# Session 7

# Risk Management for Port Management

# PORT DEVELOPMENT AND COMPETITIVENESS

## Session 7

***Risk Management for Port Management***

Speaker: Mr *Fong Kum Hor*



## Lesson 7: Outline

- Changing Government policies.
- Changing competitive environment
  - Re-organisation in the Shipping industry.
  - Development and changes in traditional markets.
  - Growth of new markets.
  - Immerging threats from new ports.
- Method to mitigate risks.

CDAS

## Changing Government policies

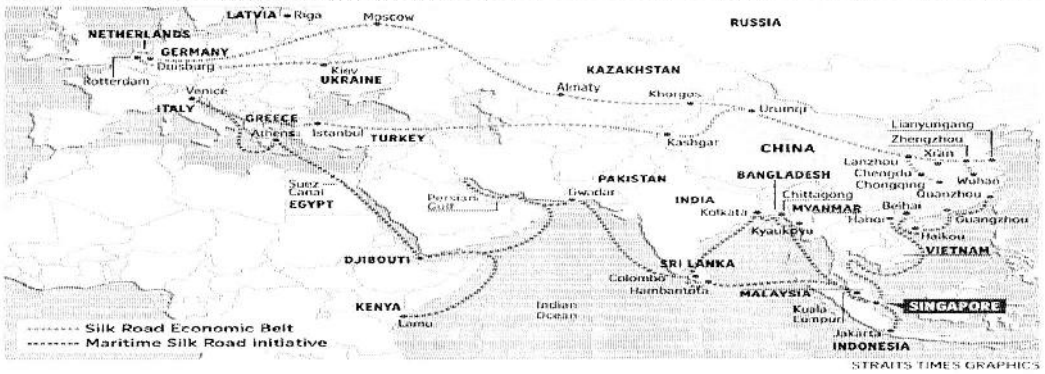
- Vision of maritime economy and the overall economy strategy
- Commitment to the different government agencies cooperate to develop maritime economy to achieve the Global Connectivity
- Land use priority of existing city port converting to vision of downtown waterfront city for residential, commercial and leisure of a cosmopolitan liveable global city
- Decant of the city container terminals while shoring up new port terminals to the west with 35 mteu annual capacity
- Focus on port, logistics, supply chain towards global connectivity
- Vision of the 2030 Singapore and the NGP
- Initiating and leading the Industry Transformation Map (ITM) to stay relevant and creating jobs of the future
- Responding to Market change in Shipping Alliances
  5 Alliances (Grand Alliance, NWA, Green Alliance, 2 M, Ocean 3 Alliance)
  3 Alliances ( The Alliance, Ocean Alliance, 2 M + HMM)

CDAS

## Changing Regional Environment

- The regional TIM port development challenges in Malaysia's Carey Island 10,000 ha mega port with 30 mteu capacity.
  Malacca mega port city infrastructure development and foreign fund investment
- The Indonesia New Priok Kalibaru port with 12 mteu capacity
- The Thailand Kra Canal port zone developments
- Sri Lanka Hambantota deep sea regional hub
- China's OROB & BRI connecting the world silk road and maritime route through Asia and Africa with infrastructure development promoting global trade

## China's One Belt, One Road




The emerging risks in port development are therefore closely linked with the changing industry, market and competitive ports environment. Mitigating such risks dictate that a research based Port Master Plan and Strategy Plan be developed

CDAS

## What is a port masterplan?

The main purposes of a port masterplan are to:

- Clarify a port strategic plan to allow port management to plan for the medium and long term
- Assist local/regional planning and transport network providers in preparing their own development strategies to support port development
- Inform port users, employees and local communities how they can expect the port to develop over the coming years

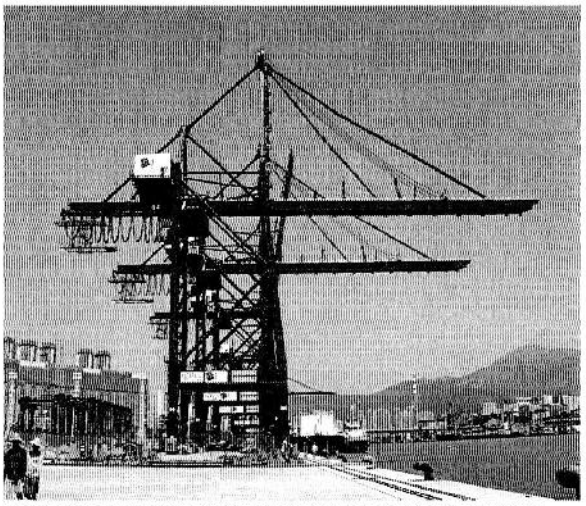
Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9 10 Sept 2014

CDAS

## Levels of masterplanning

Masterplanning can be carried out at a number of strategic levels:

- Multinational level (e.g. Baltic Alliance, Dover/Calais)
- Regional level (e.g. National Government strategic planning or local area planning)
- Individual port or terminal planning



Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9-10 Sept 2014

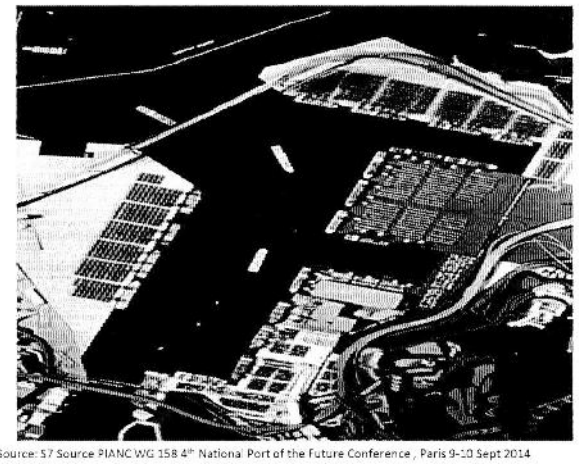
Page 7

CDAS

## Timeframe for masterplanning

Port planning can also cover different issues and encompass different periods of time:

| Period of time | Infrastructure |
|---|---|
| 1-5 years | **Project Planning**<br>Business planning Port zoning<br>Short term development |
| 5-10 years | **Strategic Planning**<br>Investment planning Medium term development |
| 20-30 years | **Master Planning**<br>Long term development |



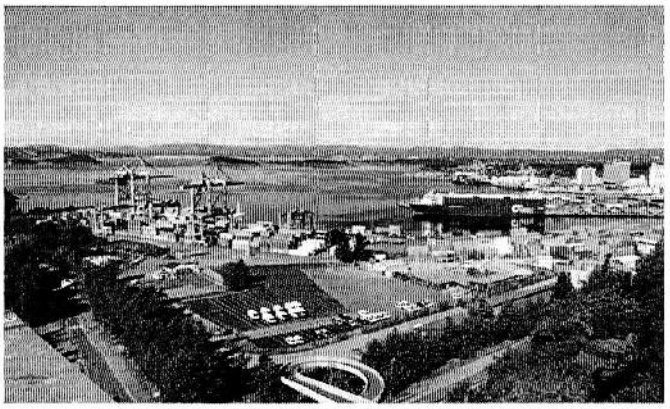
Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9-10 Sept 2014

Page 8

## The Strategic Plan

The Strategic Plan is a document that includes:

- Mission and vision statements
- Values and behavioural standards
- Analysis of business and environmental factors
- Strategic objectives
- Lines of action and forward responsibilities.



Source: S7 Source PIANC WG 158 4th National Port of the Future Conference, Paris 9-10 Sept 2014

Strategic planning establishes guidelines for port competitiveness and normally has a time frame of 5 - 10 years.



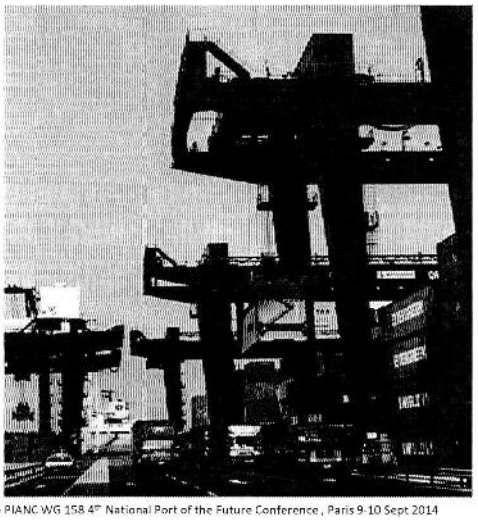


## The Masterplan

The masterplan is a document which describes how a port must grow and adapt in accordance with the evolution of future demand, changes in transport technologies and other factors.

- Short term planning could lead to solutions that make further development impossible.
- This long-term planning should not only define requirements for overall port development but also its integration into the environment and transport networks.

Masterplanning is long-term planning, ideally over a 20 to 30+ year timeframe.



Source: S7 Source PIANC WG 158 4th National Port of the Future Conference, Paris 9-10 Sept 2014

## Guiding principles for port masterplanning

- Flexible: Port layouts should be flexible enough to incorporate significant changes into the forecasted scenarios. A certain degree of ambiguity is advisable in port zoning.
- Future proof: Masterplanning should allow some future proofing of the critical parameters that typically produce the (early) obsolescence of infrastructure:
  - Water depths at the quaywalls
  - Landside operational and storage areas
  - Hinterland connections
- Phasing: The port must be able to develop in logical phases.

Development in phases enables flexibility for the progressive adaptation of the port to meet future demands.

Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9-10 Sept 2014





## Challenges for existing ports

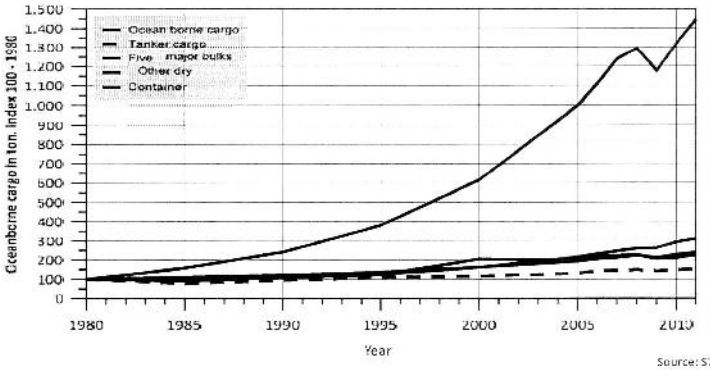
Many ports are encountering difficulties in achieving their main objective as a port, to efficiently meet service demand.

- Traffic may have grown rapidly, often exceeding port capacity.
- The size of vessels has increased and some port facilities may no longer be able to serve them, so miss out on vessel calls.
- Port productivity may be poor due to the inefficiency of management or operational systems.
- Cargo handing equipment may no longer be appropriate for current handling requirements.
- Stacking yards may not be able to grow at the same pace as vessel berth productivity since the existing port limits prevents the expansion of terminals.
- Inland transport connections may be inadequate or congested.

Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9-10 Sept 2014

## Changing cargo types

Growth in international seaborne container trade 1980 – 2011
(indexed to 1980 = 100)




Source: S7 Source PIANC WG 158 4th National Port of the Future Conference, Paris 9-10 Sept 2014

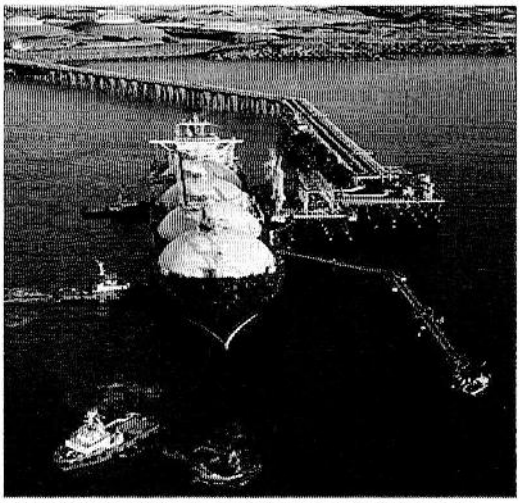




## Changing vessel technology

Vessels have evolved in three main areas:

- Growth in size
- Increasing specialization
- Environmental impact reduction

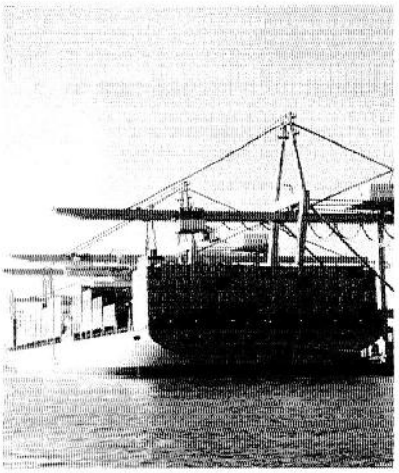



Source: S7 Source PIANC WG 158 4th National Port of the Future Conference, Paris 9-10 Sept 2014

CDAS

# Growth in container vessel size (1994 – 2014)

| | TEU DWT | LOA (m) | Beam (m) | Draft (m) | Cont. across |
|---|---|---|---|---|---|
| CSCL 18400 CLASS 2014 | 18.400 TEU 205.000 | 400 | 58,6 | 16,0 | 23 |
| Maersk McKinney Moller 2013 | 18.270 TEU 196.000 | 399 | 59,0 | 15,5 | 23 |
| CMA CGM Marco Polo 2012 | 16.020 TEU 187.626 | 395 | 53,6 | 16,0 | 21 |
| Emma Maersk 2006 | 12.508 TEU 156.907 | 398 | 56,4 | 16.0 | 22 |
| Gudrum Maersk 2005 | 9.500 TEU 115.700 | 367 | 42,8 | 15,0 | 17 |
| Sovereign Maersk 1997 | 7.226 TEU 104.696 | 347 | 42,9 | 14,5 | 17 |
| Regina Maersk 1996 | 6.418 TEU 84.900 | 318 | 42,9 | 14,0 | 17 |
| NYK Altair 1994 | 4243 TEU 68.179 | 300 | 37,1 | 13,0 | 15 |

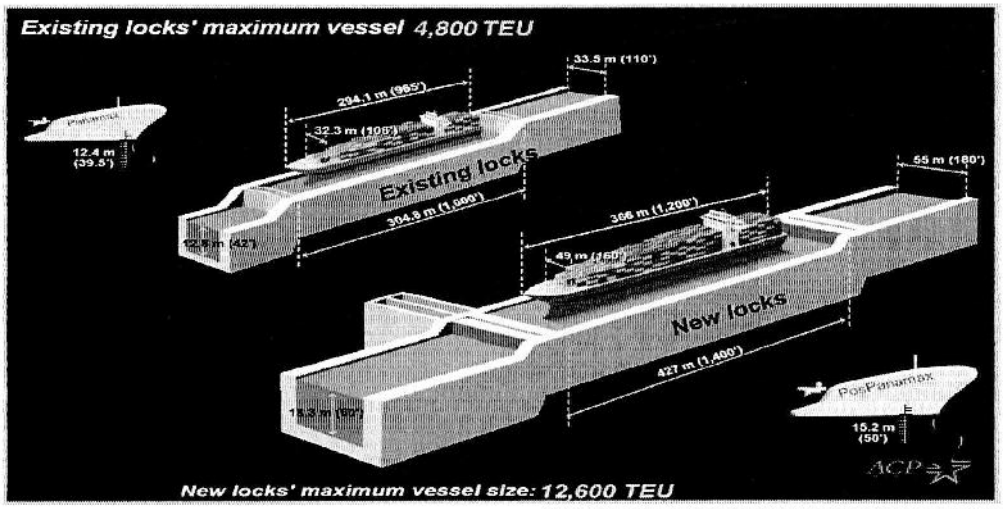


Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9-10 Sept 2014

Page 15

CDAS

# Marine infrastructure – Panama locks

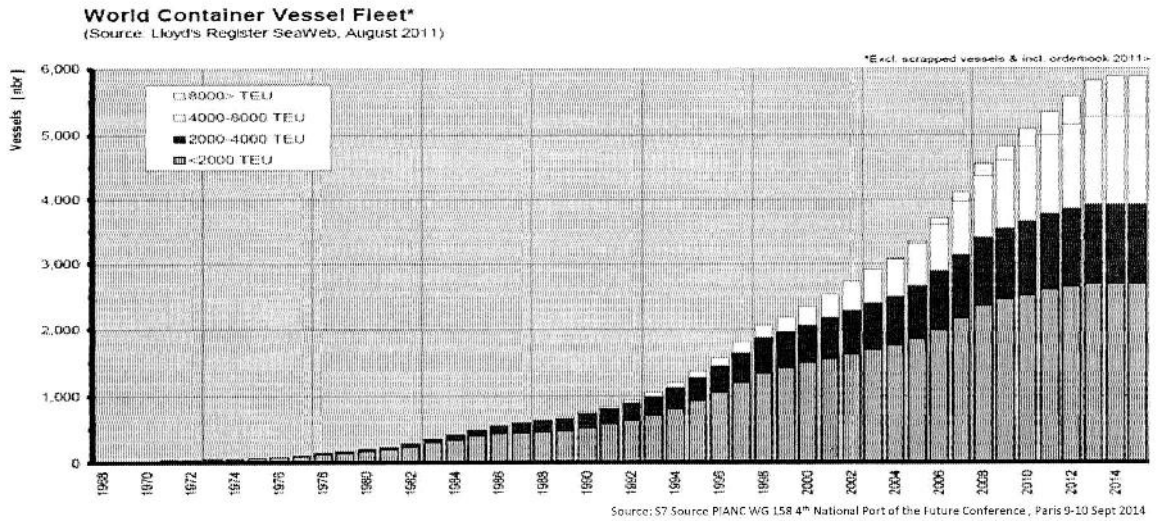



Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9-10 Sept 2014

Page 16

CDAS

## World Container Fleet




Source: S7 Source PIANC WG 158 4th National Port of the Future Conference, Paris 9-10 Sept 2014



CDAS

## Impacts on port planning

Deeper drafts:

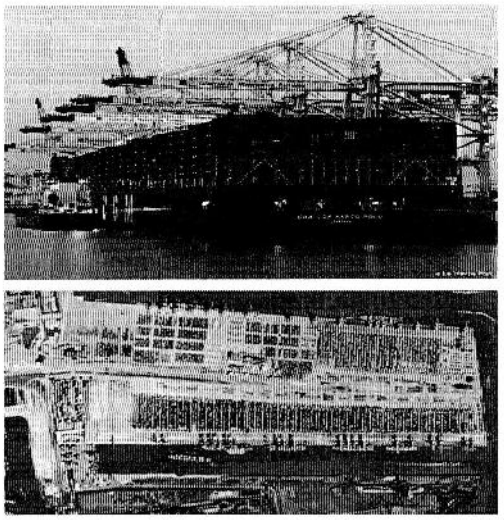
- Deeper & wider approach channels
- Deeper berths & port basins
- Larger quantities of dredging

Longer vessels:

- Greater number of containers to be handled per vessel
- Longer berths
- Larger terminal areas

Larger quay cranes:

- Longer outreach and taller air clearance
- Twin/triple/quadruple lift
- Increase in load on quay structures



Source: S7 Source PIANC WG 158 4th National Port of the Future Conference, Paris 9-10 Sept 2014

## Preparation of a port masterplan

Issues to be addressed:

- Traffic forecasting – to define future requirements
- Review of existing port facilities and operations – to assess potential capacity and available reserve
- Terminal planning and KPIs – to cater for future growth
- Hinterland links – to ensure effective operation of the port
- Project evaluation and optimisation – to determine the best way forward
- Environment and "Green Ports" issues
- Management and manpower
- Finance and implementation

Source: S7 Source PIANC WG 158 4th National Port of the Future Conference, Paris 9-10 Sept 2014



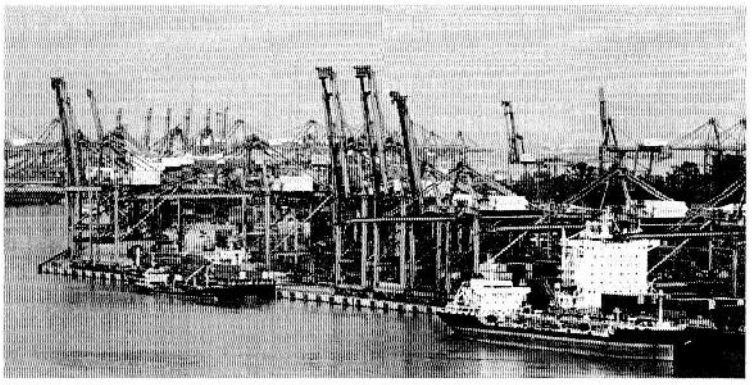


## Preparation of traffic forecasts

To identify the types and volumes of cargoes expected through the port and enable define the timeframe for infrastructure development and investment.

Traffic forecasting should address:

- National & regional economy
- Macro-economic studies
- Commodity/sector studies
- Foreign/ domestic trade
- Transhipment/transit trades
- Competing ports and trading ports
- Cargo handling developments
- Trends in vessel sizes
- Traffic toward the hinterland

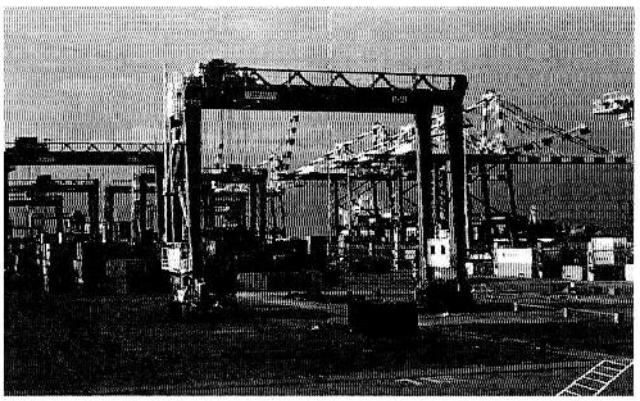


Source: S7 Source PIANC WG 158 4th National Port of the Future Conference, Paris 9-10 Sept 2014

## Capacity and productivity assessment

Capacity and productivity assessment of existing port infrastructure and operations:

- Review of existing port facilities and infrastructure
- Operational Analysis
- Performance and Productivity
- Handling Rates
- Throughput and capacity
- Logistic chains and value added services
- Ports and Inland Transport links



This will enable the existing port capacity and any potential for operational efficiencies to be identified.

Source: S7 Source PIANC WG 158 4th National Port of the Future Conference, Paris 9-10 Sept 2014





## Container terminal planning and KPIs

Container flow through a terminal may be monitored at three main interface points

- across the quay,
- through the storage area
- through the gate.

Key Performance Indicators (KPIs) can be used to benchmark performance and determine the future potential capacity of a container terminal

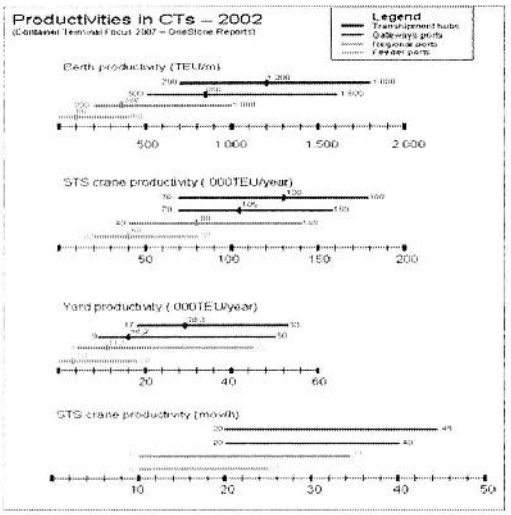
Source: S7 Source PIANC WG 158 4th National Port of the Future Conference, Paris 9-10 Sept 2014

CDAS

## KPIs and Capacity

Terminal capacity can be assessed using KPIs and will depend on:

- the length of quay available
- the size of ships that can be handled together with the draft available
- the number of cranes available for container transfer
- the type of equipment in use
- container stacking height
- how frequently containers are moved through the yard, i.e. dwell time




Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9-10 Sept 2014

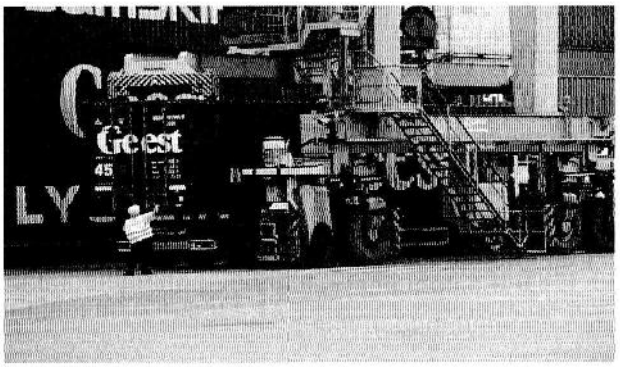


CDAS

## Project optimisation and evaluation

Project optimisation and evaluation must consider:

- Life cycle analysis
- Traffic and operational modelling
- Cost/benefit analysis
- Risk/sensitivity analyses
- Phasing and implementation strategy
- Management strategy
- Organisational structure
- Manpower development plans
- Funding and finance

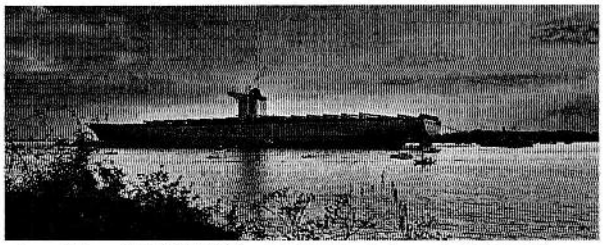



Port masterplanning needs to address not only the physical development of the port, but also the future management, operations and manpower strategies and funding sources.

Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9-10 Sept 2014

## Green ports

- **Green Ports**
- The inclusion of green thinking in the port masterplanning process is fundamental to modern port management.
- Greater stakeholder 'partnerships', stronger consideration of green design initiatives and early consideration of environmental values at and around individual ports, is central to port development.
- Ultimately, more efficient and sustainable use of resources, resulting in greater port productivity and overall cost savings should the key drivers to a green approach to masterplanning.

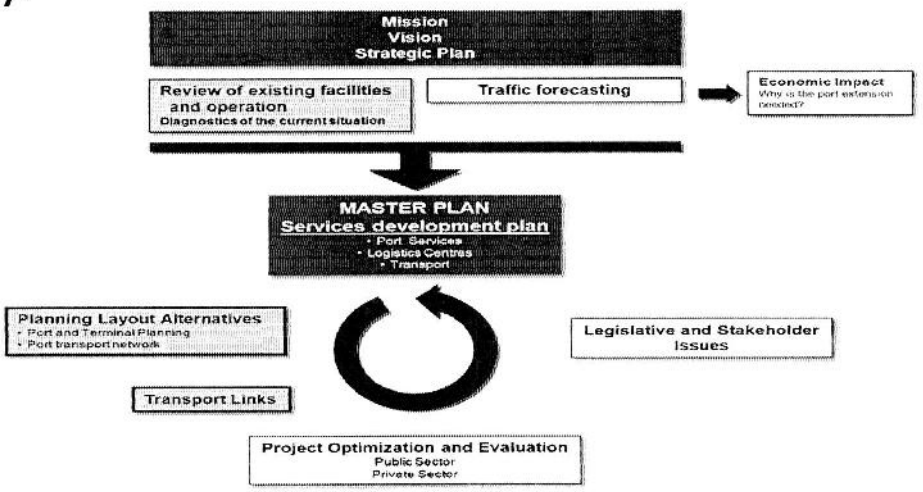


Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9-10 Sept 2014





## In summary:




Source: S7 Source PIANC WG 158 4th National Port of the Future Conference , Paris 9-10 Sept 2014

# Question?