Automatically calculate storage and demurrage charges, advise to shuffle cargo to optimize floor utilization. This system to automatically send out the cargo information to the single window system to advice consignee to follow instructions and to make arrangements, includes booking reservation to clear after the dues are paid to a bank.

R4. Single Window – Including sub systems works to provide the essential information. They can be gradually incorporated, and will be unrestricted for time of introduction and automation. The system and the demand will automatically drive the need. Always a proven system is recommended. Knowledgeable people have done this before.
- FAL convention – electronic data from ship to port
  - Mapping data elements with various organisations and institutions.
- Customs link with Portal
  - Customs procedures

- Information required by the consignee to clear his cargo
- Customs e-declaration
- Customs e- payment
- Customs clearance notifications

- Shippers & Consignees Portal
  - Organise export documentation
  - Organise import documentation
  - Check status of the container
  - Truck and cargo arrival notifications
  - Vessel arrival/departure notifications
  - Exchange notice of Readiness
  - Container release notification

- e-Commerce - The list is unlimited and each subsystem can be selected from the master page. The business portal for all service providers and service seekers enabling a transparent fair playing ground customer service
  - Competitive and fair to all
  - Links approval granting organizations to speed up processes
  - National business Port information and data published for information sharing
  - Truck & Transport Services
  - CASA (Ceylon Association of Ships Agents)
  - Banks & Payment Gateways
  - Contract Labour
  - Private warehouses

- Media
  - Web Sites
  - Language Translation
  - Customs Notifications
  - Business Announcements
  - Financial Notifications
  - Contact page

- Central Publications & Corporate Communication
  - Port Legal Policies Procedures & Rules
  - Language Translator
  - Call Centre, Complaint Handling & Customer Services
  - Social Media & Library of References and Business Publications
  - Safety Rules, location maps & Calendar
  - Registration formats & online data input forms
  - Space Availability, public announcements, procurement & charts

Recommendations on Warehousing by SLPA

The following recommendations can be made regarding SLPA's warehousing design and development:

R1. Port of Colombo: Design and construction of a **new warehouse to cover the MCC** operational requirements in the future.

R2. Port of Colombo: Investment in new equipment (pallet trucks, reach stackers) to **operate the logistics warehouse.**

R3. Port of Colombo: Procurement of a modern, state-of-the-art **Warehouse Management System (WMS).**

R4. All Ports: Apply the Warehouse Management System (WMS) to new warehouse developments.

Recommendations on Trade Facilitation

The following recommendations are identified on trade facilitation to create a proper business environment to attract FDI and to support Economic Processing Zone and Logistics Hubs.

R1. Develop a Roadmap for the development of Logistics hubs.

The plan should address following identified issues:

- Reduction of fragmentation institutional network: the purpose is to reduce cost and time of import and export procedures. China has only 11 agencies that provide 129 services, from customs clearing to issuing Authorised Economic Operator (AEO) authorisation. Sri Lanka has more than 20 and less developed services;
- Defining operational guidelines: to implement new or updated regulations and legislation such as Merchant Shipping Act;
- Unified Customs duty: unify the existing Customs duty and other pare-tariffs (PAL, VAT, CESS, Customs Surcharge, etc.) into a single Customs duty;
- Information Technology Agreement: join the Information Technology Agreement of the WTO to create a free trade in electronics, to attract FDI to this sector as shown in the examples of Singapore, China and South Korea.

In the planning of the port linked EPZ development and attracting FDI the following aspects are recommended to be addressed:

R2. EPZ policies that attract investments from large logistic sector operators, banks and insurers as well as developers: national and local tax benefits including full exemption of tax for companies from priority sectors for up to 5 years with diversified investment threshold. Priority sectors for the port EPZ are food and beverages, spices and concentrates, IT/electronics and logistics;

R3. Solutions for easy establishment of foreign labour: the EPZs should offer to investors the opportunity to employ foreign high-skilled labour with fast-tracked permit procedures and more relaxed labour laws regarding termination of the contract;

R4. Lower investment threshold for manufacturing companies: manufacturing companies would have a lower investment threshold with the view of prioritising export sectors and value-added operations for the transhipment goods, especially targeting Indian sub-continent. The duration and size of the benefits will vary with the size of the investment. Detailed thresholds will be determined by better understanding type and size of companies with potential interest to establish in the EPZ;

R5. Use of modern technologies: base development on use of modern technologies to connect logistic companies, institutions, industries and service providers – Port community, Single Window, Trade Portal, Integrated trade platforms;

R6. Improve skills: improve skill base at SLPA through structured training programmes targeting skills required to run EPZs;

R7. EPZ promotion programme: design a modern EPZ promotion programme based on geographical advantages; the opportunities offered to traders by signed FTAs, trade and logistics hub concept, stimulating trade policies and strong investment incentives.

Recommendations on Customs

The following recommendations are made on Customs:

Customs – General

R1. **Customs should further improve and liberalise their activities** to create a split between the physical flow of goods and the administrative flow of goods. In this way, the import flow can be sped up and import duties can be paid once goods are in transport. Digitalisation of the import duties payments shall improve the flow of goods.

R2. Move to fully electronic Customs processing: customs entries are currently being filed electronically. Next step should be to move towards getting the appraisal/verification of Customs entry to be done electronically on the system. This obviates the need to visit the Customs office and will greatly speed up and simplify the processing of documents;

R3. Build modern set of incentives for customs officers: to facilitate moving to full online processing and increase transparency, a generous incentive scheme to reward Customs officials for speed in processing documents should be considered. Such a reward scheme could be based on the number of applications approved per day, to align the interests of the importer and the Customs staff;

R4. Allow pre-documentation as standard for all goods: currently, this facility is available only for perishable cargo; it should be extended to all cargo, to minimise bottlenecks when vessels arrive;

R5. Develop AEO scheme: SLPA could start promoting port level AEO scheme that could be extended to PA run EPZ. The scheme should include provisions to improve valuation and risk management and, in this way, reduce the congestions at the port. Modern customs management technology such as extended port single window can be employed to fast track AEO status to all export firms in line with the best practice. All new investors in PA EPZ should be considered for fast-track into the AEO scheme;

Customs - IT

R6. Asycuda World is able to handle electronic payments and electronic payments should be encouraged. Eg Customs should facilitate e-payment more and industry needs to be educated to use it.

R7. Customs is recommended to further improve the **customs single window** and become paperless. Further it is recommended to facilitate and promote the development of a **single maritime window** (with which customs in the future, would electronically distribute their clearances)

Customs - Clearance of goods

R8. **Goods Clearance should become independent of the physical flow**. By promoting the use of EDI the E-declaration can be done whilst goods are in transport towards the port of entry. E-Clearance can therefore (based on risk management) already be provided before the goods arrive at the port. Customs in this respect should not interfere in the physical flow with exemption of the identified goods under the high risk profiles. Digitalisation is also the best method to reduce the level of bribery.

Customs - Risk management

R9. **Risk management is key in the allowance of free movement of goods** when clearance is provided.

R10. Risk profiles in Sri Lanka is still set at high levels. **Once more trust has been built into the system the share of the green line can increase**. This can be obtained by increase fines for trespassers and reduce the costs for trustworthy consignees. “Intervention squads” should ensure that Green line consignees are indeed occasionally checked. Charge on manual declarations should be made rather than at computerized declarations to create incentives.

Customs Gate efficiency

R11. **The gate procedure needs to be simplified and to become paperless**. This can be done through a digital gatepass. Seals with GPS will enable the truck to pass through a RFID identifier at the main gate. In that case the seal needs to be mounted at the terminal gates instead of at the main gate.

Customs Green line

R12. **The Green line should be promoted and increased through proper risk management**. Due to the large number of small consignees and the rapid changes of consignees this is not easy but it is the only way

forward to a more efficient transport system. Large and or regular consignees should be promoted to the green line. Customs is advised to increase the Green line volumes supported by random scanning checks at newly assigned Green line users. In the end shippers and consignees shall have a full paperless interface with customs through their customs single window and physical inspection is dramatically reduced.

Customs Scanning

R13. The **terminal inspection should be reduced to a minimum** and more containers should be send through Green Line or through to the Scanning line. Reasoning is that space at the terminals is required for cargo operations.

R14. **A Scanning Line is to be introduced next to the Green Line based on proper risk management**. This scanning is done before physical inspection is carried out and should have the aim to reduce the amount of physical inspection. Automate Customs inspections by installing scanners: replace physical inspection with electronic scanning as a standard procedure. The physical inspection should be based on modern risk management models.

R15. Customs likes to implement 100% scanning. This is not advisable when the set-up and operational efficiency is not in place and the scanning results in unacceptable queuing and waiting times. So **the risk/reward of 100% scanning should be evaluated** as well as the cost incurred to society when 100% scanning leads to long waiting times of trucks as well as increased number of physical inspections.

R16. **The scanning is done preferably by fixed scanners in which the driver will exit the truck**. The health issue of exposure to radiation needs to be addressed and normally the truck-driver will exit the truck whilst the truck is pulled through the scanner.

Customs Inspection

R17. **Inspection should be concentrated among a few (preferably one) site(s**) to increase use of resources and planning.

R18. The area near Bloemandhal Area has been appointed for this. The total capacity on inspection should become more efficient to handle more containers simultaneously and have a **larger capacity by implementing fixed container scans** and to reduce the level of physical inspections.

Customs detained goods

R19. **The areas for customs detained goods should be allocated outside the port zone to free warehouse spaces.** Customs has several spaces in the port zone which is used for detained cargoes. These warehouses and spaces occupy valuable port land without any income for the port.

Recommendations on Navy

R1. The coast guard function of the Navy is important to protect the Nation. In view of increased boating activities around the coast the Navy should prepare themselves for increased demand for surveillance. The influence phere in coastal waters is 200nm beyond which is regarded as international waters, as determined in the United Nations Convention in the Law of the Sea (UNCLOS).

R2. A permanent Navy basis should be implemented in Hambantota as this port is closest to international shipping routes.

R3. Additional berthing spaces to be developed in ports of Hambantota and Trincomalee for the largest navy vessels.

Recommendations on Auxiliary functions

International benchmarking

R1. Port of Colombo lacks development space for **distribution centres and logistics**. This is either to be found in several sections North of Colombo (but preferably one) or at reclaimed land as part of north port development.

R2. Port of Colombo has to cater for new industries like the new **LNG powerplant**

R3. **Bunkering** is an auxiliary function which hold promises for the future. The port should prepare to offer this in a liquid bulk hub.

R4. Port of Colombo should be part of a **national unit which offer emergency response** and salvage through supplying heavy offshore tugs.
R5. The Sri Lankan **free trade zone policy** is not adequate, and should upgraded in this respect.
R6. **Tax incentives** are provided to new industries and port zones but a one-stop shop for FDI is required.
R7. Through **investments in the logistics chain** and port accessibility, Sri Lanka should move up in the ranking of the World Bank Logistic performance index.
R8. **Ease of doing business**. This is a ranking from the World Bank to summarize the ease of doing business. It includes customs bottlenecks and bureaucracy in general. Sri Lanka is to upgrade its position through implementing trade facilitation policies and a Single Window.
R9. The **airport to sea function** should be promoted to attract additional cruise vessels.

Tug and Pilots

R1. Given the growth in demand for pilotage services, **it is recommended to purchase an extra tug of 80 ton Bollard Pull.** This could also avoid the costs of hiring tugs from private suppliers. A 80t BP tug can be used for Mega containerships and ocean emergency response or salvage.
R2. **SLPA should reduce the crew size** assigned for tugs which is well above the required levels.
R3. It is advisable **to outsource the maintenance activities** of tugs in order to provide continuous pilotage service.
R4. **Tugs which perform salvage operations should be additional to the port operations** in order to the keep the port towage operations running whilst a salvage operation is executed. Salvage tugs to be stationed at geographical strategic locations like Port of Colombo, Hambantota and Trincomalee.
R5. It is recommended **to form a company which is a fully owned subsidiary of SLPA to carryout pilotage services** in the long run as the company structure would be flexible and effective in operations and finance decision making. It should be independently operated as a profit centre.

Bunkering

R6. It is recommended **to develop capacity for bunkering services at Colombo port** considering short and medium term needs having duly assessed the services of competing ports such as Hambantota.
R7. **LNG** being a new source of fuel for ships which is currently being tested, could become category of fuel that port of **Colombo must be ready in the long run with appropriate capacity**.
R8. It is recommended SLPA to form **joint venture company with Ceylon Petroleum Corporation**(CPC) to benefit from synergies of both. SLPA has the infrastructure while CPC has the speciality in supplies. The newly formed joint venture company should be independently operated as a profit centre.

Watersupply

R9. **Port of Colombo: Water supply should remain in the same location**, but investments needed on water barges & pumping capacity
R10. **New quays should be equipped with water supply abilities once developed in ports.**
R11. Other ports should have water supply services as well.

Weighing and scanning

R12. **Terminals operators** must have a **VGM facilities** as each container and each port should be verified otherwise they are not allowed to be loaded on a vessel
R13. The **digitalisation** and the **integration** of information of **weighing facilities** should be organised.

Ballast Water Management

R14. Investigate the **BWM regulation** and the way SLPA can conform to this at each port.

Ship repair and facilities

R15. SLPA should consider to have the **periodic maintenance their own tugs and pilot boats** and other marine equipment done by third parties in order to concentrate to their core activities.
R16. It is advisable to **rent-out ship yard facilities** during idle times.
R17. It is recommended to **monitor Marine Engineering division as an identified business segment** of SLPA with separately tracking of revenue and costs.
R18. It is recommended to investigate to obtain **more stake in Colombo Dock Yard PLC** in the long run to be benefited from repair services given to the SLPA as a related party as well as a share of the overall profits of the company from its total operations.
R19. At Trincomalee, ship repair facilities for small vessels is to developed under PPP.
R20. At Hambantota ship repair facilities for large vessels is planned
R21. At port of Oluvil ship repair for small boats is planned.

Container maintenance and repair

R22. **Container maintenance & repair** services to remain with the private sector and promoted to be near Ports and Logistics Hubs.

Empty depots

R23. **Container empty depots to be facilitated** at newly developed Dry ports.

Fleet registration and classification

R24. Ship recognition and identification should be supported by a **fleet database** which ensures updated information on the vessels particulars and classifications. This applies to all ports.

Out of Port Services and crew services

R25. **OPL and Ships crew services** are important for the vessels that pass Sri Lanka on route. Fast crew services can be further expanded from Galle and developed in Hambantota. An efficient connection with the airports is required.

Training centres

R26. It is recommended to market the courses provided by the Centre among **external students to generate revenue** and sustain as a self-sufficient centre.
R27. It is advisable to **improve the current status of the centre** to campus through external affiliations and finding synergies with other training institutes in the world.
R28. It is recommended to restructure the centre as a **fully owned subsidiary company of SLPA** in the long run which independently operates as a profit centre.

Marina's

R29. It is recommended to develop **marina facilities outside the commercial port** boundaries of port of Colombo to minimize disturbances to commercial activities and possible accidents.
R30. A new marina is to be planned at Trincomalee.
R31. At Galle the existing marina is to be upgraded.
R32. At Hambantota a new marina is planned.
R33. At Oluvil small boats moorings are projected.
R34. At KKS small boats moorings are projected.
R35. It is recommended to make a PPP construction for each for the large marina's in the nation.

Licensing & Chandlery

R36. The **licenses should be digitalised** where possible. An online system should show the status of licenses.

R37. It is advisable for ship chandlery service **to remain with private parties** as the SLPA should focus on core value added activities.

Fire department

R38. At Colombo the fire department should be strengthen with adequate number of **firing engines and staff** considering the development of more terminals at Colombo Port and expected increase in oil tankers of LPG & LNG.

R39. At all ports in Sri Lanka the Fire department service should continue to be provided by SLPA as an **essential service** under harbour master control.

R40. It is recommended to **financially monitor fire division** as an identified business segment of SLPA with separately tracking of revenue and costs.

R41. **Emergency response plans** should be updated for all ports in Sri Lanka.

Medical services

R42. It is recommended that port authority should consider **outsourcing medical services** to private/public entity to focus on more value added activities.

R43. SLPA **employees** should be given **medical insurance** covers to reimburse the medical expenses obtained from private entities. The cost of medical insurance cover could be shared between SLPA and employees in appropriate proportion.

Financial services

R44. SLPA should promote **electronic payments** among port users by providing required platforms at all ports.

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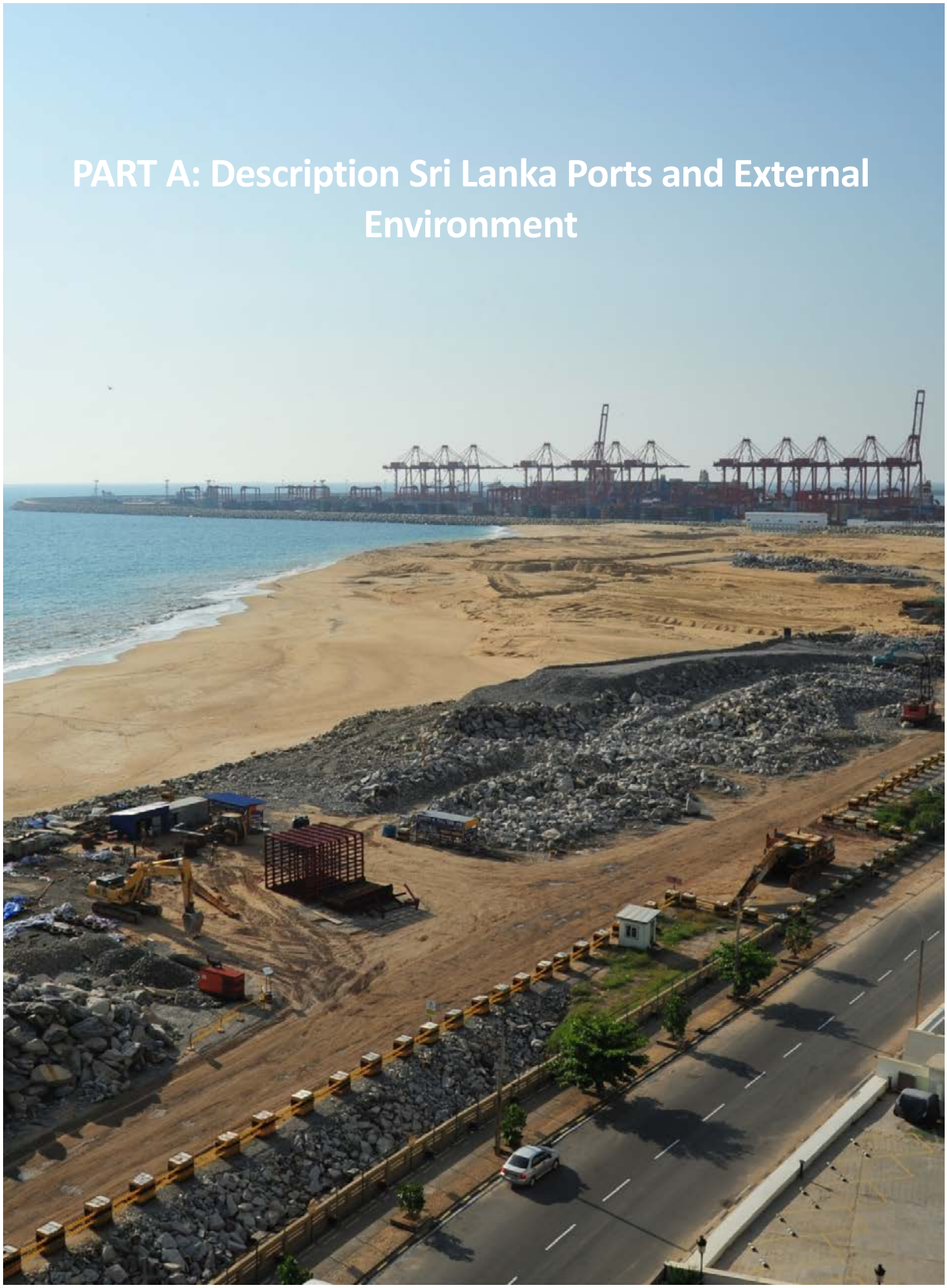
PART A: Description Sri Lanka Ports and External Environment



1 Introduction

1.1 Background

On the 30th of November 2016, the Asian Development Bank (ADB) and Maritime & Transport Business Solutions B.V. (MTBS; representing the Consultant) signed the contract for the development of a National Port Master Plan for Sri Lanka (ADB reference 50184-001).

The primary objective of the assignment is to develop an overarching and integral guidance document that can be employed by the Sri Lanka Port Authority (SLPA) to harmonize and strengthen the Sri Lankan port sector. To this end, the Sri Lanka National Port Master Plan will comprise the following main components:

- National Port Directions (this report);
- Detailed Port Development Plans:
  - Colombo;
  - Trincomalee;
- A Shortlist of Connectivity Projects; and
- An Assessment of the Port Access Elevated Highway (PAEH).

1.2 Objective

The National Port Directions Plan covers the next 30 years and includes a summary of investment plan for priority projects to be carried out in the next 10 years, following an assessment of the characteristics of existing port operations, and of existing and planned maritime and landside infrastructure.

The National Port Directions plan is developed through the following reports:

- Draft National Port Directions Report, covering the draft national forecast of cargo flows and related requirements for ports;
- Draft Colombo Port Development Plan, covering the Colombo Port Development Plan including priority projects but excluding prefeasibility analysis;
- Colombo Port Development Plan, including the pre-feasibility of priority projects, which were decided by the stakeholders, based on the Draft Colombo Port Development Plan;
- Draft Trincomalee Port Development Plan, covering the Trincomalee Port Zoning Plan;
- Trincomalee Port Development Plan, including the pre-feasibility of priority projects, which were decided by the stakeholders, based on the Draft Trincomalee Port Development Plan;
- Passenger Terminal Concept report, covering a passenger terminal construction project in Colombo port;
- An assessment of the Port Elevated Highway (PAEH); and
- National Port Directions Plan (this report), covering the national forecast of cargo flows and related requirements for ports.

1.3 Structure of the report

In order to enable easy navigation through the report, related topics have been grouped in overarching Parts. The following parts are distinguished:

- Part A covers the general strategic policies of the plan, the description of Sri Lankan Ports, the international context of developments and strategic directions and tasks driving the needs for port development;
- Part B covers the national trade and production, macro-economic views and includes the tourism & cruise sector. A demand analysis per commodity segment is described and translated to the capacity development needs reviewing the existing facilities, volumes handled, and performing the gap analysis. The chapter Port Development Directions describes the port development directions for the ports of Colombo, Trincomalee, Hambantota, Galle, Kankesanthurai, Oluvil and Puttalam jetty. For each port the main directions, observations, development requirements and recommendations are mentioned. The main recommendations result in short term priority projects. Finally, the chapter ends with mapping the main development options.
- Part C presents Port Connectivity & Logistics hubs. In this chapter the national road, rail, coastal shipping and inland waterways issues related to port connectivity are discussed and recommendations provided. In the chapter on Logistics Hubs the international best practice is discussed first where after the relevant studies on Logistics hubs and corridor development are reviewed and recommendations provided.
- Part D covers Innovation, Technological developments and trade facilitation. This part covers issues on IT, Port Community Systems, Warehousing, Trade facilitation, Customs, Navy and auxiliary port functions. In the latter topic, the international best practice on Maritime Cities and their attractiveness and competitiveness are also reviewed.

2 Port Sector Directions

2.1 Introduction

This chapter introduces the main directions for the Sri Lankan Port sector. It addressed the vision and mission and set out the long-term strategy for the port sector. The core values and management tools are discussed, and it translates the strategy into strategic tasks.

The following approach has been used for this chapter:

- Paragraph 2.2 provides the Government export vision on Sri Lanka describing that Sri Lanka exports should diversify through attracting new export commodities and products;
- Paragraph 2.3 provides the Strategic directions on Ports;
- Paragraph 2.4 displays the Strategic tasks; and
- Paragraph 2.5 provides the trends in the international environment.

2.2 Government National Export Vision on Sri Lanka

The National Export Strategy (NES) document published in December 2017 highlighted that the nation export sector needs to be reshaped and transformed. In alignment with the vision 2025 and the National Trade Policy the NES aims to simulate growth and job creation by improving the ability of firms to export and compete in foreign markets. Current obstacles need to be dissolved and "things need to be done differently" to increase the contribution of trade to economic development according to the document. Economic reforms for a more flexible business environment combined with increasing regional trade opportunities and major transformations in production techniques provide a unique window of opportunity for Sri Lanka to modernise and start a new cycle of export growth.

It was clearly addressed that Sri Lanka should realize its full potential as regional trade hub taking the opportunity to catch up to fast growing Asian export countries. Sri Lanka centrally located on major trade routes between Asia and Europe, Middle East, Bay of Bengal, and Africa is well positioned to participate in global production networks serving large consumers markets. The focus should be at new exports beyond today's exports which rely on a blend of traditional industries of apparel, tea, gems and rubber. To create the new export environment high tariffs, complicated administrative procedures and challenging access to inputs will be addressed to favour growth of high technology and knowledge intensive exports.

The National Vision is there for defined as:

"Sri Lanka – an export hub driven by innovation and investment".

There are four strategic objectives:

1. To have a business-enabling, predictable and transparent policy and regulatory framework that support exports.
2. To strengthen Sri Lankan exporters' market entry and compliance capacities
3. To become an efficient trade and logistics hub to facilitate exports
4. To drive export diversification through innovation and by strengthening emerging export sectors

The following six focus sectors have been identified under the NES and the role of ports has been added:

Focus sector	Type of Industry	Growth trend	Ports involvement
IT-BPM	Services	Mature	High (container traffic)
Wellness / tourism	Services	Emerging	Medium (cruise)
Spices and concentrates	Agriculture	Mature	High (air and shipping traffic)
Boating industry	Manufacturing	Visionary	High (marina's and boat yards)
Processed foods and beverages	Agriculture	Emerging	High (container traffic)
Electrical and electronic components (EEC)	Manufacturing	Visionary	High (container traffic)

The following picture shows the NES strategy schematically.

Figure 2-1 Export Strategy

Strategy and the port sector.

In this document the strategy of ports to facilitate the national export strategy and the role of ports as engine of the economy is highlighted.

The ports of Sri Lanka play a vital role in the implementation of this strategy. As an island, all what is consumed is imported or exported goes through nations ports. Without proper functioning of the ports, the import of raw materials and the exports of half fabricates, or final products is hampered, and the export strategy may

fail. Hence the need for modern and effective ports. This implies creating more efficient ports by upgrading port infrastructure, creating more efficiency by modern handling techniques and reducing the administration paper works by innovative systems. Additionally, the ports should be connected to dry ports which facilitates the newly attracted export processing activities. Most of the focus sectors as mentioned in the NES, translates to the flow of containers through Sri Lankan ports. It therefor that this segment should get prime focus in line with the logistic hub concept and the excellent geographical location Sri Lanka has on the containerized trades. Next to facilitating trade, the ports sector is an area at which new industries can settle. Especially medium to heavy industries are best located near the ports where logistical advantage can be obtained in the supply of raw materials. In this respect ports and their industry play a vital role in the energy consumption of the country both for power stations, refineries, and industry as well as for imports for consumer markets like refined products such as petrol, gasoline and kerosene. Ports also play a vital role for the food consumption/processing in the country and for the construction sectors. With increased wealth of citizens is it also expected that the roro sector of imported cars will boost. Finally, ports have a role in the tourism sector. Many Sri Lankan ports and cities are worthwhile to visit and to start or end wildlife and or cultural excursions. The cruise industry has discovered the island already, but the industry is only at an "early entrance" stage. Marina's and boat yards are common features when the "boating industry" visionary export sector is developed.

The following paragraph explains the strategic directions for ports based on the National Export Strategy, the Vision 2025 and the National Trade Policy.

2.3 Strategic Directions on Ports

To define the Strategic directions on Ports first the Ports vison and missions is addressed. Within a framework of core values and management policies which apply to the entire setting, the strategies are defined and the main components, the strategic directions.

Figure 2-2 Strategic framework

A combination of the National Export Strategy and the excellent position as transhipment hub are highlighted in the National Ports Sector Vision.

Ports vision:
"Sri Lanka will have leading ports in the Indian Ocean, Middle East and East African whilst developing the Nation through new networks of efficient logistic corridors to support development of key import and export sectors".

This vision statement emphasises that the transhipment hub position on maritime trades is to be maintained and enhanced. It also encompasses that the ports maritime strategy should focus on facilitating logistics efficiently and innovate through applying new technologies. Further the ports should focus on attracting sustainable investments supporting the nation and the national export strategy. Finally, the strategy is to become an international well recognized maritime centre.

A few elements are highlighted in this vision statement:

- **Transhipment hub** – The ports sector will focus on maintaining leadership in the transhipment business by a world class transhipment hub at Colombo, serving the Middle East, East Africa, India, Pakistan and the Bay of Bengal;.
- **The Logistics Hub** – The steps towards becoming a logistics hub involves identifying strengths, identifying potential markets and business and attracting those utilising the full capacity of SLPA and the government.
- **Sustainable ports** – The ports in Sri Lanka will become sustainable through sustainable investments and introducing "green" concepts in a safe working environment.
- **Maritime Centre** – The port of Colombo is to become a well recognized international maritime centre, offering services to the maritime industry.

Ports Mission statement:
"SLPA facilitates economic opportunities for Sri Lanka by creating a competitive, knowledge-based and industry-accumulated port environment utilising Sri Lanka's strategic advantages in the maritime trade."

This mission statement expresses SLPA's reason of existence by aligning the organisation's mission with that of the nation. SLPA ultimately provides the economic gateways to the country in the form of its ports and is thus subject the nation's greater economic strategy but is also central in the local function for a region.

A few concepts highlighted in this vision and mission statement are:

- **Trade and Economic Opportunities for Sri Lanka** – The ports are the facilitator for the nation's exports and imports in terms of infrastructure, efficient procedures, investment climate and safety and security.
- **Competitive Port** – Sri Lanka should position their ports competitively in relation to other hub ports. The need is there to promote ports and logistics hubs and as a total concept to the outside world. Port competition is mainly focussed on to achieve maximum value and minimal costs for the country. Constant comparison with global leading ports and direct competitiors ensures the organisation is aware of potential improvements.
- **Knowledge Based Port** – Investments in people and technology will ensure sustainable growth.
- **Logistics corridors** – The concept of logistics corridors is applied to facilitate efficient logistics hubs.
- **A role in wealth of the nation** – Each port shall have a function and role to serve the growing wealth of the nation.
- **Accumulated port environment** – Each port will set a growth path for attracting maritime businesses and specifically Port of Colombo is to become a well recognised International Maritime Centre (IMC).

Core Values

The core values whilst striving for the vision and mission are:
"Integrity", "accountability", "reliability", "knowledge-based", "efficiency", "transparency"

Although these words are self-explanatory it will require considerable efforts to achieve these core values. Mind-set needs to be changed and training is required to create similar values at all levels throughout the Port Sector.

Management policies

This reflects the main management policies to achieve the core values.

- Harmonising through IT. Key is to utilise modern technologies to change and harmonize the Port Sector
- Demand oriented. Processes should be demand driven with transparent inputs and outputs.
- Institutional reform. Institutional reform is required to align roles and responsibilities in the sector, to create focus and to create a level playing field.
- Safe, secure and sustainable policies. Ports serve the nation and are the backbone of the Society. Port activities should be safe, secured and contribute to an national sustainable agenda.

2.3.1 Strategies

There are five main strategies derived from these vision and mission statements which encompasses the major components of the port vision and the port mission:

1. Transhipment Hub port strategy
2. Logistics Hub strategy
3. Serving the nation economic growth strategy
4. Sustainable development of ports strategy
5. International Maritime Centre Strategy

These strategies are explained in next paragraphs.

Transhipment Hub Strategy "One nation"- "One Hub"

This strategy aims on staying a leader of hubs ports in the Indian Ocean. Port of Colombo ranked 23rd on the global container handling ports in 2016 with a total of 5.7 million TEU handled TEU of which 75% was transhipment cargo. It is the main hub port for transhipment in the Indian Ocean. The geographic position of Port of Colombo near the main East West shipping routes is key in maintaining leadership position. The transhipment in Sri Lanka is focussed at a single Port, Port of Colombo, to benefit from centralization and utilise the capacities which have been designed for it. Centralisation will provide economies of scale and ensure focused investments. As such the shipping community will be able to act jointly to do want has been done already for many years making Port of Colombo a large transhipment hub. Gateway cargo acts as a corner stone for shipping lines to call at ports and therefore a successful transhipment Hub also should have a significant share on gateway cargo. With ample development space with sufficient water depths and serving the largest consumer markets, the western region, Port of Colombo is to be promoted as National Transhipment port. Multiple ports serving this same transhipment industry would divide the shipping community and will be less efficient for shipping lines which have to serve the western region and like to centralize their operations as much as possible. Although the Port of Colombo has several terminals both in public and private sector, the marketing should be focussed on "One nation" One "Hub". Coordination, cooperation amongst Port Authority, terminals and the port community are required to make the total system efficient and to promote Sri Lanka as a whole and Port of Colombo specifically as transhipment hub. The aim is to focus on "working together" and "act together". With a changing environment in the transhipment business with more competition, larger vessels, and more direct trades, the challenges under this strategy are high.

Logistics Hub Strategy "Becoming an intelligent Logistics Hub"

The Logistics Hub strategy is focussed on creating the business environment to attract logistics to designated areas so-called Dry Ports which have proper connections to the ports. The logistics industry should aim at value added activities in the global production chains. Products can be manufactured and re-exported again. Electrical appliances, household goods, and other consumer market products should be strived for. Through connecting the Ports with these Dry Ports through Corridors an efficient network for the exports and imports is created. Digitalisation of the network will support intelligent logistics. The logistics sector will become attractive through establishment offered trade zones and other trade incentives. Together with trade policies and trade agreements, value added logistics can create Sri Lanka as an export driven nation making efficiently use of the central geographical location in the Indian Ocean and the ample options of connectivity provided by the container line shipping services.

Serving the nation economic growth strategy "Accelerating the economy"

Ports act as "engine" and as a "front-door" for the economic development of the nation. The front-door should be wide open to ensure efficient cargo flows towards the nation and should pave the way to facilitate new exports. Barriers of congestion are to be removed and ports should contribute to the national growth strategy by focussing on specific trades optimising their individual strength and their role in serving the nation as well as the region. The specific trades such as Liquid Bulk, LNG, Dry Bulk, Containers, RoRo each has their characteristics and investments in port infrastructure should well utilised.

Sustainable development of ports strategy "Green and sustainable"

The sustainable component in this strategy comes from the world class ports taking the direction to contribute to a sustainable port environment. The carbon foot print of ports and their facilities is measured and policy is created to (gradually) reduce the emissions and contribute to a cleaner world. The emphasis is to green the port and the port users gradually. In order to understand the effects measurements and monitoring systems should be implemented. It is noteworthy that some private terminals have already taken this direction by implementing electrical RTG as such reducing the emissions.

International Maritime Centre strategy

The Port of Colombo is to become a well recognized as Maritime Centre, a place in which efficient maritime services are provided and which various trade related services and maritime industries are vested. The strategy is to be developed over time. The development of Port City may act as accelerator to this strategy.

Three main "centres" have been identified:

- Centre of trade sectors:
  - Finance / Insurance / Trading & Arbitration
  - Logistics companies
- Centre for port and shipping industries:
  - Shipping and classification societies;
  - Maintenance and Repair
  - Port Technology
  - Bunkering
- Accumulation of supporting industries
  - Education & Training
  - Research & Development
  - Consultancy

The following table illustrates the main strengths of the several ports and the focus areas:

Table 2-1 Competitive Role of Ports

Ports	Strengths	Specifics	Focus areas
Port of Colombo	Deepwater terminals	Designed for Transhipment of Containers	Transhipment Containers
	Near demanding consumer regions	Western region	Gateway Containers & Logistics
	Attractive for Tourism	City & Port City & access to nation	New Cruise terminal (and marina's in Port City)
	Industrial supplies	Refinery supply, power station supply	Liquid Bulk
	Protected berthing for LNG	Planned LNG power station	LNG
	Dry bulk	Limited water depths	Cement, Grain and animal feeds
	General cargo	Limited water depths	Assign additional quays
Port of Trincomalee	Natural deep water in protected areas		Ship services and lay-up business
	Hosting Cement and Grain facilities	Private Cement plant Private Grain plant	Dry bulk (grains, cement)
	Strategic oil supply location	Private liquid bulk terminal	Expansion of Liquid Bulk
	City and Region is attractive to tourism	Boating industry to be developed	Marina's and Cruise terminal
	Demand for power stations	Optional supply of power stations	LNG or gas
	Support regional development	Limited quays	Expansion of quays
	Support regional logistics developments	Optional industrial and logistics areas near rail	Develop industrial and logistics areas
	Support new export products and markets	Value added activities in light- and medium industries	Liquid bulks, Dry Bulks and Container traffic
Hambantota	New port with ample industrial space	Designed for Industry	Refinery, Cement plants Liquid bulk & LNG
	Ample space at break bulk quays	New break bulk terminal	RoRo business, general cargo and break bulk
	Planned shipyards	Opted for ships yards	Shipyards
	Supply regional projects	General cargo & Container trades	General cargo & Project cargo & Containers
	Support regional logistics developments	New container terminal	Container trades

Ports	Strengths	Specifics	Focus areas
	Support new export products and markets	Value added activities in medium- to heavy industries	Liquid bulks, Dry Bulks and Container traffic
Oluvil	Small port on East coast	Limited water depths	Fishery industry and cold chain
	Regional and local function	Limited water depths	Coastal activities, marina
KKS	Proximity to India	Limited water depths	Optional ferries
	Regional and local function	Limited water depths	Coastal activities, marina
Puttalam Coal jetty	Limited water depth	System with barges	Coal imports

Five strategies lead to 21 strategic directions.

The five strategies are displayed in next table with T (Transhipment Hub Port Strategy), L (logistics Hub strategy), N (serving Nation economic growth strategy), S for the Sustainable strategy and C for International Maritime Centre. For each of the strategies the strategic directions are displayed.

There are 21 strategic directions formulated for the port sector based on the five strategies.

Table 2-2 Strategic directions and tasks

T	L	N	S	C	Strategic directions	Strategic tasks
V				V	Leader in Indian Ocean Hub port	Hub port marketing "One Nation", "One Hub" Effective ITT Low handling tariffs Efficient auxiliary functions (like bunkering) Excellent nautical services & safety
		V		V	Improve Colombo as Maritime Centre	Profiling and branding Colombo Port Boosting Ease of Doing Business Creating a vibrant business and living environment Facilitate new business opportunities Provide incentives to attract business Partnership with other IMCs
		V		V	Tourism development	Perform Cruise marketing (incl. home port) Create Cruise terminals with PPP Develop Marina's with PPP
V	V	V	V	V	Supply oriented and timely port development to ensure supply is offered in advance of demand growth	Port Master Planning covering next 30 years with periodic 5 years updates
		V		V	Port investment for primary sectors for the nation and right-fit	Energy sector - Align requirements to port solutions Industry sector – Facilitate existing and new refineries and new industries

T	L	N	S	C	Strategic directions	Strategic tasks
						Fuel supply - Facilitate the growth for fuel supply Food sector – Facilitate grain and fertilisers supply Consumer markets – Facilitate container traffic Construction – Facilitate general cargo and project cargoes Car industry – Facilitate RoRo cargoes
V					New Products and commodities	Facilitate the development of newly traded commodities like Liquid Bulks (LNG and refined), Dry Bulks (Biomass, grains and minerals)
V	V			V	Modernisation of equipment and services	Increase productivity at quays to reduce ship waiting times Invest in new quay and yard equipment Gate automation Workshop systems and support
V	V	V	V	V	Demand oriented	Boost commercial management with focus on PPP
		V			Reform and Self-sustainability	Restructure into business units, commercialize and corporatize (with PPP) Tariff restructuring
V	V			V	Enhance logistics competitiveness	Assign Dry ports with FTZ Modern warehouses and systems
	V			V	Customs efficiencies	Single customs window and risk management
V	V	V		V	Efficiency through digitalisation	Port Community System Digitalisation of information flows, “smart port” technologies Measurements of KPI’s and display at dashboards
	V				Serving dry port developments and connectivity	Connect Port with dry ports efficiently through bonded transport
V	V	V		V	PPP	Enhance port environment with PPP to attract world class operators
V	V	V	V	V	Knowledge and education	Ensure education is modern and appropriate for the maritime and port sector, increase women participation
			V		Green port concept	Introduce measurement systems and execute EIAs in early stages of development

T	L	N	S	C	Strategic directions	Strategic tasks
						Prepare carbon footprint and promote emission reduction schemes Facilitate the change in bunkering requirements
V	V	V	V	V	Safe and secure working environment	Ports will provide safe and secure working environments according to international standards
V	V	V	V	V	Compliance with IMO and SOLAS	Ensure compliance with latest IMO and SOLAS regulations. For example, ISPS, Ballast Waste Management, VGM, and FAL convention
V	V	V		V	Attracting foreign direct investments	Act as landlord for new industrial and logistics areas near ports and along the corridors Participate in trade facilitation legislation Trade policy development Boosting Ease of Doing Business
	V	V		V	Focus on add value and logistics industries	Newly export oriented industry will require new demand from ports in terms of infrastructure and services levels. The port sector will participate in facilitating requirements.
	V			V	Facilitate global production networks	Participate in defining framework of requirements for new industries

Strategic directions observed

This paragraph presents some background information on the strategic directions as illustrated in the framework. The following 21 strategic directions have been identified:

Table 2-3 Strategic directions observed

	Strategic direction	*Observation*
1	Leader in Indian Ocean Hub port	Colombo is ranked 23rd on the global container handling ports in 2016. Within the Indian Ocean Colombo is leader.
2	Cruise sector development	Tourism is an important industry for Sri Lanka. The ports of Colombo, Galle and Trincomalee can benefit from this opportunity by having specialized cruise berths
3	Supply oriented and timely port development to ensure supply is offered in advance of demand growth	The South Harbour development has supported Colombo Hub port concept in time and ahead of competition
4	Port investment for primary sectors and right-fit	Sri Lankas primary sectors are energy, food, industry and consumables. Being an island, all what is required by

	Strategic direction	Observation
		the economy flows through the ports and as such is reflected in port requirements. The energy production is depending on the existing power plant capacities and the development of new capacities by CEB. Fuel for power stations, being gas, LNG, oil or coal needs to be catered for. Fuel products are also needed for local car and truck consumption. The industry in Sri Lanka needs to diversify whilst dated factories need to be replaced or upgraded such as the refinery in Colombo. New industries should be place at logical locations ensuring right-fit. The car industry has a special focus as it generates RoRo traffic through ports. The food sector drives the grain and rice trades which is imported mainly by large bulk carriers. The consumables sector encompasses mostly the containerized gateway cargo flow.
5	New products and commodities	The nation is developing new products and commodities which will require port infrastructure. A good example is the Biomass in Trincomalee which generates wood pellets that can be exported as second fuel to coal fired power stations in Asia. Another example would be the need for Cold stores. These cold stores can cater for fresh foods and beverages a facility which is lacking today.
6	Modernisation of equipment and services	SLPA terminals equipment should be modernised to maintain competitive services
7	Demand Oriented	SLPA's has direct and indirect clients. The direct clients can be split between Port concessionaires and SLPA terminal users such as shipping lines, agents, consignees. Indirect clients can be regarded and the port community. Information on developments is to be improved and transparency on policy is required.
8	Reform organisation and self-sustainability	SLPA organisation is structured as a line organisation with departments. Cabinet approvals are required for many decisions and the company is less responsive to market demands than commercial entities. Ports entities should become self-sustainable to ensure efficiency, right fit and sustainable units.
9	Enhance logistics competitiveness	The Sri Lankan ports today have an inefficient logistic setting due to the scattered warehouse facilities near the port and old-fashioned facilities in the port and congestion at the roads
10	Customs efficiencies	Single customs window and risk management
11	Efficiency through digitalisation	There is still a high level of paperwork especially in the warehousing sector and SLPA terminals. Today

	Strategic direction	Observation
		digitalisation of the information flow is a prime subject in the ports environment. A huge efficiency gain can be created once steps are made into digitalisation of the information flow.
12	Serving dry port developments	Today inland depots are scattered over the city. Modern warehouse facilities at dry ports with a proper connection with the port has been identified as important setting for logistics hub port developments
13	PPP	Private Public partnerships are key to attract foreign direct investment and at the same time to create additional revenues for the Authority. Colombo has successfully implemented PPP structures with terminal operators and is expected to continue with this.
14	Knowledge and education	Today the training institute of SLPA provides many port workers. Knowledge and skill are very important for the Ports and Maritime sector in Sri Lanka. Training institutes play a vital role to prepare the employees of the future but in that case modernisation of the institute and tie-up with international developments related to education and simulations are required.
15	Green port measurement systems	Today the ports of Sri Lanka have no such measurement systems and to become modern ports the sector will need to address this. Several individual operators have already invested in sustainable port solutions. Port Authorities have a prominent role in regulation which steers the carbon footprint of the port sector. To market the Sri Lankan port sector with a sustainable vision, investors with similar ambitions will be attracted. The port and its users shall contribute to a modern safe and clean port environment.
16	Safe and secure working environment	orts will provide safe and secure working environments according to international standards
17	Compliance with IMO and SOLAS	Ensure compliance with latest IMO and SOLAS regulations. For example, ISPS, Ballast Waste Management, VGM, and FAL convention
18	Attracting foreign direct investments	The port sector is an international playing field. The create the right investment climate shall attract foreign direct investments into Sri Lanka contributing to employment and wealth for the nation. The port sector needs the right legal framework to attract FDI and to create win-win situations for both the investor and the Authority. The port sector already has attracted considerable amounts of foreign direct investment through concessions with global terminal operators and through the recent Hambantota deal. The future is that SLPA stays in control to attract FDI in ports

	Strategic direction	Observation
19	Focus on add value and logistics industries	The hub port strategy of Sri Lankan ports can be enhanced by attracting value added logistics. This Light manufacturing and assembly markets are key for developing logistics centres near the ports.
20	Facilitate global production networks	Participate in defining framework of requirements for new industries Ports become increasingly important for the link in logistics to serve global production networks. This means that the nation not only produces for internal consumption but also for export of components and half fabricates to serve global manufacturing

2.4 Strategic tasks

The strategic directions have been translated into strategic tasks as displayed above in Table 2-2. Each of the strategic tasks have been further detailed in next paragraph.

Leader in Indian Ocean Hub ports

- Profiling and branding Port of Colombo including Hub port marketing, "One Nation", "one Hub" . Sri Lanka should be promoted as one nation one hub to attract shipping lines to perform their transhipment at Port of Colombo. In this respect Port of Colombo is adequately positioned to add additional container capacities in the future to accommodate additional services. The marketing function is to be performed by the marketing unit of the National Port Authority. It will ensure participation at major shipping events world wide and "stay close" with shipping lines.
- Effective ITT. The transhipment function is depending on efficient Inter Terminal Traffic (ITT). This encompasses the fact that communication between terminals should be effective and efficiently organised again minimal costs. Digitalisation, combined with adequate truck capacities and well organised gates with digital truck recognition will contribute to efficient ITT.
- Low handling tariffs. Transhipment business is considered non-captive cargo. This means that shipping lines may move their transhipment package to other competitive ports when the price is too high.
- Excellent nautical services & safety. A transhipment hub is stronger when primary services like tug boats, pilots and mooring is performed efficiently. Night navigation will be implemented in Trincomalee to increase productivity.
- Efficient auxiliary functions (like bunkering). A transhipment hub is stronger when auxiliary functions are well organised and shipping lines have efficienct access to services such as bunkering, crew services, and ballast waste management.

Tourism development

- Perform Cruise marketing (incl. home port). Cruise marketing is important to attract Cruise shipping lines.
- Create Cruise terminals with PPP. A new passenger terminal is projected at the BQ quay in Port of Colombo; additionally, plans have been prepared to create a passenger terminal in Trincomalee and Galle when demand is sufficient.
- Develop Marinas with PPP. The boating sector holds promise for Sri Lanka. In several ports, marinas are projected to facilitate this sector. Examples are new planned marina's in Colombo port city, Trincomalee, Hambantota and the expansion of the marine facilities in Galle.

Timely port development

- The ports of Sri Lanka will facilitate trade developments in a timely fashion. The purpose is to have a blueprint for future development, reserving space where it may be needed in future, taking into account the regulatory and environmental requirements, and creating an efficient and economic port operation. National and regional masterplans are aimed at creating the optimum allocation of functions within a country. In a masterplan, development lay-outs are provided to determine indicative cost figures but the level of detail is limited. As port development takes time, planning should be done well in advance of demand growth. Port masterplanning will consists of short term three-year national plans, medium term plans thar cover 5-10 years and support certain development, and masterplans which cover future possible developments over a period of approximately 30 years. After each five years, the long term masterplans are updated. Execution of port expansion shall be done in a sustainable way, through proper pre-feasibilities and feasibility studies, in order to ensure project deliver positive financial and economic returns. The plans in the framework of long term, medium term and short term are interrelated. The masterplan forms the framework for the medium plans and the medium plans forms the basis for the short term plans. The masterplan requires an update interval of about 5-10 years during which the original phasing is reviewed against demand monitoring and phasing is enhanced or delayed. As such, it is a continious planning process.

Port investment for primary sectors of the nation and right-fit

- Energy sector - Align requirements to port solutions. This is primarily LNG and Gas, as coal fired power stations are not the preferred solution due to emissions. Right-fit means that power stations are planned in areas where power is required, ample space is available, and supply of gas or LNG can be secured through marine facilities (floating buoys and or port facilities). A new LNG power plant is projected near Colombo and LNG supply can be secured through the Port of Colombo. Other power stations are planned in the Sampur area (near Trincomalee) and at Hambantota.
- Industry sector – Facilitate existing and new refineries and new industries. A new refinery is planned for Hambantota; this port has ample space to develop this industry.
- Fuel supply - Facilitate the growth for fuel supply. The nation's fuel supply should be undisrupted and continuous. Historic events caused temporarily shortage and this needs to be avoided at all times. Additional tank storage and marine facilities should be created to ensure sufficient fuel supply. Deep water marine facilities are required to create economies of scale.
- Food sector – Facilitate grain and fertilisers supply. Grain imports are expected to increase and deep water facilities are existing in Trincomalee. For fertilisers no production facility is present. Opportunities to supply both the nation as well as for exports are present. The port of Trincomalee has ample space to develop such factory but also Hambantota would be suited for such facility.
- Consumer markets – A facilitated through container traffic. Ports to handle containers are Colombo, Hambantota and to lesser extend Trincomalee. The connectivity of the port with nation's highways are crucial for the gateway cargoes. The efficiency of existing flows can be optimized.
- Construction markets – Facilitate general cargo and project cargoes. The nation is being developed rapidly. Construction works in the western region are large but also other parts of the country face heavy demand for construction works. The majority can be translated to the import of steel products which are commonly imported through the use of general cargo ships. These ships can be accommodated in Colombo, Hambantota and Trincomalee.
- Car industry – This market drives the import (and exports) of RoRo cargoes through the ports. Due to the space required at ports to handle finished cars, some ports are less suited than others. Colombo port and Trincomalee have limited parking spaces whereas Hambantota has ample space available. The latter is therefore the optimum port to handle these commodities despite the fact the majority of demand is triggered by the western region.

New products and commodities

- Sri Lanka export sector should diversify.
- New export products are for example biomass (wood pellets) and ilmenite and agriculture products. These products require additional port facilities from cold stores to silo's and belt systems to additional quays at sufficient water depths.
- Other new products will be LNG, both required for powerstations as well as for bunkering fuels.
- In the edible oil sector options arise grinding of seeds for additives in animal feed or for biodiesel. Recycling of waste oils and used fats to create the so-called 2nd generation biodiesel is also a trending topic. CO2 emissions are reduced as biodiesel produced is of high-quality, has no impact on the environment, and has a favourable effect on engine performance.
- Ethanol is also earmarked as interesting new commodity. Ethanol is a renewable fuel made from corn and other plant materials. The use of ethanol is widespread in developed countries, and more than 97% of gasoline in the U.S. contains some ethanol[7]. The most common blend of ethanol is E10 (10% ethanol, 90% gasoline). Ethanol is also available as E85 (or flex fuel)—a high-level ethanol blend containing 51%-83% ethanol depending on season and geography—for use in flexible fuel vehicles. E15 is defined by the Environmental Protection Agency in the US as a blend of 10.5%-15% ethanol with gasoline. E15 is an approved ethanol blend for use in model year 2001 and newer light-duty conventional gas vehicles. Ethanol is in high demand in countries in Asia to green the fuel types and to reduce emissions. Sri Lanka is well positioned to act in the value chain or to act a distribution hub of this liquid fuel.
- In the mineral sector (supply to ceramics) construction. Grinding of minerals is best done near the port where raw materials are imported. This industry can support the ceramics industry in the country.

Modernisation of equipment and services

- Invest in new quay cranes and yard equipments
- Investments in adequate IT systems to support the technological improvements.
- New Terminal operating software to increase productivity at quays to reduce ship waiting times.
- Gate automation.
- New workshops and maintenance support systems.
- Warehouse equipment and IT systems
- ITT services to be upgraded with IT planning, modern equipment and improving availability.

Demand oriented

- Sri Lanka Ports will become more client oriented. The port has direct clients and indirect clients. The ports shall be organised with improved marketing and commercial departments to respond quickly and in a professional manner. It is important to set decision trees with clear mandates so that transparency is provided in the decision making process. Proposals for planning are separated from procurement rules and claim handling is done at the business unit concerned. Information to clients shall be improved through the use of on-line services where appropriate. Administrative procedures shall be improved through the use of e-signatures and digital flow improvements.

Reform and Self-sustainability

- SLPA organisation is structured as a line organisation with departments. Cabinet approvals are required for many decisions and the company is less responsive to market demands than commercial entities. Ports entities should become self sustainable to ensure efficiency, right fit and sustainable units. Through the reform into a port authority and a port management company, the organisation will be transformed to become more transparent with accountable business units.
- Restructure into business units, commercialize and corporatize (with PPP).

[7] US Department of Energy

- Tariff restructuring. The tariff restructuring is required in order to offer services against proper rates and to become sustainable, whilst at the same time the tariffbook is simplified where appropriate. The tariff restructuring would also enable to set competitive prices whilst recovery of investments is secured. A new tariff system will go in parallel with the reform process, as tasks and responsibilities between a port management company and operational units changes.

Enhance logistics competitiveness

- A business platform / taskforce is required to streamline wishes and ideas to improve competitiveness and create mandated plan of actions. SLPA should be part of the platform.
- Administrative procedures will be reduced through the use of a Port Community system which shared and distributes relevant information of cargo in the logistic chain.
- Assign a network of Dry ports with FTZ regulations
- Create modern warehouses at (dry) ports
- Warehousing services will be improved with modern IT systems (cargo management system) and modern pick and place equipment to improve the services on LCL and MCC cargoes.
- Create information statistics and transparency through modern IT solutions
- Reduce congestion at gates through implementing new gate systems

Customs efficiencies

- Customs efficiencies shall be improved through the use of a Customs Single Window with E-declaration and E-payment
- Ensure of communication with New Port Community system
- Customs gate procedures to be improved through digitalisation and e-electronic seals
- Improvement of risk management systems
- Use of scanning equipment to speed up the amber line procedure
- Increase green channel traffic combined with random scanning and checking squads.

Efficiency through digitalisation

- Port Community System
- Digitalisation of information flows
- Introduction of “smart port” technologies
- E-port permit applications to enhance port access at gates
- Measurements of KPI’s and display at dashboards
- New terminals operating systems support the use of E-manifest, E-communication, E-facturation and E-control and dashboards.
- Warehousing services will be improved with modern IT systems supporting bar code scanning, pick and place, and warehouse management.

Serving dry port developments and connectivity

- Facilitate the development of dry ports which act as bonded cargo villages. These areas can be designated for free trade zone and will have trade facilitation support measures.
- Port are connected through highway networks with dry ports.
- The port of Colombo will have access to the Elevated Highway (PAEH).
- Dependening on the national rail masterplan, these dry ports may be connected with the ports to allow rail transportation of cargo.
- The ports of Colombo, Hambantota and Trincomalee shall be connected by rail in alignment with the national rail masterplan.

PPP

- New PPP structures will be planned to allow joint ventures and partnerships in order to benefit the private and the public sector at the same time. New ventures on warehousing and on dry ports are envisaged.

Knowledge and education

- Knowledge and eduction is crucial for the sustainability of the ports and shipping sectors. Maritime and logistics education is key for the well being of the sector in the future. Also the enpowerment of women is promoted to diversify the labour force in this industry. The local institutes like the Mahapolo Ports and Maritime Academy will expand their education programs whilst at the same time develop partnerships with international Universities and Polytechnics on shipping and logitics to ensure modern education programs including simulation training capabilities in the long run.

Green port concept

- Establishment of a green policy and implementation framework including measurement systems, monitoring and controlling emissions, set targets for the emission controls.
- Establishment of HSSE department. Attention for environmental issues within the operation of the port would be greatly served by establishing a dedicated, relatively independent Health, Safety and Environment (HSE) department. Such a department should conduct its task from the perspective of assuring optimum conditions for health, safety and environment. It should not be subordinate to a section with merely economical and efficiency interests.
- Green the port organisation, effective measurements to green port activities (own organisation and port users).
- Execute EIAs in early stages of development;
- Prepare carbon footprint and promote emission reduction schemes;
- Prepare for solar power at buildings and warehouses to reduce carbon footprint of the Port itself;
- Introduce cold ironing at new facilities in Ports
- Promote electrical equipment and vehicles when replacing existing ones; and
- Facilitate the change in fuel types both for road transport as well as for bunkering requirements.
- Set up an environmental Management System in line with ISO 14001 certification for the different parts of its operations.

Safe and secure working environment

- Ensure a safe and secure working environment by applying international standards of ILO and modern technology;
- Ensure safe cargo working and ships working through excellent trained and educated employees;
- Ensure that emergency reponse plans are updated and drilled;
- CCTV and port monitoring and surveillance will be improved to maintain a modern and safe working environment.

Compliance with IMO and SOLAS

- Ensure compliance with latest IMO and SOLAS regulations. For example ISPS, Ballast Waste Management, Ship waste, VGM, and FAL convention. A complete overview is presented in Appendix XI.

Attracting foreign direct investments

The port sector is an international playing field. To create the right investment climate shall attract foreign direct investments into Sri Lanka contributing to employment and wealth for the nation. The port sector needs the right legal framework to attract FDI and to create win-win situations for both the investor and the Authority. The port sector already has attracted considerable amounts of foreign direct investment through

concessions with global terminal operators and through the recent Hambantota deal. The future is that SLPA stays in control to attract FDI in ports.

- Secure and land plots for future industry near the ports and in Dry ports;
- Perform port marketing based on the "One nation, One port" concept (our ports are "one" due to well established networks of roads and corridor developments;
- Participate in identification of new export oriented industries or added value services and draw a framework of requirements to attract these industries. The port sector will participate in facilitating requirements once identified and found feasible. A common approach is the value chain analysis in the global production chain networks;
- Act as landlord for new industrial and logistics areas near ports and along the corridors;
- Participate in establishment of trade facilitator committee; and
- Participate in trade policy developments.

Value added logistics

- The hub port strategy of Sri Lankan ports can be enhanced by attracting value added logistics. This Light manufacturing and assembly markets are key for developing logistics centres near the ports.

2.4.1 National development programs

Several studies have been analysed to create this report:

- Prime Minister speeches, november 2015
- Prime Minister statement, October 2016
- Prime Minister budget speech, 2017
- Vision 2020, SLPA
- The Ministry Megapolis and Western DevelopmentMasterplan, November 2016
- Multi Modal Transport Project, ADB and Japan Fund for Poverty Reduction, 2012
- SLPA Port Development Masterplan 2016
- Colombo - Trincomalee Economic Corridor (CTEC), ADB November 2016
- Colombo - Trincomalee Economic Corridor (CTEC), comprehensive Development Plan, ADB January 2016
- LNG break bulk opportunities, PWC 2017
- SLPA three years budget plan, December. 2017
- JICA Logistics Study Full report, June 2017
- Preliminary Draft of Sri Lanka Energy Sector CTEC, PWC November 2016
- Proposed landuse plan UDA, June 2017
- Improvement of Land Transport System in Sri Lanka, Policy Perspectives
- Colombo East Terminal Traffic Study, Drewry Sri Lanka, 2016
- Feasibility Study and Preliminary Design of Southern Highway Extension towards Colombo SHETC project and Final report for the Port Access Evlevated Highway Project (PAEH), Katahira & Engineers International, August 2014
- Enabling Clean marine transport, International Gas union, March 2017
- Harbours review, Baltic Press, January 2017
- Port Strategy of India's Next Big Leap in Trade, AP Chamber, February 2017
- Ports and Terminals, H Ligteringen/ H. Velsink, Delft 2012
- Port management and opertions, P. Alderton, 1999
- Ports in Proximity, Competition and coordination amoung seaports, T. Notteboom/C.Ducruet/P de Langen 2009
- Newspapers Mirror Business, specfic articles
- Newpapers DailyMirror News, specific articles

- Business Observer, specific articles

2.5 International environment

The main external maritime trends are described in this paragraph:

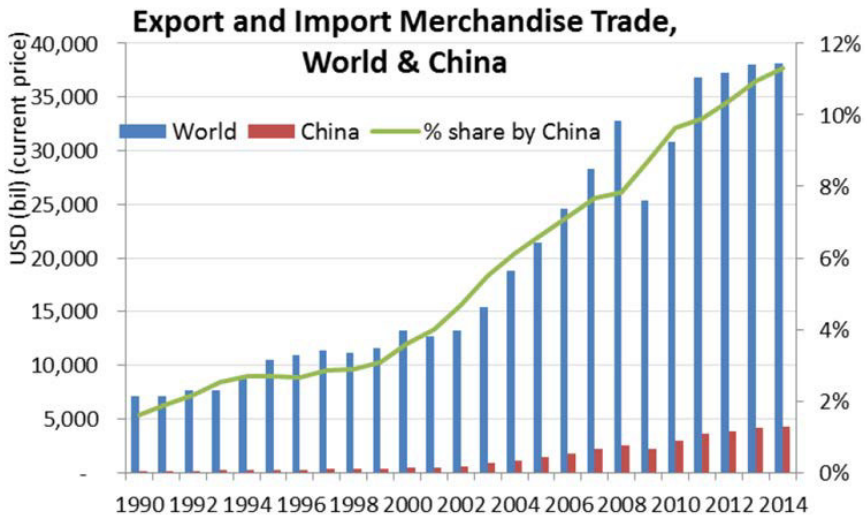
1. International trade growth slows down
2. China's role is slowing down
3. India emerging role?
4. Increased vessel sizes and cascading
5. Alliances and consolidation
6. Changing port management structures
7. Digitalisation in the port industry
8. Technical changes in the maritime shipping industry
9. International Port Competition

2.5.1 The international trade growth slowed down

After strongly rebounding from the 2008 Recession, international trade has grown at a sluggish pace that further deteriorated in 2015 according to statistics from WTO. The world trade volumes remained low at a growth of 2.6% (similar to 2015) and expected to rise by 3.6% in 2016.

Per UNCTAD, a substantial part of the drop in international trade was due to nominal factors, principally the fall in the price of commodities and the overall appreciation of the United States dollar. Weaker demand also played a role, especially in East Asia and in other parts of the developing world. Although the largest decline occurred in commodity sectors, the value of trade also contracted in all manufacturing and agricultural sectors. Declines in the value of trade were also observed in the service sectors. The trade collapse of 2015 affected all geographic regions. In general, trade flows of developing countries registered a sharper downtrend relative to the last trade collapse of 2009. South–South trade performance was also weak, largely driven by lower East Asian imports. In terms of export performance, countries in East Asia generally fared relatively better.

Figure 2-3 Export and Import Merchandise trade



2.5.2 China's role in international trade is slowing down

In particular, China's emerging role in international trade cooled down due to slower GDP growth of 6.9% compared to double digit growth over several years between 1990 and 2010. The centralised economy is slowly focussing more on internal development rather than export focussed resulting in less seaborn trade. China's role in global merchandise trade had become rather dominant with a share in world imports from 1% in 1980s to 10% in 2014 and to 12% share in world exports. The shift in trade flows to/from the East Asia has resulted in the emergence of mega scale ports in Asia. In 2015 9 out of the top 10 ports were from Asia compared to only 4 in 1980. This has been dominated by the development of Chinese (export oriented) deep-water container ports like Dalian, Tanjin, Qingdao, Shanghai, Ningbo and Xiamen.

Figure 2-4 China Merchandise trade

Source: WTO, National Bureau of Statistics China, ADB, ICF

Outlook

The World Bank outlook for the East Asia and Pacific region is projected to grow at 6.2 % in 2017, and at a slightly lower 6.1 % on average in 2018-19, in line with previous forecasts. A gradual slowdown in China is offsetting a continued modest pickup in the rest of the region, led by a rebound in commodity exporters and a gradual recovery in Thailand. Growth in commodity importers excluding China is projected to remain robust, as stronger exports will offset the negative effects of eventual policy tightening on domestic demand. Downside risks are mainly external. They include heightened policy uncertainty and increased protectionism in key advanced economies, and the risk of an abrupt tightening of global financing conditions. A sharp slowdown in China is a low probability risk, but it would have major negative consequences for the main East West trades on which Sri Lanka performs considerable transhipment volumes today.

2.5.3 India as emerging nation?

Indian economy is one of the economies with great potential to become an emerging economy in global production due to the large labour force and low wages. However, the so far India growth has not accelerated. With new incentives from the Government to stimulate well developed manufacturing clusters India hopes to improve manufacturing output to 25% of GDP from current levels of 16%, like in many key sectors with low cost production countries such as China and Vietnam. To boost manufacturing they adjust regulations and tax regimes to attract foreign direct investments for special economic zones in sectors like defence, automobiles, textiles, garments and electronics. It has been identified that the current industrial centres are located remotely from the ports. Incentives to place these industrial clusters near to the west and east ports has been identified in India's port strategy.

These long developments will have impact on the Sri Lankan transhipment position once deep-sea ports have been created and more direct trades occur.

So far India showed the following performances:

- During 2016-17, major and non-major ports in India have accomplished a total cargo throughput of 1,133 million tonnes, an increase of 5.7 % on previous year 2015-16. The growth in cargo handled at major and non-major ports in 2016-17, were 6.8% and 4.2%, respectively. The share of major ports in the total traffic handled by Indian ports increased from 56.5% in 2015-16 to 57.2% in 2016-17.
- The country's major ports handled a combined traffic volume of 647 million tonnes during 2016-17, registering an annual growth rate of 6.8 per cent. The major ports recorded the highest ever capacity addition of 100.37 MT in 2016-17, thereby raising the total capacity to 1065 MT per annum, as against a capacity of 965.36 MT per annum in 2015-16.
- The government has taken several measures to improve operational efficiency through mechanisation, deepening the draft and speedy evacuations.
- The Department of Industrial Policy and Promotion (DIPP), Ministry of Commerce and Industry, reported that the Indian ports sector received FDI worth US$ 1.64 billion between April 2000 and September 2017.
- Between FY07– FY17, cargo traffic grew at CAGR 0.38%
- Over FY07–16, CAGR in the volume of different segments was as follows:
  - Solid cargo 2 % per cent.
  - Liquid cargo 3.1 %.
  - Container cargo 6%

Source: Ministry of Shipping; Indian Ports Association (IPA)

The Indian Port strategy is to bring manufacturing areas closer to ports as it has been estimated that India can save up to USD 28 billion in infrastructure investment and another USD 3.3 billion in transportation costs if 50% of overall trade moves closer to ports by 2020[8].

The Indian government plans to develop 10 coastal economic regions as part of plans to revive the country's Sagarmala (string of ports) project. The zones would be converted into manufacturing hubs, supported by port modernisation projects, and could span 300–500 km of the coastline. The government is also looking to develop the inland waterway sector as an alternative to road and rail routes to transport goods to the nation's ports and hopes to attract private investment in the sector.

The strategy includes upgrading and expansions of ports with 39 million TEU which is illustrated in next table for the container segment.

Table 2-4 Main capacity increases by Indian and Bangladesh ports.

Region	Capacity Increase (million TEU)
East India - Capacity Increase	13.5
West India – Capacity Increase	14.3
South India - Capacity Increase	11.4
Bangladesh – Capacity Increase	9.0

[8] Port Strategy of India's Next Big Leap in Trade, February 2017

Total India	39
Total Bangladesh	9

Ports included in analysis were: JNPT, Mundra, Pipapav, Cochin (Vallarpadam), Vizhinjam, Colachel, Visakhapatnam, Krishnapatnam, Chennai, Kattupalli, Ennore, Tutucorin, Sonadia Port and Payra Port.

Development of Maritime Policies in India

India's Merchant Shipping Act, dating from 1958, included several strict rules that restricted intra-country transhipment and paved the way for international transhipment hubs such as Colombo. Specifically, the Merchant Shipping Act included the following restrictions:

- Generally, only vessels with Indian flag were allowed to carry out cabotage.
- Only fully-owned Indian vessels were allowed to be registered under the Indian flag.

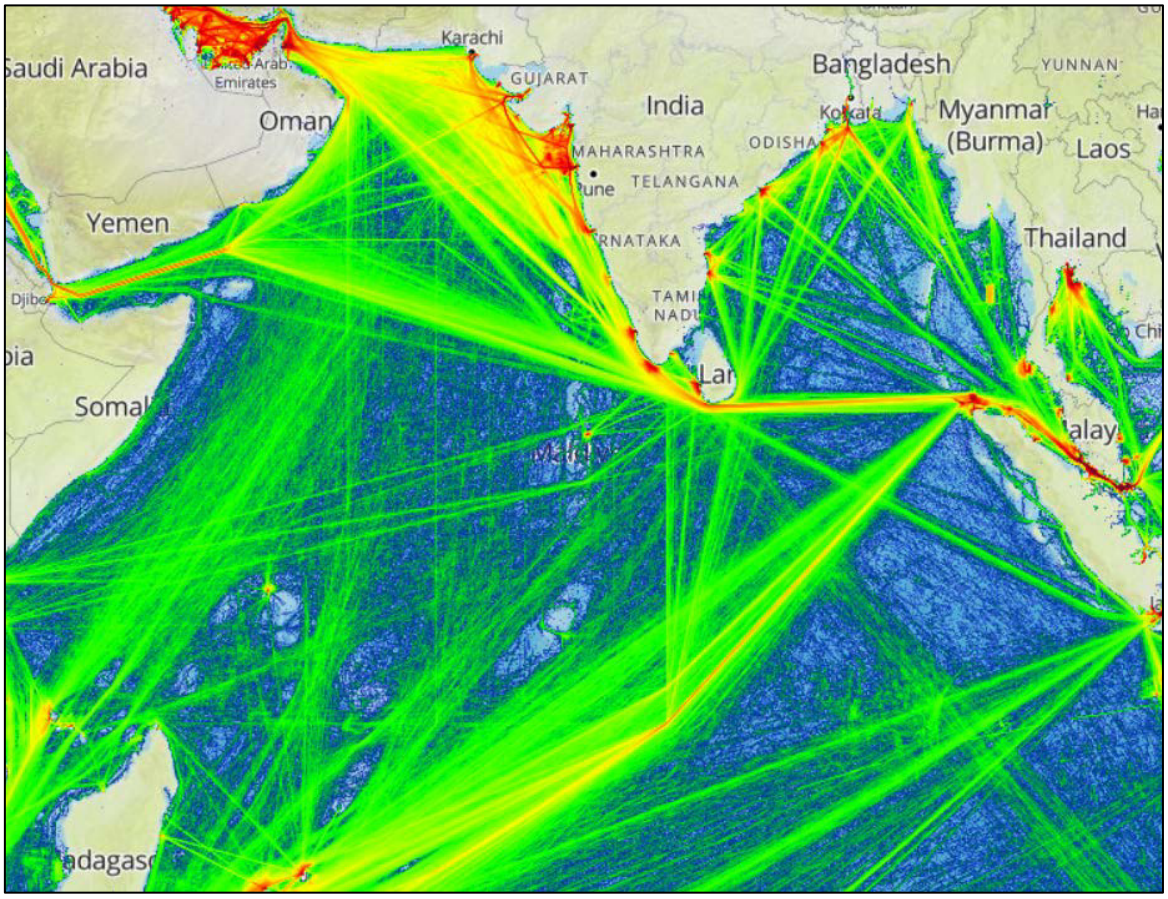
These rules, among others, restricted the size of the fleet capable of carrying cargo between Indian ports. However, in late 2016, a new Merchant Shipping Act was ratified, which aims to solve this issue by relaxing the requirements for registering vessels under the Indian flag. Through these improvements, the Indian Government aims to quadruple the available tonnage of the country's fleet by 2020. Substantial growth in intra-country transhipment will put further pressure on international transhipment activities.

The conclusion is that India is strongly preparing the port and transport sector to facilitate export growth through new developed industrial zones closer to ports. With respect to coastal shiping the abolishment of cabotage legislation may attract foreign shipowners performing on domestic transhipment around indian coast. Due to the existing infrastructure issues and long haul distances to existing production sites it will take time before India's economy becomes a leading economic exporter like China is today.

2.5.4 International Shipping & Transhipment

Transhipment of containers is a core activity at the port of Colombo. Transhipment cargo amounts to approximately 75.0% of all containers handled. In 2015, the port handled about 5.1 M TEU. The transhipment volume of approximately 3.8 M TEU is mainly captured due to the strategic position of the port, proximate to the main East-West Shipping lanes and close to feeder destinations along the Indian coastline. It has adequate water depth and container facilities to handle the largest vessels in the global container trades.

Figure 2-5 Colombo strategic position near main shipping routes – density chart

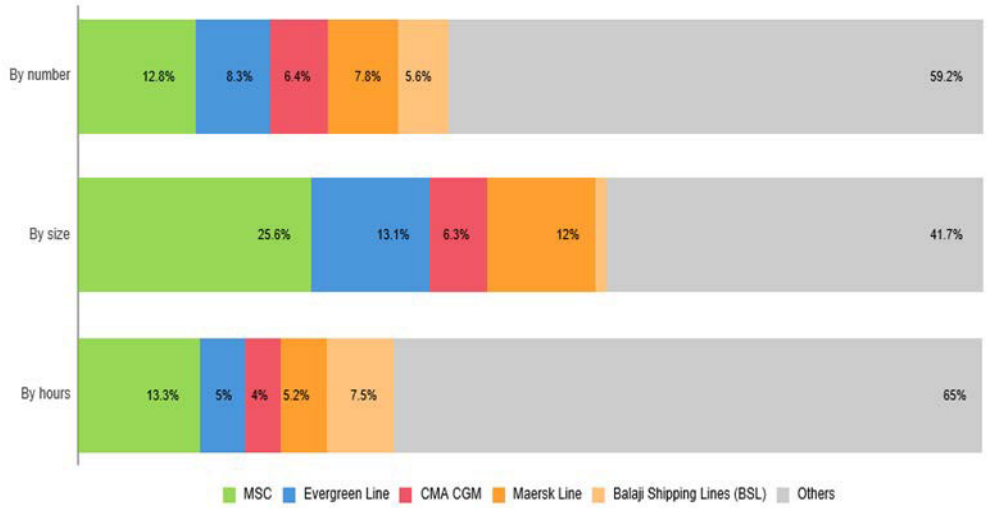


Colombo is used both for transhipment of containers from mother vessel to mother vessel (relay activities), and for transhipment from mother vessel to smaller feeder vessels. The latter is the traditional transhipment case. In this case, a hub-and-spoke system is applied, with feeder vessels distributing containers to destinations with insufficient draft, such as destinations on the East and West coasts of India, the Maldives, Bangladesh, Myanmar, and Pakistan. The relay business has increased considerably in the recent past. Main regions, such as the Middle East, East Africa, and the Indian West coast are served when the main westbound services, originating from South East Asia or the Far East, relay their cargo to the eastbound services originating from the US East Coast, Europe, and Middle East. It should however be noted that transhipment trade is "foot-loose". This means that the activity of transhipment can be moved to other ports should the shipping line wishes to concentrate its transhipment somewhere else along the shipping chains. At the same time the tariffs for transhipment handling are low compared to gateway cargo handling simple because of this competitive edge. This also stresses that the efficiency of handling and other service elements play a role in the competitive profile of a transhipment port.

Out of the 17 East-West Services Colombo only receives 3 of the main services performed by the Ultra Large Container Vessels.

MSC is the largest operator in Port of Colombo by number of calls and by average sizes. The three main East West services are the NEU6, AE-1 and the FE5 displayed in the picture below. The 2M with MSC and Maersk offer the AE-1 service. The Ocean Alliance offers NEU6 through COSCON and CMA CGM and Evergreen. And the FE5 is performed by The Alliance. Noteworthy is that still about 50% of the vessel calls are offered through a high number of smaller shipping lines performing on the various feeder trades.

Figure 2-6 Colombo weekly vessel call analysis 2017Q3



Source: Alphaliner

Figure 2-7 Main East West Services

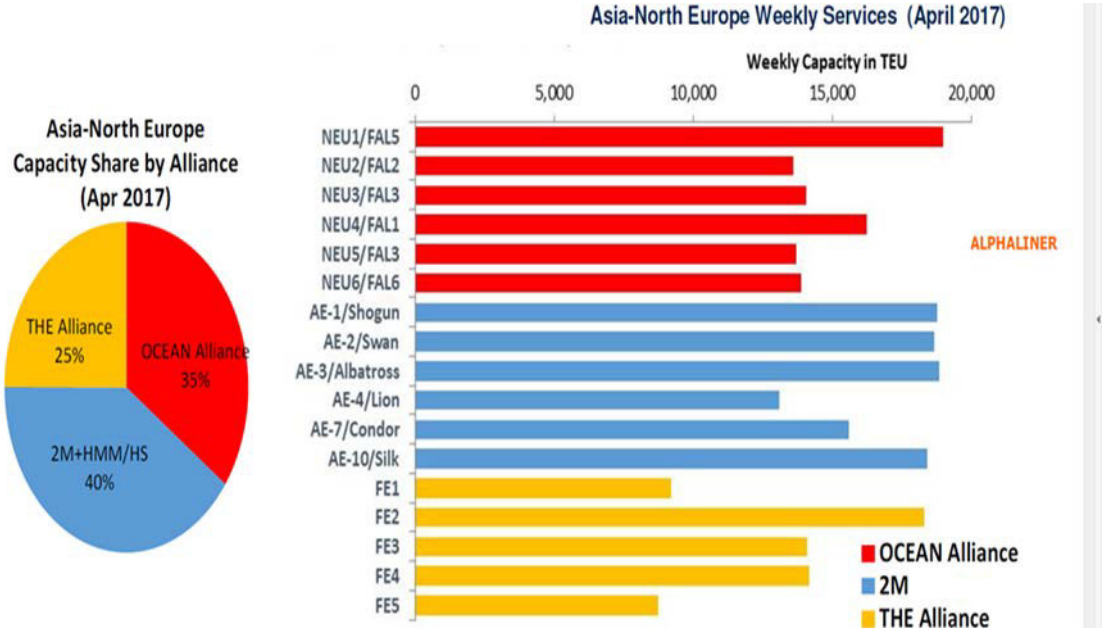


Table 2-5 Main lines and hub calls

Westbound	Singapore	T. Pelepas	Colombo
NEU1	x		
NEU2	x		
NEU3	x	x	
NEU4	x		
NEU5	x		
NEU6			x
AE-1		x	x
AE-2		x	

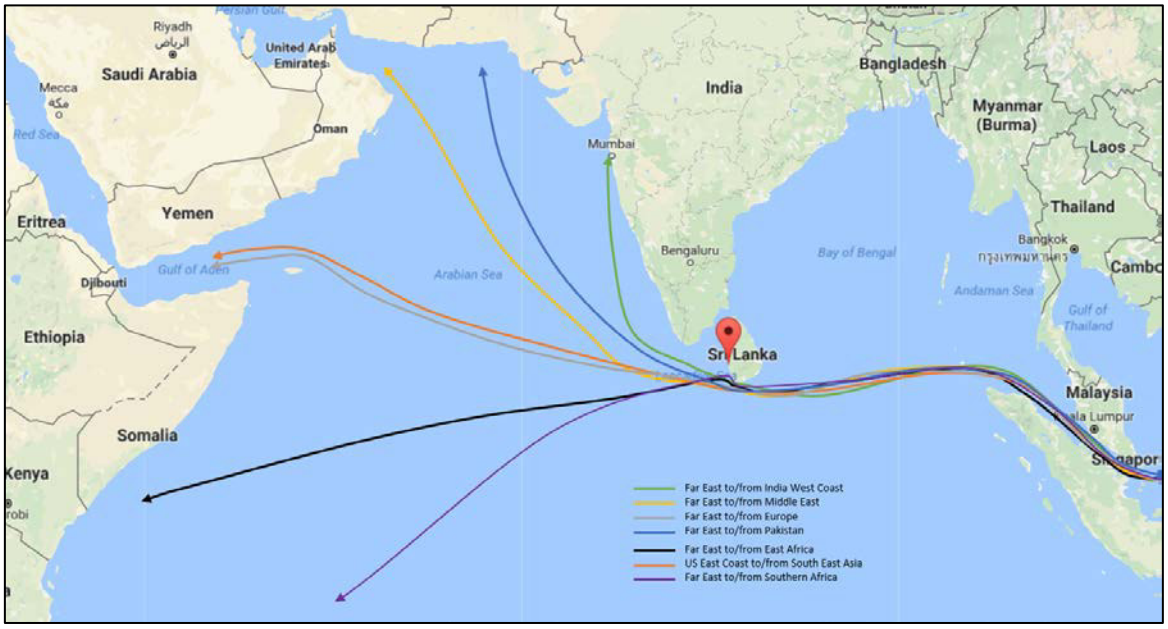
Westbound	Singapore	T. Pelepas	Colombo
AE-5		x	
AE-6		x	
AE-7		x	
AE-10		x	
FE1	x		
FE2	x		
FE3			
FE4			
FE5			x

Table 2-6 Main lines hub through relays on six main trades

Region from/to	Region to/from	Vessel operators
Far East/South East Asia	India West Coast	CMA CGM-ANL, Maersk Line/CMA CGM, OOCL, ESL, APL, MSC, KMTC, RCL, NYK, Hapag Lloyd, Yang Ming, Xpress feeders, Wan Hai, PIL, MOL, Evergreen, COSCO
Far East/South East Asia	Middle East	G6, Maersk Line, MSC, KMTC, ESL, RCL, Evergreen
Far East/South East Asia	Pakistan	APL, NYK, Xpress, MOL, Wan Hai
Far East/South East Asia	Europe/Mediterranean	G6, 2M, CKY-Evergreen, CMA CGM-ANL, MSC
Far East/South East Asia	East Africa, South Africa, West Africa	MSC, CMA CGM, UASC, Maersk Line, MOL
Far East/South East Asia	US East Coast	2M, G6, ZIM, Evergreen

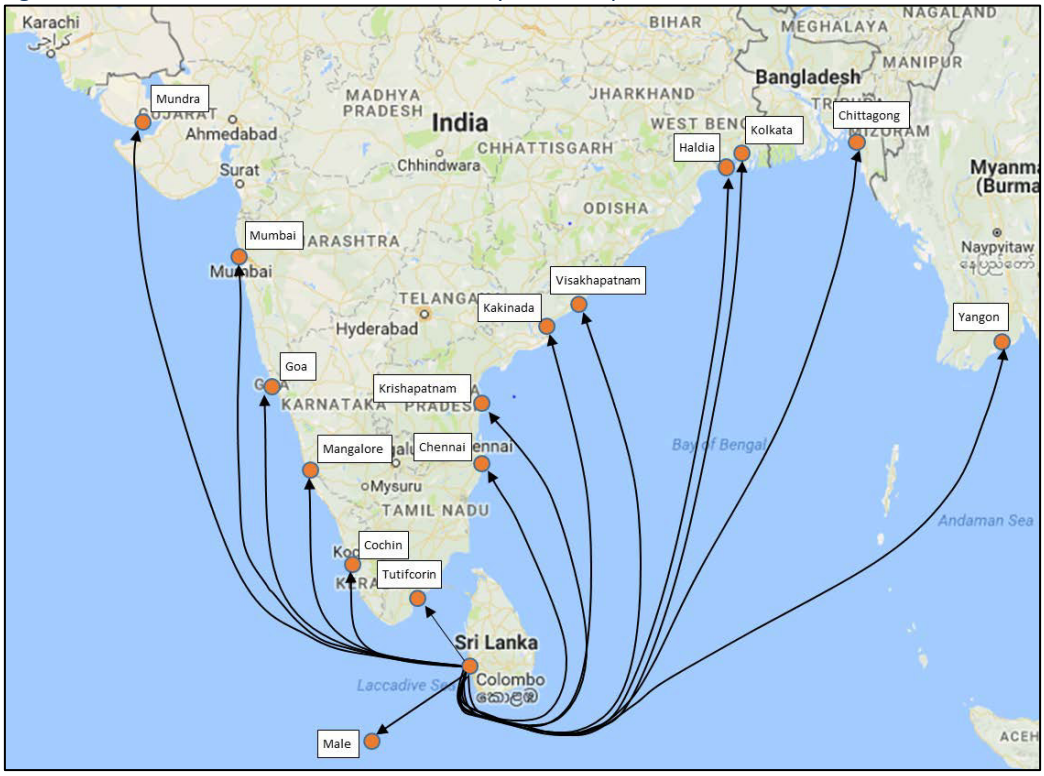
The following table displays the six main Far East originated routes for the port of Colombo.

Figure 2-8 Colombo as a Hub for the 6 Main Trade Routes



It should be noted that the main East-West container shipping services are operated by the global vessel operators (amongst others, Maersk Line, MSC, CMA -CGM), which deploy the largest container vessels of the world. These Ultra Large Container Ships (ULCS) today have a capacity of around 20,000 TEU, have a length of up to 400m, a width of 59m (25 container rows in width), and a draught of up to 16.5m when fully loaded. This trend towards larger vessels results in the need for ports to expand their capacity in time, to continue to handle these ULCS and to remain competitive as a hub. The construction of the South Harbour, with the new CICT terminal, is a good example thereof.

Figure 2-9 Colombo's direct feeder destinations by hub and spoke



2.5.5 Shipping trends

The following shipping trends are important for the Sri Lankan port environment

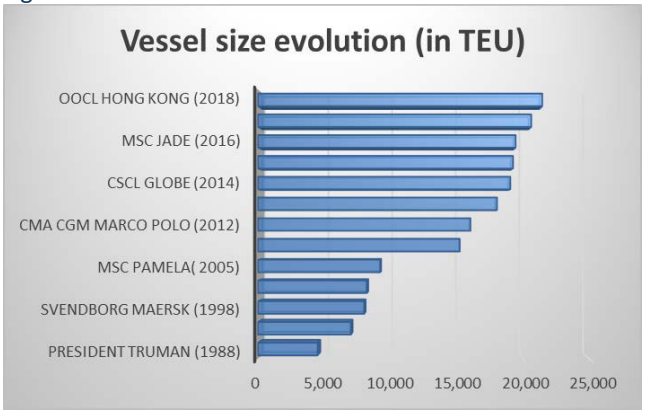
1. Increased vessel sizes
2. Cascading and low freight rates
3. Alliances and consolidation
4. Reducing turnaround time
5. Technical changes in the maritime shipping industry

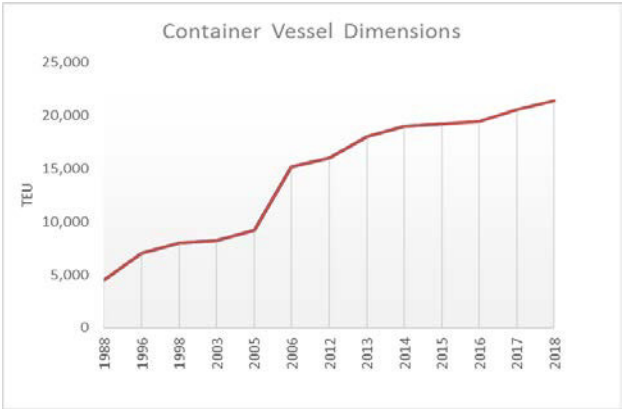
Larger vessel sizes and cascading

The trend towards larger vessels sizes is caused by the cost focus of shipping lines. They maximise economies of scale and reduce unit costs through applying larger vessels. The fact that growth of the global economy has been limited contributed to lower demands and lower freight rates. This again urged shipping lines to excel in ordering larger units to save fuel through technological improvements and to further reduce unit costs.

The typical large container vessel increased from 3,000 TEU in 1980 to the "EMMA MAERSK" of 15,000 TEU in 2006, the MAERSK McKinney MØLLER of 18,000 TEU vessels (Triple E-class) in 2013, and in 2017 the vessel MAERSK MADRID of 20,568 TEU. The latter is part of the new Triple E – II-class which have a dimension of 400m*58m*16.5m (LOA, Width, Draught) and are especially designed for the Far East - North Europe trade. The largest vessel today is OOCL Hong Kong with 21,400 TEU and a dimension of 400m*58.8m*16m.

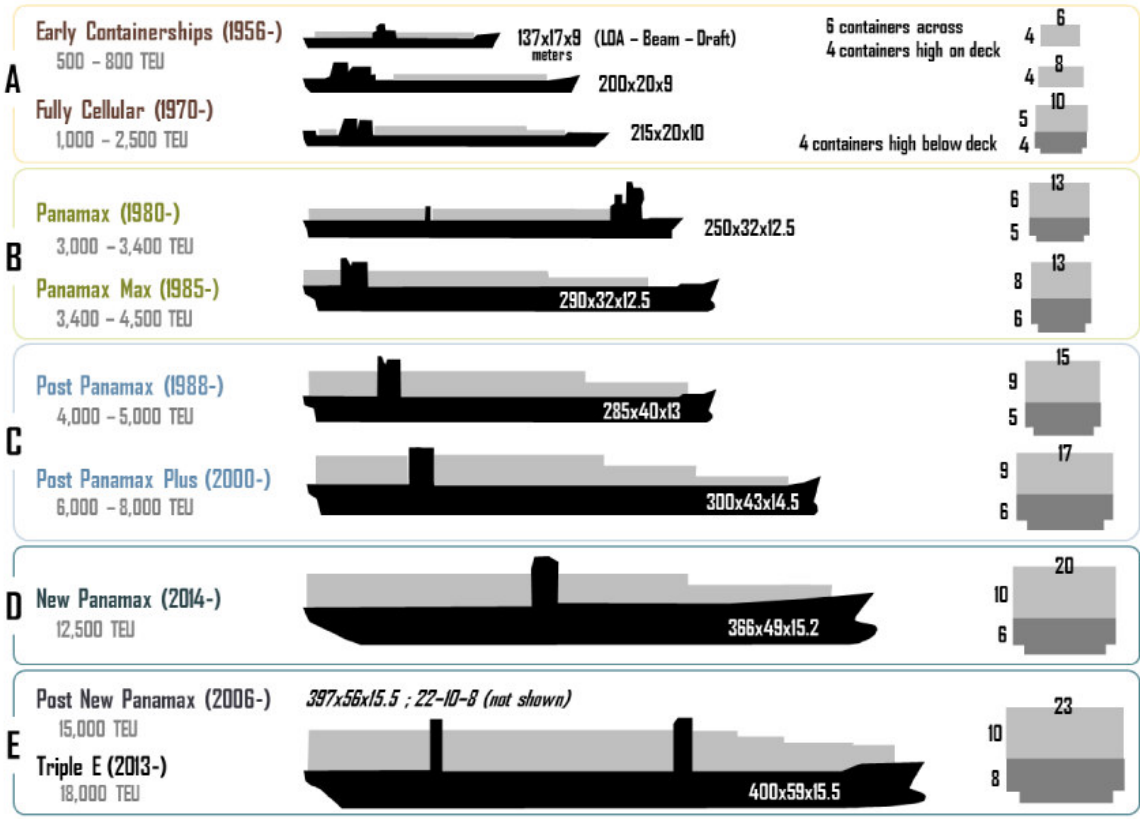
Figure 2-10 Vessel size evolution





The evolution in larger vessels is displayed here below.

Figure 2-11 Vessel size evolution Container Vessels



The new dimensions of ships are illustrated in next table.

Container ships are distinguished into 7 major size categories: small feeder, feeder, feedermax, panamax, post-panamax, new panamax and ultra-large. As of January 2014, there are 265 container ships which are larger than 10,000 TEU.

Figure 2-12 Current Container vessel dimensions

Container vessels	TEU capacity	LOA (m)	BEAM (m)	DRAUGHT (m)
Small Feeder	<1,000	70-160	13-25.5	4-8.4
Feeder	1,000-1,999	146-205	22-32.2	8.3 -11.0
Feedermax	2,000-2,999	189-237	22-32.2	11.5-12
Panamax	3,000-4,999	237-294	32.2	12.4
Post Panamax	5,000-9,999	300 - 366	49	15.2
New Panamax	10,000 – 14,000	336-365	48.7	15.5
Ultra Large Container vessel	14,000 and larger up to 22,000	366-400	49-59	15.2-16

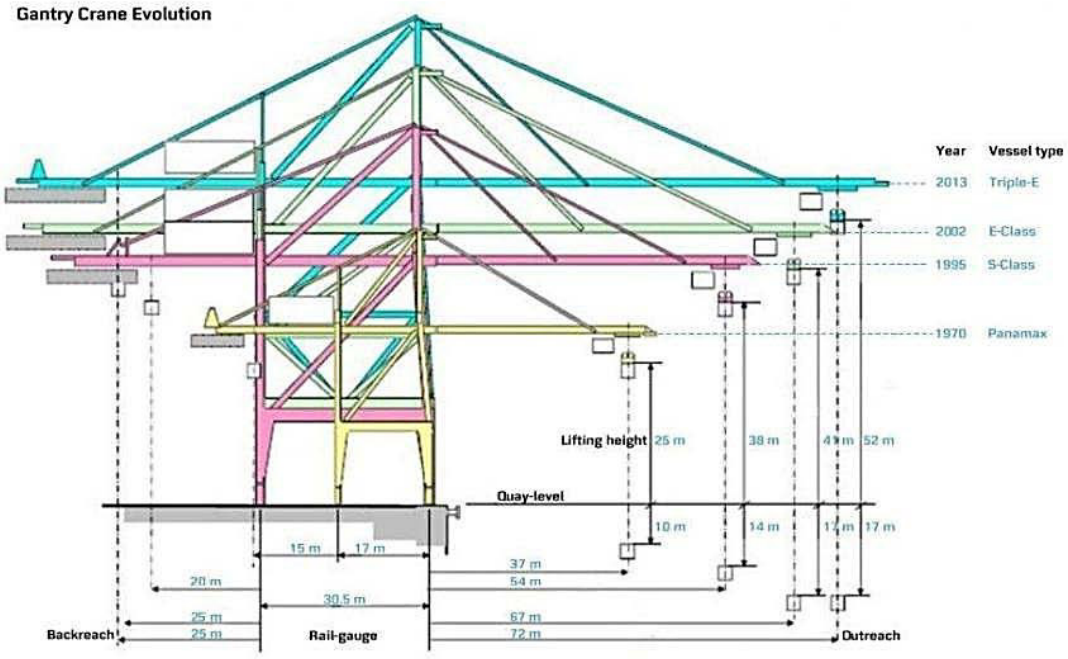
Source: Clarksons / MTBS

Larger vessels also have implications for the port design as larger depths are required and bigger and more cranes are needed to maintain a competitive level of efficiency. Also, the stacking area and the hinterland connections faces new challenges as huge quantities have to be moved in short time frames.

Larger ships have also implications for the type and size of quay cranes. As such the vessel size evolution also generated a ship-to-shore size crane evolution.

The graphic below shows the crane developments over time.

Figure 2-13 Ship to Shore Crane evolution



Years	Typical ship-to-shore Cranes	indicative lift above quay / below	Rail gauge	Indicative Backreach	indicative outreach	containers wide	Typical maximum vessel (in TEU)
1970-	Panamax QC	25/ 10	17.0	0.0	30-40	11-13	3-5,000
1995	Post-panamax QC	38/ 14	30.5	20.0	45-55	17-19	9-11,000
2002	Super-post panamax QC	42/ 17	30.5	25.0	60-70	21-23	13-16,000
2013	Ultra Large Container vessel QC	52/ 17	30.5	25.0	68-72	25	18-20,000

Several ports world-wide upgrade their super-post panama cranes through heightening or enlargements or order new Super or Ultra Large Container Vessel cranes to allow the newest and largest container vessels.

Cascading Effect & Freight Rates

The cascading trend (the newest, largest vessels replace the current vessels on the main trade lanes, the vessels being replaced will in turn replace smaller vessels on other trade lanes), also impacts the Sri Lankan ports. The Indian West coast has seen massive improvements in vessel sizes as more direct trades became feasible due to available ships. The vessel size increased from 3,000 TEU to 4,000 TEU towards 7,000 TEU. In Colombo vessel sizes also increased rapidly. The port accommodates the world largest vessels in South Port up to 22,000 TEU and has noted increased feeder vessel sizes as well.

Moving towards larger vessels goes hand in hand with declining freight rates. As Figure 2-14 shows, the China Container Freight Index and the Shanghai Container Freight Index, indicators of the freight rates charged on the main global Far East – Europe trade lane, have been in decline since 2012, with a particularly strong fall happening in the last year. The decreased revenues for shipping lines accelerates the need for further cost reductions such as through further consolidation.

Figure 2-14 Far East - Europe Container Freight Rates

Source: Alphaliner

The industry has a drive towards cost-efficiency and driven by prolonged financial losses. The shipping industry can be characterised by continuous changes, acquisitions and bankruptcies due to its high competitive environment. A drive towards cost-efficiency has also lead to the formation of several high profile shipping line alliances and, to a lesser extent, acquisitions on the primary Far East – West trade. In essence, it is a cost-sharing mechanism whereby shipping lines are focusing on cutting operating expenses.

The East-West container routes, including the North Europe and the Mediterranean - Far East trades, are dominated by the so-called East-West Alliances. Several years ago, there were more than six alliances including the New World Alliance and the Grand Alliance. Presently there four major alliances left, their carriers are (short names, in alphabetical order), all visualised here below:

- 2M Maersk Line, MSC;
- CKYHE Alliance COSCON, Evergreen, Hanjin, "K" Line, Yang Ming;
- G6 Alliance APL, Hapag-Lloyd, Hyundai, MOL, NYK, OOCL; and,
- Ocean Three China Shipping, CMA CGM, UASC.

Due to recent industry consolidation affecting six of the mentioned sixteen carriers, the alliances are bound to be further re-organised. These developments comprise:

- Merger between China Shipping and COSCON under the new holding China Cosco Shipping Group (CoscoCS), with COSCON as the surviving liner shipping brand;
- CMA CGM taking over APL effective June 2016;
- Hapag-Lloyd and UASC to amalgamate before the end of 2016;
- The bankruptcy of Hanjin by August 31st 2016; and,
- New Japanese container shipping line through a merger between NYK, MOL and "K"-Line by July 2017 named ONE (operational by 2018).

Figure 2-15 – Shipping lines mergers and acquisitions

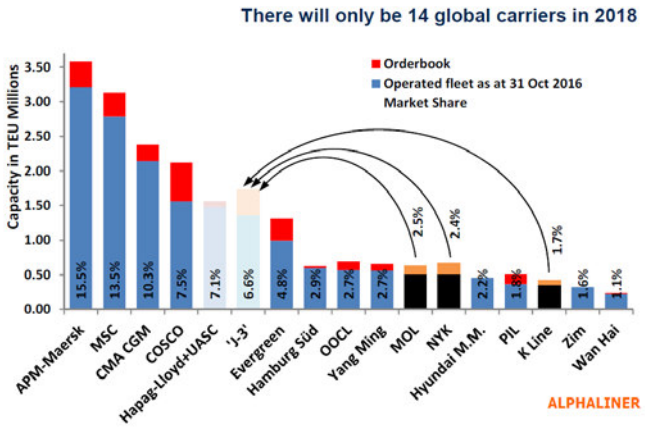


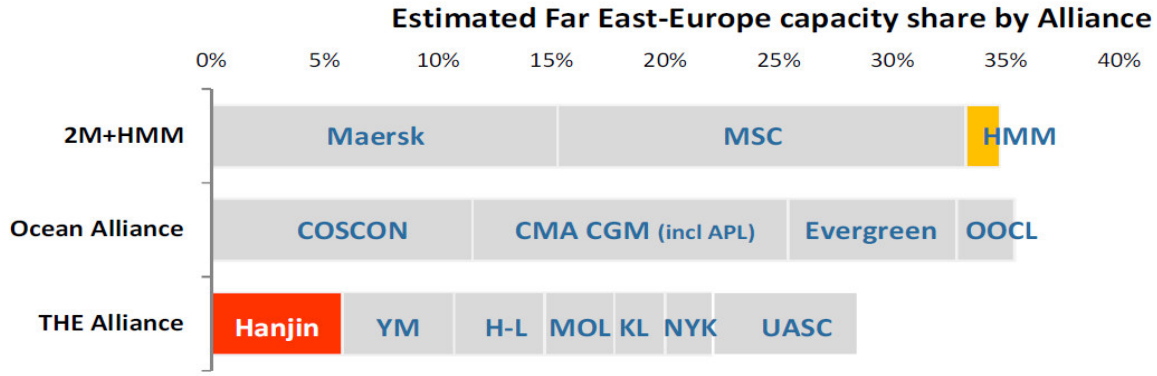
Figure 2-16 lists the recent mergers and acquisitions. In all, the consolidation combines vessel capacities of major liners having in more ships for increased network options. Each of the major alliances has Ultra Large Container Vessels on order, further highlighting the industry-wide movement towards large vessels.

Thus, effective July 2017, the now 10-carrier Alliances scene (instead of 16 in 2014) will look as follows:

- 2M+ Hyundai, Maersk Line, MSC
- Ocean Alliance CMA CGM/APL, COSCON, Evergreen, OOCL
- THE Alliance Hapag-Lloyd/UASC, Hanjin*, Yang Ming and ONE ("K" Line, MOL, NYK)

** Hanjin Shipping went into financial default at 31st of August 2016. Prospective bidders on the assets are rumoured to be Hyundai and Maersk Line.*

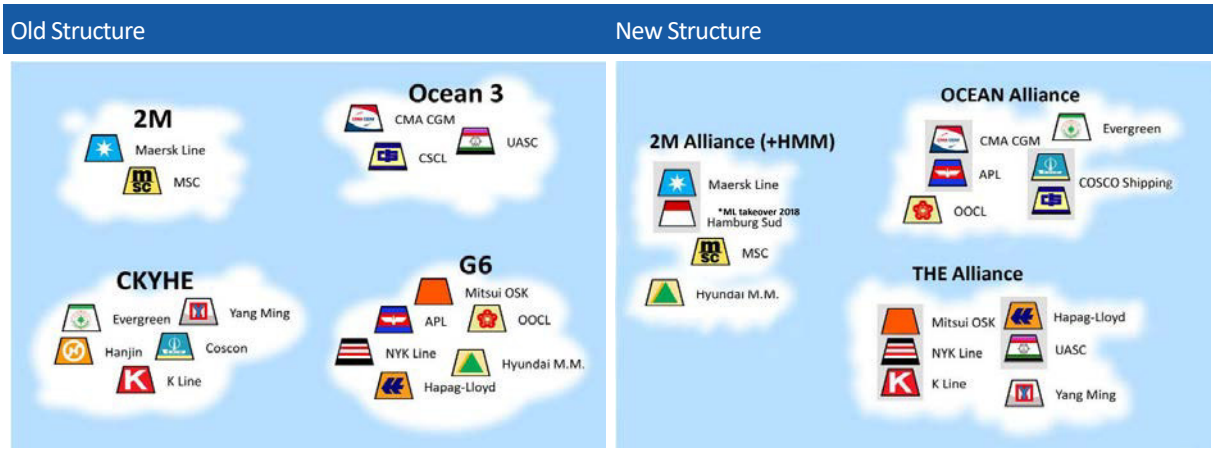
Figure 2-16 - Far East - Europe Capacity Share by Alliance



Source: Alphaliner

The old situation versus the new situation effective from July 2017 is presented in the picture below.

Figure 2-17 Old and New East-West Shipping Alliance Structures



Source: Alphaliner

Next to the 10 Alliance members on the East West trades there still exist four shipping lines outside the alliances namely; Hamburg Süd (acquired by Maersk), PIL, Wan Hai and ZIM.

Finally, there is a stronger relationship between the shipping lines and the global port operators than in the past. Many shipping lines have (through their parent) a tie with a network of terminals. For example, the AP Møller group owns APM Terminals and Maersk Line, CMA CGM owns Terminal Link, and COSCO owns Cosco Pacific as terminal group. Next to these shipping line terminal operators there are independent terminal operators such as for example PSA, DP World, Eurogate and ICTSI.

For Sri Lankan ports the consolidation of shipping lines is important as each alliance like to concentrate its shipping network at selective terminals in order to optimise their network costs.

Reducing turn-around time

Next to the main global trend of attaining economies of scale by increasing vessel sizes, a second major development is the focus on reducing the idle time of vessels. In order to reduce the idle time of vessels, the total turn-around time of the vessel need to be improved. The turn-around time of a vessel depends on three factors:

- Anchorage;
- Towage (in and out of the port);
- Berthing.

By reducing the turn-around time in ports, shipping lines can achieve significant efficiency advantages resulting in a reduction of the number of vessels that is required to provide daily services, as is further explained in the economic due diligence.

2.5.6 Changing port management structures

Globally the trend towards more specialisation of cargo handling, combined with larger vessels, and capital constraints at Port Authorities, have changed the land scape for port authorities to allow more private involvement in cargo operations. The trend supports the general perspective that private companies are better equipped and more efficiently organised. Meanwhile large labour forces in traditional ports have been restructured to address the change towards privatisation.

Generally, speaking this trend has continued since the 1990s and resulted into a move from central led and operated port authorities in a "service port concept" to a "landlord model" in which a split was made between regulation, facilitation of trades and the operational function of cargo handling.

This is illustrated in next graphic.

Port management model	Private Sector	Regulation	Infra	Super-structure	Equipment	Labour	Nautical services
0. Public service port (as is)	Zero	Public	Public	Public	Public	Public	Public
1. Landlord + private terminal	Medium	Public	Public	Private	Private	Private	Public or private

Figure 2-18 Public Service Port and Landlord Port model

The main advantage of landlord models compared to service ports is that the State often has no influence on the day to day operations or regulations. The landlord port authority acts as landowner (mandated by the state) and as regulator through a port act (mandated by the state). Another advantage of landlord models is that private investors can develop and operate specialised terminals under concession contracts. In this way the industry specialists become active in the port and the Port Authority has the ability to own and create the land, set the port regulations and national tariff on marine services and perform the auxiliary functions when they are not outsourced to private sector as well.

Moreover, Government controlled port authorities have moved into corporatisation and even privatisation as well. In the latter, often the Government shareholding is still majority but the Port Authority has become a company under the state companies acts.

Sample of port reform in The Netherlands.
Traditionally port authorities in the Netherlands have been government agencies of the municipal government of the city or town in which the port is located. As part of a wider trend of privatisation, the Dutch national government and local governments have retreated from performing port related activities themselves in the belief that enterprise-based port management would allow for greater flexibility and efficiency through more competition and a better response to consumer's demands. Due to reforms during the last 20 years the landlord port authorities are now public limited companies and no government agencies anymore. Although legal title to the land in the port areas rests with the municipal government,

the port authorities have leased this land in perpetuity for free and may generate revenue through sub-leases and concessions with private parties, such as private port operators. The master lease agreements with the municipal governments therefore allocate the economic ownership of the land to the Port of Rotterdam respectively Port of Amsterdam. Despite the fact that several public service obligations have been delegated to the harbourmaster division of these independent port authorities ('Port of Rotterdam' and 'Port of Amsterdam'), these are highly commercialized entities. The Port of Rotterdam was privatised in 2004 and the Port of Amsterdam was privatised in April 2013.

It should be noted that Singapore is an exceptional case where centralisation prevailed and the Port Authority emerged into a large group of Government controlled entities. However, they too moved into specialisation where the cargo handling is performed by a separate company within the group of Authority controlled companies.

Samples from Port Authority models and reform statements:

Ports	Country	Type of models
Rotterdam	Netherlands	Municipality port as landlord → changed in to commercialised and corporatized entity to **Privatised port authority** (2004) with shares hold by the municipality and the government.
Amsterdam	Netherlands	Municipality port as landlord → changed in 2013 to **Privatised port authority** with shares hold by municipality and the government.
Le Havre	France	Ports in France were for long classified as **Tool port.** This means that since 2008 the port authority and port operator responsibilities have been split. Later they developed HAROPA a common coordination platform between ports (Le Havre, Rouen and Paris).
Singapore	Singapore	Central State Controlled Company established in 1997.
Port Klang	Malaysia	Port Klang was privatised in 1985 when the container terminal was given under 21yr concession contract. Costs of repair, maintenance and administration was reportedly halved and tonnage handled increased by 75% whilst wages also increased by 85%.
Port of Shanghai	China	The port of Shanghai was decentralised in 1994 and container terminals were operated through a JV between HIT Hong Kong and port of Shanghai. Between 1994 and 1997 the terminals output and dockers wages doubled whilst costs were reduced and

		productivity increased by 30%. Average ship time in port was in 1997 around 30% of the average measured in 1994.
Southampton	UK	Controlled by Associated British Ports **(Private port)** Formed in 1983, now controlling 21 ports. Employees got part of the shares. Reportedly the labour productivity increased by 40%. ABP followed the example of Port of Felixstowe (1980s) changing trust ports into private ports.
Lagos	Nigeria	National port authority has **reformed to land lord** allow private concessions to run cargo terminals since 2005. The container terminal at Apapa was the first.
Cape Town	South Africa	The National Port Authority Portnet **reformed itself to a landlord,** creating a national authority and cargo specific entities (1999-2003)
Djibouti	Djibouti	A **management contract** was provided to DP World to run and operate port and terminals under a management agreement. CM Ports took over this management contract in 2012 after which DP World continued with its concession on the Doraleh container terminal.
Sohar	Oman	A new port was developed in JV as "**Port Management Company"** between Port of Rotterdam and the Government according to a landlord port model.

The examples above shows following common type of ownerships for Port Authorities:

Type of ownerships	Description
State ownership	State owns the port authority, often traditional service ports but also modern state controlled companies like Port of Singapore. The state owned company is often controlled by the minister of transport and or minister of ports & shipping.
Autonomous	Public trust ports like applied in the UK were autonomous before they went into privatisation.
Private ownership ports	A private owned port is a limited company acting under the company acts of the country. It has shares and it controlled by the board of directors.

	UK ports were fully privatised during the 1990s, several ports followed the same directions in the next two decades.
Municipality ports	From history many (European) ports were operated under the ownership of the municipality. As the role from ports changed for local interest to national importance, many of these ports either became under national umbrellas (national co-operations) or developed into private ports today.
Port management company	A port management company is often a JV between public and private companies. The advantage is that company can be a JV with the private sector (for capital or for know-how) whilst acting under the central port authority rules.
Port manager	The refers often to a management contract to a knowledgeable entity to run the port or the terminal for a limited period of time to ensure continuity (often during transitional phases)
Hybrid ports	These ports are regarded in transition for service port to landlord port and still have features of a service port whilst allowing private concessions in ports

Source: MTBS and P. Alderton (Port Management and Operations)

The most common port management models are presented in next table.

Figure 2-19 Institutional Port Models

Port management model	Private participation	Regulation	Infra	Superstructure	Equipment	Labour	Nautical services
Public service port	Zero	Public	Public	Public	Public	Public	Public
Tool port	Very low	Public	Public	Public	Public	Private	Public or private
Landlord + Public-private terminal	Medium	Public	Public	Public Private JV	Public Private JV	Public Private JV	Public or private
Landlord port	Medium	Public	Public	Private	Private	Private	Public or private
Landlord + DBFM	High	Public	Public & Private	Private	Private	Private	Public or private
PDMC	Very high	Public	Public Private JV	Private	Private	Private	Private
Private port	Maximum	Public or private	Private	Private	Private	Private	Private

The table illustrates the level of private sector involvement which is small at the top and large in the bottom of the table.

- Public service port model. In this structure the organistion is in one central public controlled entity which performs all functions in the port including cargo handling (shown as equipment in it table). (often port authorities with an British background were structured like this)
- Tool port model. In the tool port private labour is requested to operate with public provided infrastructure and equipment to operate on cargo handlings.
- Landlord port model. In this model the regulation function (public) and the cargo function (private) are often separated through providing concessions to the private sector for operational activities.
- Landlord plus DBFM. The Landlord plus the Design, Build, Finance and Manage. Newly infrastructure is provided under a DBFM concession in which the private entity is involved from design till end of the concession contract and hand over back to the Land Authority.
- Port Development Management Company. This company is normally established in a public – private joint venture.
- Private port. The fully private port is an concept which is used often by industrial sectors wher the port is part of the industry (liquid bulk port for refineries, dry bulk prot for the mining sector etc). For common ports including many different types of commodities the private port is not common due to te strategic importance to the nation.

2.5.7 Digitalisation in the port industry

Digitalisation in the port industry is the upcoming trend. Many ports in the world have implemented either Electronic Data Exchange **(EDI)** for transfer of point to point communication. The FAL convention makes it mandatory by 2018 to implement digital communication between ships and port authorities under the **FAL convention**. Several ports have implemented a **Port Community system** which allows EDI communication in a single window between multiple parties simultaneously and sharing data amongst parties. Samples are Port of Singapore, South Korea, The Netherlands and so on.
The next focus is to increase digitalisation across the supply chain. Port Authorities like Port of Rotterdam develop the "SMART port" concept in with port users are connected through SMART applications on mobiles phones, tablets etc., through the use of **Internet of things**. Related this are the latest developments around **Blockchains.** The latter reflects keeping data on the cargo in a secured chain to which allows full control on status, quality information and payments along the chain.

Additional information on Port Community Systems is displayed in a separate chapter.

2.5.8 Technical changes in the maritime shipping industry

Through conventions of the International Maritime Organisation and SOLAS several important changes are faced by the shipping industry.

1. Ballast water management
2. Emission reduction
3. Verified Weight Measurements

Ballast water management
IMO's Ballast Water Management will come into force in September 2017. This convention enjoys the accession of 52 parties and involvement of 35 percent of the global merchant shipping tonnage. It requires all ships of 400 gross tonnage and above (including all existing vessels except floating platform, FSUs and FPSOs) to possess International Ballast Water Management Certificate (IBWMC). The time consumed in terms of ballasting and deballasting are considered as unproductive times for ships.

Moreover, the installation, cleaning and maintenance of Ballast tanks will cost millions of Dollars per ship. Similar regulations are also mandated in some non-contracting states like US with some discrepancies in approval of BWM equipment. The discrepancies include the range of approved systems (currently more than 60 available types) and the approving authorities.

Emission reduction
IMO's regulation for reduction of air pollution (including SOx, NOx, Particulate Matter, and Green House Gases) is another influential trend that has the potential to develop restrictions and incur huge costs in the industry level. These regulations are
mainly derived from chapter IV and Annex VI of MARPOL convention, and include:

- Reduction of SOx, and Particulate Matter in Ship Emissions- Reduction of SOx, and Particulate Matter are seen as harmful components in ship emissions and IMO is targeting their reduction in the industry. The trend can have significant influences on the maritime fuel production, bunkering, shipbuilding, and most importantly the freight industry. There are two general approaches in the industry: lowering the sulphur content in the maritime fuels or using exhaust scrubbers to clean the gas emissions from the ship. According to IMO announcement in MEPC70 (Oct.2016) the 0.5% Sulphur cap in the marine fuels will take effect from 2020. This implies a necessary shift in the marine fuel supply from Heavy Fuel Oils to Marine Gas Oil.
- Reduction of NOx in Ship Emissions- by increase of MGO, reduction of NOx emissions from ships will find more significance. The NOx emission control is based on a 3-tiers scheme that establishes the NOx emission limits in ships based on the date of the engine design. Tier I and Tier II limits are global, while the Tier III standards apply only in NOx Emission Control Areas.
- Green House Gas (GHG) Emission Abatement – The 'Comprehensive IMO Strategy on Reduction of GHG Emissions from Ships' is being developed between 2017 and 2022 and the needed GHG reduction requirements will be concluded for entering into force from 2023. The results will entail several capital-intensive modifications and/ or utilization of technologies in the ships. Also consult the annex Appendix XI

Verified Weight measurements
The International Maritime Organization (IMO) has amended the SOLAS (Safety of Life at Sea) convention under regulation 2 of chapter VI which mandates the declaration of the Verified Gross Mass (VGM) of a packed container before loading on board vessels within a prescribed cut-off date / time to the shipping line and / or port terminal authorities. Effective 1st July 2016, the regulation stipulates the use of two approved methods to declare the VGM for each container by the shipper or his representative. The first is through weighing the box including content or alternatively the content is weighed and the tare of the container is added. This regulation has increased the demand for weighing points in the port and terminals.

Aside from the technologies that serve the regulatory compliance purposes, the industry is also the scene of technological developments towards enhancements in the industry's productivity. These developments are seen as the hopes of the industry to overcome the myriads of issues and challenges that are troubling her businesses. The Smart Ship concept is one of the prominent instances of such technological development.

2.5.9 International Port Competition

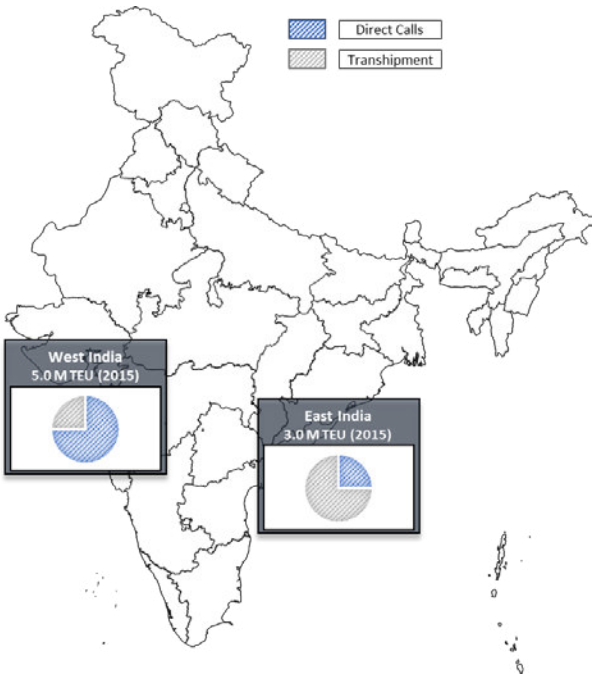
Sri Lanka is an important regional maritime hub, due to its strategic position near the East-West trade routes. Currently, Sri Lanka – through the port of Colombo – mainly serves as a hub for cargo destined for other nations in the Indian Sub-Continent. However, several recent and planned developments put pressure on Sri Lanka as a maritime hub. The table below provides an overview of Sri Lanka's key strengths, weaknesses, opportunities, and threats concerning its competitiveness as a maritime hub.

Strengths	Weaknesses
• Geographically strategic situation near the main East – West trade routes • Strategically situated to serve countries in the Indian Sub-Continent • Substantial water depths near the coastline • Transhipment tariffs at Colombo are competitive compared to other regional hub ports	• Broad maritime sector and related services are less developed than competitors, such Singapore
Opportunities	**Threats**
• Rapid growth of demand in Indian Sub-Continent countries • FDI on maritime silk route • Consolidation point for draft limited ports in Bay of Bengal • Attract new industries through FDI	• Development of deep-water ports in India and Bangladesh • Development of transhipment hubs in South East Asia and the Middle East • Improvement of Maritime Policies in India

The three identified threats are further discussed below.

Development of Ports in India and Bangladesh

India and Bangladesh are Sri Lanka's main transhipment destinations, as their ports traditionally have not been able to accommodate mainline vessels due to lagging port infrastructure. However, ports in India and Bangladesh are slowly being developed, posing a threat to Sri Lanka's position as regional hub.



In 2015, total containerized throughput in Indian ports amounted to approximately 8.0 M TEU, of which 5.0 M TEU was handled at Western Indian ports.

With the development of Jawaharlal Nehru Port (JNP; also known as Nhava Sheva), which handled approximately 4.5 M TEU in 2014-2015, and the second largest port, Mundra (1.75 M TEU), the dependence of Western Indian states on transhipment has substantially declined. Consequently, the share of transhipped containers handled at Western Indian ports dwindled to 25% in 2015.

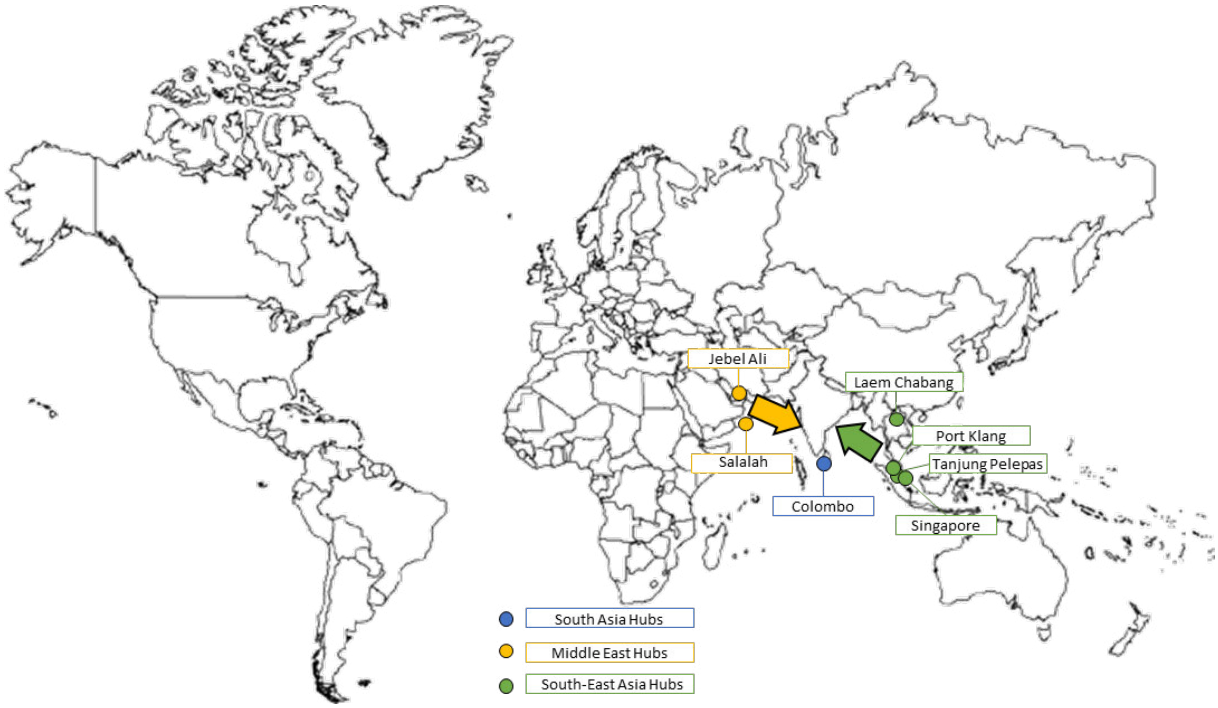
Currently, East India and Bangladesh are still dependent on transhipment, as adequate deep-water port infrastructure is lacking. However, with several port projects planned in India and Bangladesh, transhipment potential for the Indian Sub-Continent may further deteriorate. Inter alia, the following Greenfield deep-water port projects have been identified:

- India
  - Colachel / Enayam port
  - Vizhinjam port
- Bangladesh
  - Sonadia port
  - Payra port

Development of Regional Transhipment Hubs

Sri Lanka's competitive field for serving the Indian Sub-Continent has developed substantially over the last decade. The figure below provides an overview of Sri Lanka's competitive field; the following can be observed:

- Broadly speaking, there are 3 hub port groups in the region; the Middle East hub group, consisting of Jebel Ali and Salalah; the South Asia hub group, consisting of Colombo; and the South-East Asia hub group, consisting of Singapore, Tanjung Pelepas, Port Klang, and Laem Chabang.
- Due to the strong development of the Middle Eastern hub ports, Sri Lanka's market share for transhipment to Western Indian ports has declined.
- For East India's market share, Sri Lanka mainly competes with Southeast Asian ports, such as Singapore, Tanjung Pelepas, and Laem Chabang. Currently, Sri Lanka is the most dominant player for serving the East Indian market. However, several large-scale development plans, such as Singapore's new Tuas Terminal project, may put further pressure on Sri Lanka's status as a regional hub.



The table below presents the throughputs of the hub ports depicted above, as well as the ports' compound annual growth rates for the period from 2011 to 2015.

Table 2-7 Competitive Container Hub Ports

Port	Unit	2011	2012	2013	2014	2015	CAGR (%)
Middle East hub ports							
Jebel Ali	M TEU	13.0	13.3	13.6	15.3	15.6	4.66%
Salalah	M TEU	3.1	3.6	3.3	3.0	2.6	(4.30%)
Khalifa	M TEU	-	0.8	0.9	1.1	1.5	n/a
South Asia Hubs							
Colombo	M TEU	4.3	4.2	4.3	4.9	5.2	4.87%

Port	Unit	2011	2012	2013	2014	2015	CAGR (%)
South East Asia Hubs							
Singapore	M TEU	29.9	31.6	32.2	33.9	31.0	0.91%
Port Klang	M TEU	9.6	10.0	10.4	11.0	11.9	5.52%
Tanjung Pelepas	M TEU	7.5	7.5	7.4	8.2	9.1	4.95%
Laem Chabang	M TEU	5.7	5.9	6.0	6.6	6.8	4.51%

Subsequently, the table below presents several identified expansion plans for Colombo's current competing hub ports, as well as plans for Greenfield ports aimed at handling transhipment cargoes to Colombo's main feeder markets. In the South Asia Hub Ports, besides Hambantota, 11.4 M TEU capacity shall be added. In the South East Asia Hubs around 38.5 M TEU is expected to be added (of which Singapore adds 30 M TEU capacity). Finally, the Middle East Hub Ports plan to add 12.5 M TEU of capacity.

Table 2-8 Competitive Container Hub Port Development Plans

Port	Unit	Current Capacity	Future Capacity	Capacity Increase
Middle East Hub Ports				
Jebel Ali	M TEU	19.0	22.1	3.1
Salalah	M TEU	5.0	7.5	2.5
Khalifa	M TEU	2.5	15.0	12.5
South Asia Hub Ports				
Vizhinjam	M TEU	-	3.4	3.4
Colachel	M TEU	-	8.0	8.0
South East Asia Hubs				
Singapore	M TEU	35.0	65.0	30.0
Port Klang	M TEU	16.6	18.6	2.0
Tanjung Pelepas	M TEU	10.5	17.0	6.5

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3 Sri Lankan Ports and Their functions

3.1 Introduction

This chapter introduces the Sri Lankan Ports and their functions. For each main port the following information is described:

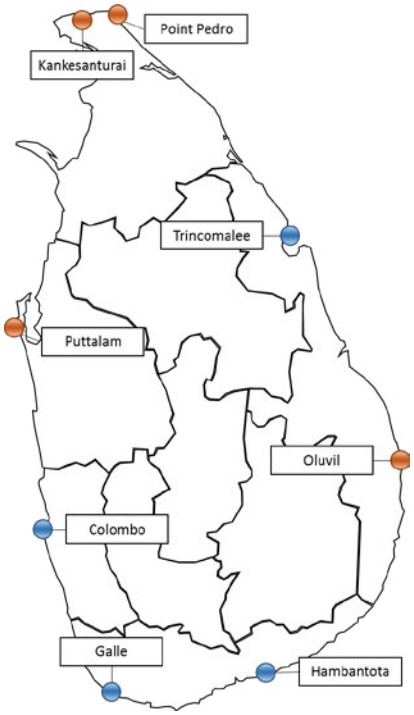
- Port layout and functions
- Hinterland connectivity
- Marine Traffic
- Cargo traffic
- Container terminals
- Dry Bulk handling
- Liquid bulk handling and
- General Cargo handling / RoRo Handling

For smaller ports like Kankesanthurai and Oluvil only basic information is displayed.

The main ports are Port of Colombo in the west, Port of Trincomalee in the east and Hambantota in the south.

The following approach has been used for this chapter:

- Paragraph 3.2 provides the sector overview
- Paragraph 3.3 details the Port of Colombo
- Paragraph 3.4 shows Port of Trincomalee
- Paragraph 3.5 details the port of Hambantota
- Paragraph 3.6 provides information on the port of Galle
- Paragraph 3.7 provides information on the port of Kankesanthurai (KKS)
- Paragraph 3.8 provides information on the port of Oluvil
- Paragraph 3.9 provides information on the Puttalam Coal Jetty



3.2 Port Sector Overview

Sri Lanka's port sector comprises several ports around the island, including Colombo Port, Galle Port, Trincomalee Port, Hambantota Port, Oluvil Harbour, Puttalam Jetty, Point Pedro Port and Kankesanthurai Harbour.

The country's three largest ports (shown in the figure on the right) are:

- Colombo Port, situated on the West coast of Sri Lanka;
- Hambantota Port, situated on the South coast of Sri Lanka; and
- Trincomalee Port, situated on the East coast of Sri Lanka.

The country's other ports[9] include:

- Galle Port, situated on the South-West coast of Sri Lanka;

[9] Fishery ports in Sri Lanka comes under the Ministry of Fisheries & Aquatic Resources and do not fall under SLPA, hence they are not mentioned here.

- Puttalam Coal jetty, a small port on the West coast;
- Kankesanthurai (KKS) and Point Pedro on the Northern coast; and
- Oluvil on the East coast.

These ports are further elaborated in the sections below.

The Sri Lanka Ports Authority (SLPA) acts as the national port authority and has a hybrid role in the country's port sector. The SLPA simultaneously fulfils the following 6 roles:

7. Landlord – The SLPA has conceded several terminals in Colombo port under a landlord PPP structure.
8. Service Port – The SLPA provides port services, such as warehousing, support services, and administration.
9. Cargo handler – SLPA is cargo handler or stevedore and owns and operates container terminals and multi-purpose or common terminals in the ports of Sri Lanka.
10. Regulator – As regulator, the SLPA provides licensing services and sets the regulations for the ports.
11. Harbourmaster and marine service provider in all Sri Lankan ports
12. Port planner and port developer – SLPA plans, constructs and develops ports in Sri Lanka

The table below shows the current usage in Sri Lankan ports with respect to cargo- and passenger handlings.

Table 3-1: Functional Overview Ports Current usage

Port	Container Transhipment	Containers	RoRo	Break Bulk / General Cargo	Dry Bulk	Liquid Bulk	Passengers
Colombo	X	X	X	X	X	X	X
Trincomalee				X	X	X	X
Hambantota			X	X		X	X
Galle				X	X	X	X
KKS				X			
Oluvil				X			
Puttalam					X		

In terms of port throughputs on gateway cargoes, Colombo Port is the most important port with 77% of all cargoes handled.
Including transhipment, the Port of Colombo has a total market share of 88% within Sri Lanka.

Table 3-2: Port Gateway Throughput (Tons)

Port	Gateway Container	Coal	Wheat Maze	Cement / Clinker / Fertilisers	Crude Oils	Refined Oils	Other Liquid	Vehicles*	General Cargo	Total Per Port	*Share of Total*
Colombo	14.20	-	.19	2.19	.31	1.69	2.87	.19	.05	.71	**22.39**	*77.7%*
Trincomalee	-	.10	.87	2.24	-	-	.28	-	-	-	**3.49**	*12.1%*
Hambantota	-	-					.03			.33	**.35**	*1.2%*

Port	Gateway Container	Coal	Wheat Maze	Cement / Clinker / Fertilisers	Crude Oils	Refined Oils	Other Liquid	Vehicles*	General Cargo	Total Per Port	*Share of Total*
Galle	-	-	-	.77	-	-	-	-	-	**.77**	*2.7%*
KKS	-	-	-	-	-	-	-	-	.03	**.03**	*0.1%*
Oluvil	-	-	-	-	-	-	-	-	-	**-**	-
Puttalam	-	1.79	-	-	-	-	-	-	-	**1.79**	*6.2%*
Total Per Commodity	**14.20**	**1.89**	**1.06**	**5.20**	**.31**	**1.69**	**3.17**	**.19**	**.05**	**1.06**	**28.83**	*100.0%*
Share of Total	*49.3%*	*6.6%*	*3.7%*	*18.0%*	*1.1%*	*6.0%*	*11.0%*	*0.7%*	*0.2%*	*4.7%*	*100.0%*	

*Transhipment of containers and vehicles are not considered in the total port throughput.
Source: SLPA

The number of vessels at the port of Colombo is 88% of all vessel arrivals in Sri Lanka. These vessels are dominantly commercial traded vessels handled by the cargo terminals. The ship repair segment only handled 50 vessels in 2016 or 1%. The total number of ships that took bunkers is around 35. The table illustrates that ship repair and bunkering are today relatively small markets.

Table 3-3: Ship Arrivals 2016

Port	Cargo Ships	Ships for Repair	Ships-bunkering	Other Ships	Total Arrivals
Colombo	4,280	46	29	50	**4,405**
Trincomalee	207	1	4	4	**216**
Hambantota	273	1	-	7	**281**
Galle	83	2	2	9	**96**
KKS	25	-	-	-	**25**
Oluvil*					
Puttalam*					
Total Arrivals	**4,868**	**50**	**35**	**70**	**5,023**

Source: SLPA
*No data available