Port Services Performance Measurement: Learning from exercises in North America & Europe

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PortEconomics

Port Performance: International efforts are not new (40+ years old)

Indicator	*Units*
Arrival late	Ships/day
Waiting time	Hours/ship
Service time	Hours/ship
Turn-round time	Hours/ship
Tonnage per ship	Tons/ship
Fraction of time berthed ships worked	–
Number of gangs employed per ship per shift	Gangs
Tons per ship-hour in port	Tons/hour
Tons per ship hour at berth	Tons/hour
Tons per gang-hour	Tons/gang-hour
Fraction of time gangs idle	–

Source: UNCTAD, 1976

The ‘efficiency’ component was dominant in early 2000s

Port Performance measurement was (commonly) based on pure **operational** features & **administrative** & **financial parameters**

CONTAINER OPERATIONS
20' TEU as a % of Total TEU for year Average revenue per TEU Average vessel turnaround time per 100 lifts (in hours) Average yard dwell time in hours
Container port throughput (TEU/meter of quay/year) Departure cut-off time (hours) Growth in TEU throughput Import containers as a % of total containers
Lifts per crane hour Percent of containers grounded (ship to rail operations only) Reliability Transhipment (as % of total throughput) Yard hectares to quay meters
VESSEL OPERATIONS
Average turnaround time per vessel Average vessel calls per week Average vessel waiting time at anchor Berth utilization %
Hours of equipment downtime per month Length of quay in meters (as a capacity measure) Revenue per tonne handled

Source: Brooks and Pallis (2008)

The shifting interest: Port performance beyond productivity

Port of New York & New Jersey
Council On Port Performance
A Collaborative Effort for a Collective Change

HHLA: Certified Quality

The HHLA Container Terminals Altenwerder (CTA) and Tollerort (CTT) have once again received one of the most prestigious certifications in the industry.

The Container Terminal Quality Indicator (CTQI) recognises the outstanding quality management system of the two terminals. The CTA has now been certified by DNV GL for the sixth time in a row, while the CTT is the proud recipient of this standard for the second time, having first been awarded it in 2014.

UNCTAD
Ad Hoc Expert Meeting on Assessing Port Performance

THE WORLD BANK
Working for a World Free of Poverty

MIMA
MARITIME INSTITUTE OF MALAYSIA
INSTITUT MARITIM MALAYSIA

Measuring the performance of Malaysian container ports

JOC EVENTS | PORT PERFORMANCE NORTH AMERICA CONFERENCE

ABOUT | DATA | RESEARCH | LEARNING

Logistics Performance Index

"port users and their views are important elements in the whole process & deserve further attention"
European Commission (2007)

PPRISM

PORTOPIA

The AAPA Customer Service Initiative Report

What did we do? What did we learn?

The AAPA Customer Service Initiative Report

Developed with the contribution of Port Authorities

Focused on effectiveness (users perceptions)

PORTOPIA

Developed with the contribution of Port Authorities

Focused on effectiveness (users perceptions)

(2) Monitoring traffic trends
(3) Environmental indicators
(4) Intermodality
(5) Governance indicators

Measuring Effectiveness in Port Service Delivery I: The AAPA Customer Service initiative

Recap of the AAPA Customer Service initiative draws on material provided by M.R. Brooks and T. Schellinck

Purpose

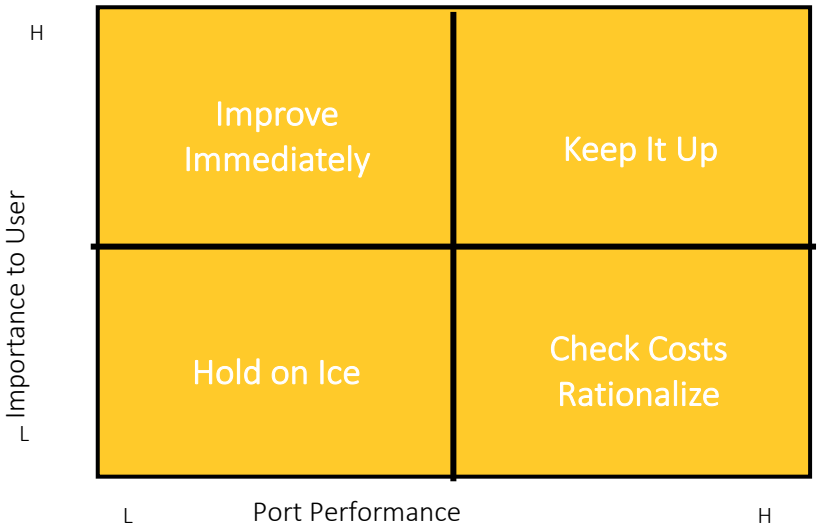
- Understand how users evaluate the ports they use
- Identify which attributes of port services are most important to users
- Identify the evaluation criteria by which users determine that a port's performance is effective in meeting their needs.

To be used by

- Ports to fine tune operations to meet customers' expectations & competition by allocating resources to where it will have the greatest impact.
- Users to provide feedback to ports,
- Decision-makers (governments, port authorities, or service providers) to facilitate assessment of port service delivery,

How to be used?

1. Identify where a port faces **performance gaps** between user expectations and performance
2. Identify where to a port can concentrate its service delivery improvement efforts? (translation: **where to allocate resources**)



Adjusted from: Hooley *et al* (2008: 407)

Three types of users

- Cargo interests
  - Responsible for the purchase of some of the transportation services for goods we sell/buy or on behalf of some importer and/or exporters.
- Shipping lines
- Supply chain partners
  - **warehouse operators** that services port(s) with container handling facilities.
  - **asset-based logistics** service supplier that uses port(s) as part of the services we provide.
  - **trucking or rail companies** that services port(s) with container handling facilities.

Approach

- Participants: Seven (7) North American container ports over 250,000 TEUs
- Each port supplied a list of more than 500 contacts for three user-groups
- Internet survey of users: One respondent / company received a personalized invitation to participate in the survey

Product

- Individual port report: results for port investment & marketing planning
- American Association of Port Authorities (AAPA) received an overall report on aggregated findings

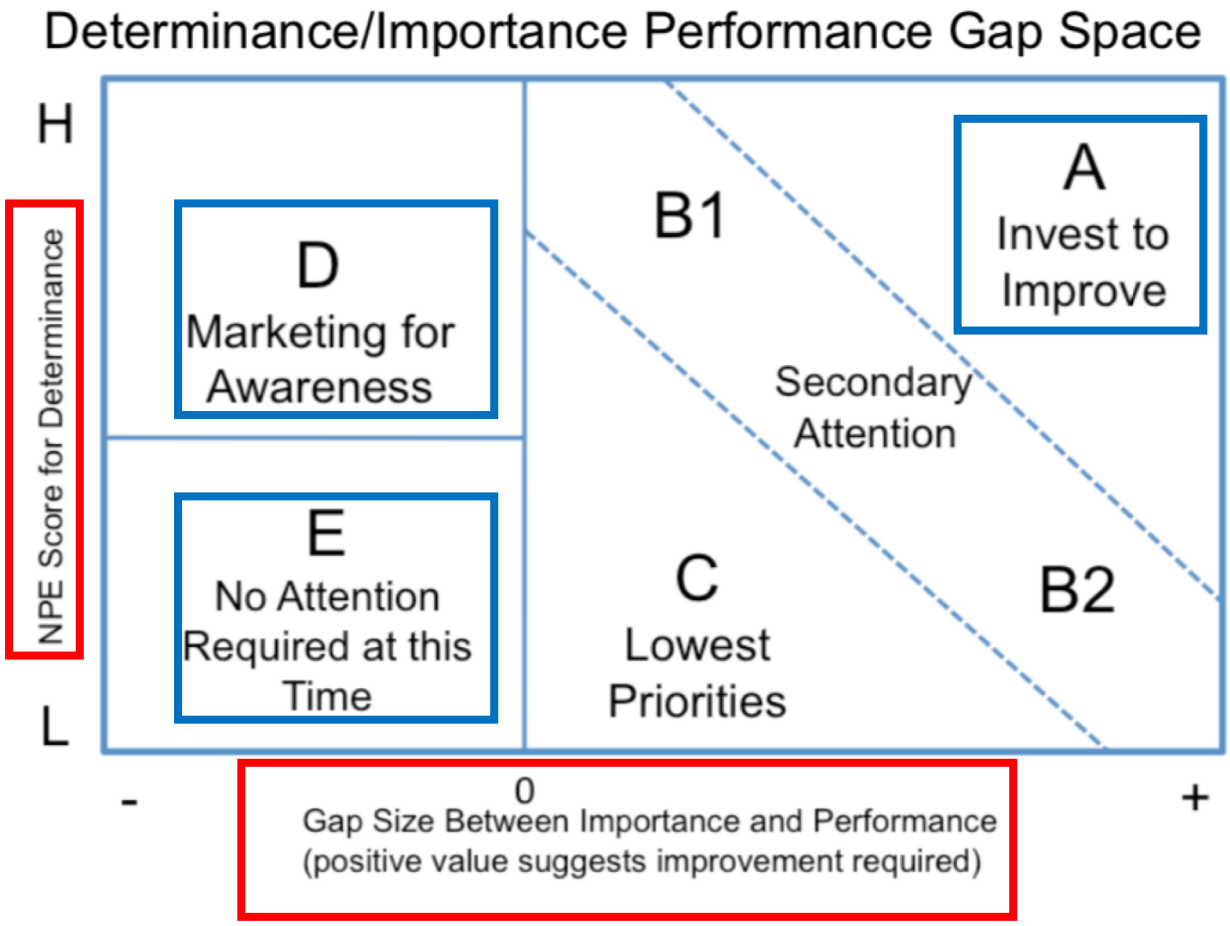
To implement you need partners

- American Trucking Research Institute via Trucking Industry Mobility and Technology Coalition
- International Warehouse Logistics Association
- National Industrial Transportation League (Ocean Transportation Committee)
- Intermodal Association of North America; and
- National Customs Brokers and Forwarders Association of America
- Canadian Association of Importers and Exporters
- Canadian Institute of Traffic and Transportation
- Canadian International Freight Forwarders Association
- Canadian Manufacturers and Exporters
- Canadian Trucking Alliance
- Purchasing Management Association of Canada
- Supply Chain and Logistics Canada
- Shipping Federation of Canada

Metrics used to measure port effectiveness

- Independent variables
  - General criteria used by all groups of users (12)
  - Specific criteria for each user group
    - Shipping lines (17)
    - Cargo owners or their agents (forwarders) (9)
    - Trucking, rail and warehouse operators (15)
- Dependent performance variables
  - **Satisfaction** with port's with service delivery (scale 1-7)
  - Rating a port's **competitiveness relative to others used** by the user (scale 1-7)
  - Rating a port's **effectiveness** in delivering the service (scale 1-7)

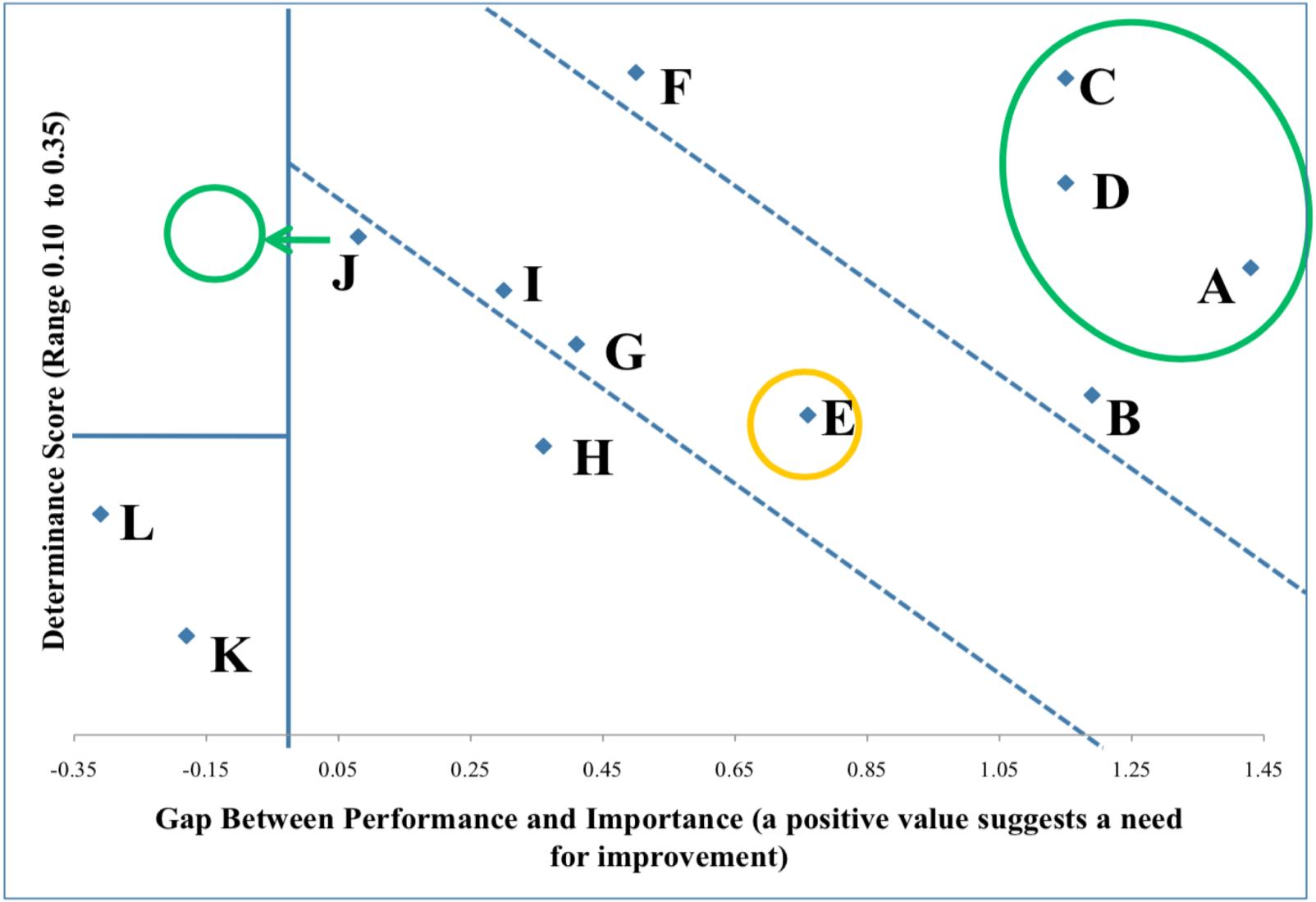
How does it work?



Shipping lines

Evaluation by Container Shipping Lines

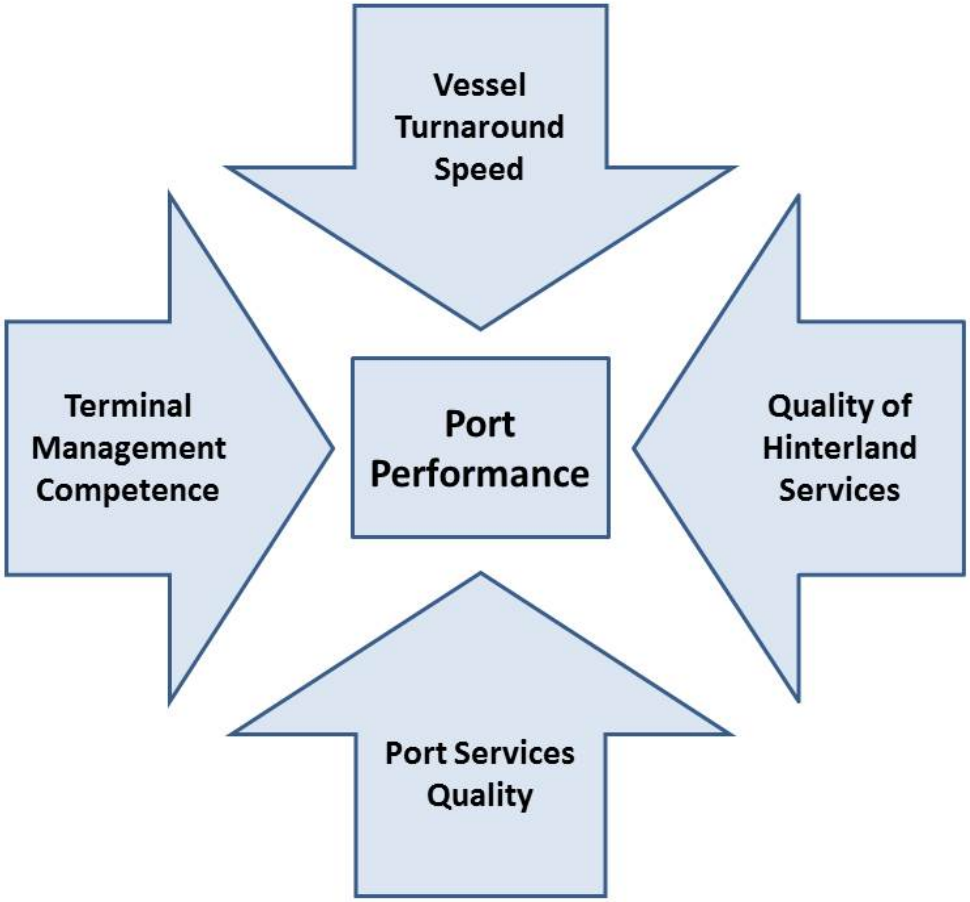
Evaluative Criteria	Influence East Coast	Influence West Coast	Performance Scores (7 ports)		Ports Needing to Invest	Ports Able to Market
			Lowest	Highest		
Availability of storage capacity	Medium	Weak	4.92	5.91	0	1
Availability and capability of dockworkers	Medium	Medium	4.29	6.08	3	0
Choice of logistics providers serving the port	Medium	Weak	4.92	5.67	0	2
Connectivity/operability to rail/truck/warehousing	Medium	Weak	4.29	6.22	2	0
Port authority responsiveness to special requests	Medium	Weak	3.00	6.18	3	0
Incidence of cargo damage	Weak	Weak	5.22	5.80	0	0
Incidence of delays	Medium	Strong	4.29	5.80	5	0
Invoice accuracy	Weak	Medium	5.36	6.00	0	0
Provision of adequate, on-time information	Medium	Medium	5.14	5.89	1	0
Quality of maritime services (pilotage, mooring etc.)	Medium	Weak	5.36	6.57	0	0
Quality of rail/truck/warehousing companies	Strong	Weak	5.14	5.90	0	2
Reasonableness of port charges	Weak	Weak	3.43	5.78	3	0
Speed of stevedore's cargo loading/unloading	Medium	Strong	4.64	5.92	5	0
Sufficiency of size of hinterland	Weak	Weak	4.73	6.30	0	0
Timeliness of maritime services (pilotage, mooring etc.)	Weak	Weak	4.91	6.33	0	0
Timely vessel turnaround	Medium	Medium	4.64	6.11	5	0
Port security	Weak	Medium	5.50	6.50	1	0
Terminal operator responsiveness to special requests	Medium	Weak	4.83	6.08	3	0


Determinance Score (Range 0.10 to 0.35)
F
C
D
A
J
I
G
B
E
H
L
K
-0.35
-0.15
0.05
0.25
0.45
0.65
0.85
1.05
1.25
1.45
Gap Between Performance and Importance (a positive value suggests a need for improvement)

Performance dimensions leading to port performance perceptions by shipping lines

1. Ports vary substantially on all of these measures

2. Ports offer different value propositions to shipping lines



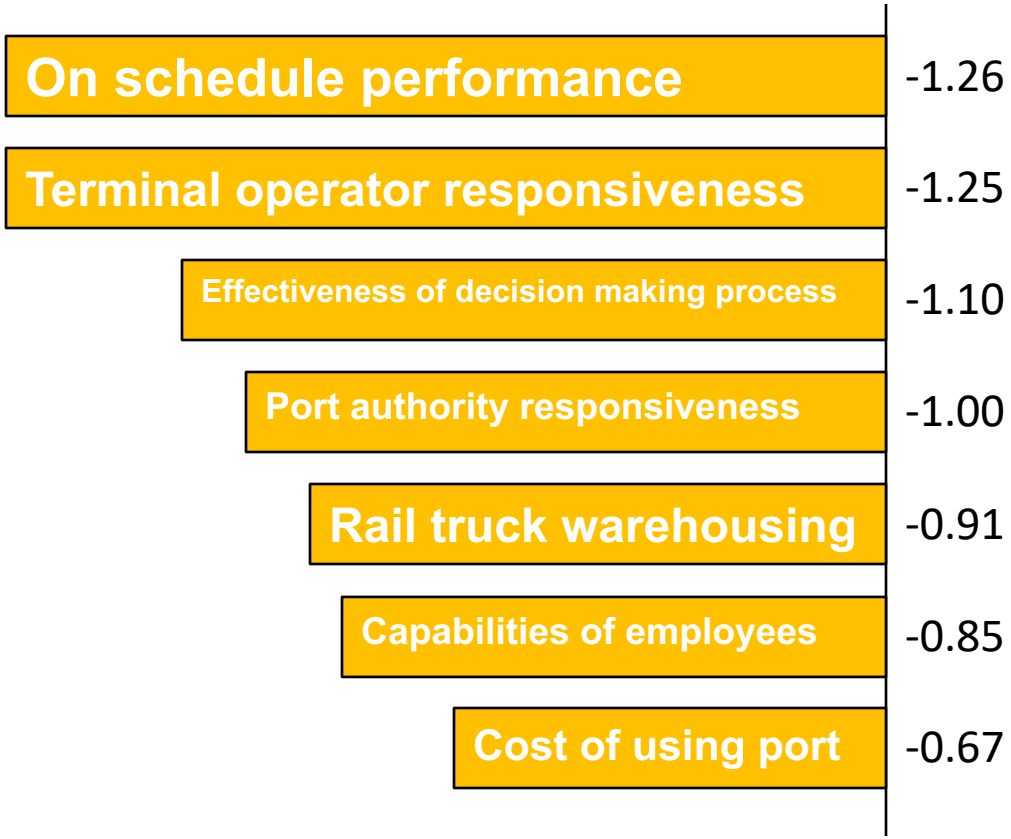
Cargo owners

- Cargo Owners who book their own transport arrangements are a distinct sub-group from those who act as Agents for owners:
  - Cargo Agents (freight forwarders) are more influenced by traditional criteria like responsiveness and information provision while
  - Cargo Owners are more influenced by perceptions of port security.
- The two Cargo segments are best evaluated separately where possible.

Performance Evaluation by Cargo Interests

Evaluative Criteria	Influence East Coast	Influence West Coast	Performance Scores (7 ports) Lowest	Performance Scores (7 ports) Highest	Ports Needing to Invest	Ports Able to Market
Ability to deliver/offer services tailored to different Cargo Interests	Medium	Medium	4.21	6.09	0	2
Choice of rail/truck/warehousing companies	Medium	Weak	5.25	6.12	0	2
Capability of employees (can they accommodate our needs?)	Medium	Strong	4.50	5.89	4	0
Connectivity/operability to rail/truck/warehousing	Medium	Weak	5.19	6.11	0	1
Port authority responsiveness to special requests	Strong	Medium	4.55	6.19	1	1
Availability of direct service to cargo's destination	Medium	Weak	5.38	6.33	0	0
Incidence of cargo damage	Medium	Medium	5.29	6.43	0	0
Port security	Weak	Medium	5.50	6.61	0	0
Provision of adequate, on-time information	Medium	Strong	5.00	6.08	3	0
Terminal operator responsiveness to special requests	Strong	Strong	4.44	5.96	3	1

Port performance summary
Gap sizes for cargo interests: Port A



Supply Chain partners

Supply Chain Partners are a forgotten user group for some ports; with their own unique set of needs, as partners they need to be part of the solution in developing port strategic investments.

Evaluation by Supply Chain Partners

Evaluative Criteria	Influence East Coast	Influence West Coast	Performance Scores (5 ports**)		Ports Needing to Invest	Ports Able to Market
			Lowest	Highest		
Accessibility to port premises for pick-up and delivery (gate congestion)	Medium	Strong	4.80	6.13	5	0
Availability of capacity	Strong	Weak	4.63	5.88	0	2
Availability of labor (do we have to wait to find someone?)	Medium	Strong	4.40	6.20	2	0
Efficiency of documentary processes	Strong	Medium	5.00	6.14	1	1
Incidence of delays	Medium	Strong	3.50	5.88	3	0
Invoice accuracy	Weak	Weak	5.00	6.43	0	0
Ocean carrier schedule reliability/integrity	Weak	Weak	5.00	6.00	0	0
Speed of stevedore's cargo loading/unloading	Weak	Strong	3.90	5.83	2	0
Connectivity/operability to rail/truck/warehousing	Medium	Weak	4.38	6.13	0	0
Port authority responsiveness to special requests	Medium	Weak	4.89	6.50	1	1
Incidence of cargo damage	Weak	-Weak***	4.56	5.75	0	0
Port security	Medium	Weak	5.64	6.25	0	2
Provision of adequate, on-time information	Medium	Weak	5.10	6.25	2	0
Terminal operator responsiveness to special requests	Medium	Medium	4.22	6.00	1	0

Lessons learnt

1. Port user groups (rate a port's effectiveness in service delivery differently,
2. **No port excelled in serving all three user groups**
3. The pattern of **performance gaps** were different on the various criteria for each port.
4. In all cases, the initiatives identified criteria for targeted **improvement** for each user group
5. Each port had a unique portfolio of factors to repair by investing for improvement,
6. Many ports found a usable "market for awareness" opportunity.
7. The produced report gave ports talking points for their discussions with suppliers.

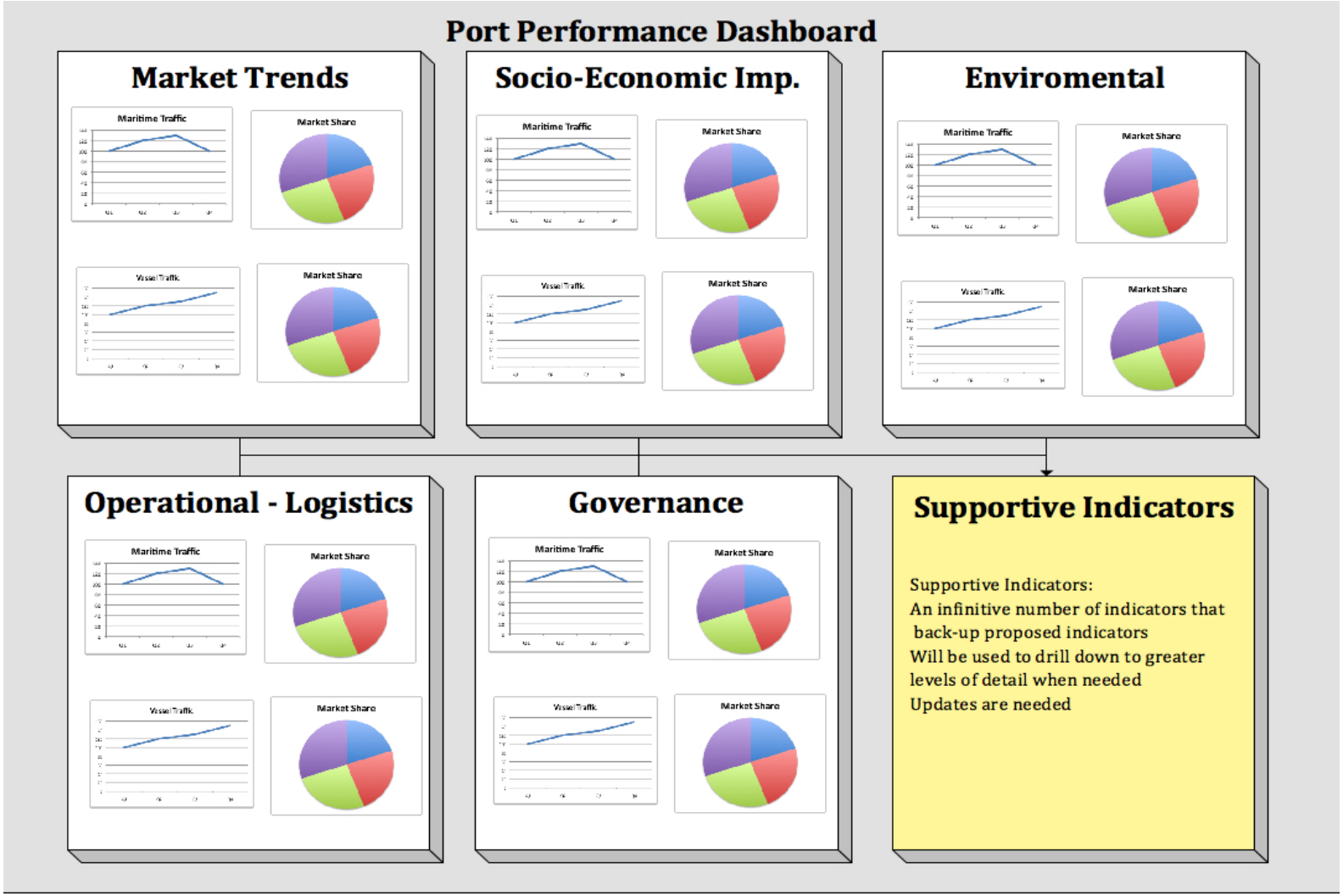
Measuring Effectiveness in Port Service Delivery II: PORTOPIA

PortEconomics.eu

Grounded on the first exercise

PPRISM

Port Performance Indicators: Selection & Measurement



Measuring 5 groups of indicators, taking advantage of technology

(1) Focused on effectiveness (users perceptions)

(2) Monitoring traffic trends
(3) Environmental indicators
(4) Intermodality
(5) Governance indicators

Users perceptions: Typology of criteria

A different set of criteria per port market:

- Container Ports
- Ro – Ro Ports
- Dry Bulk Ports
- Break Bulk Ports
- Liquid Bulk Ports
- Cruise Ports


ITALY: 3 ports


PORTUGAL: 1 port


ESTONIA: 1 port


GREECE: 2 ports


POLAND: 1 ports

Grouped in 3 Categories:

- Ship to port interface
- Port
- Port to hinterland interface

Related to:

- Availability
- Accessibility
- Connectivity
- Quality
- Timeliness of services
- Adequacy
- Cost

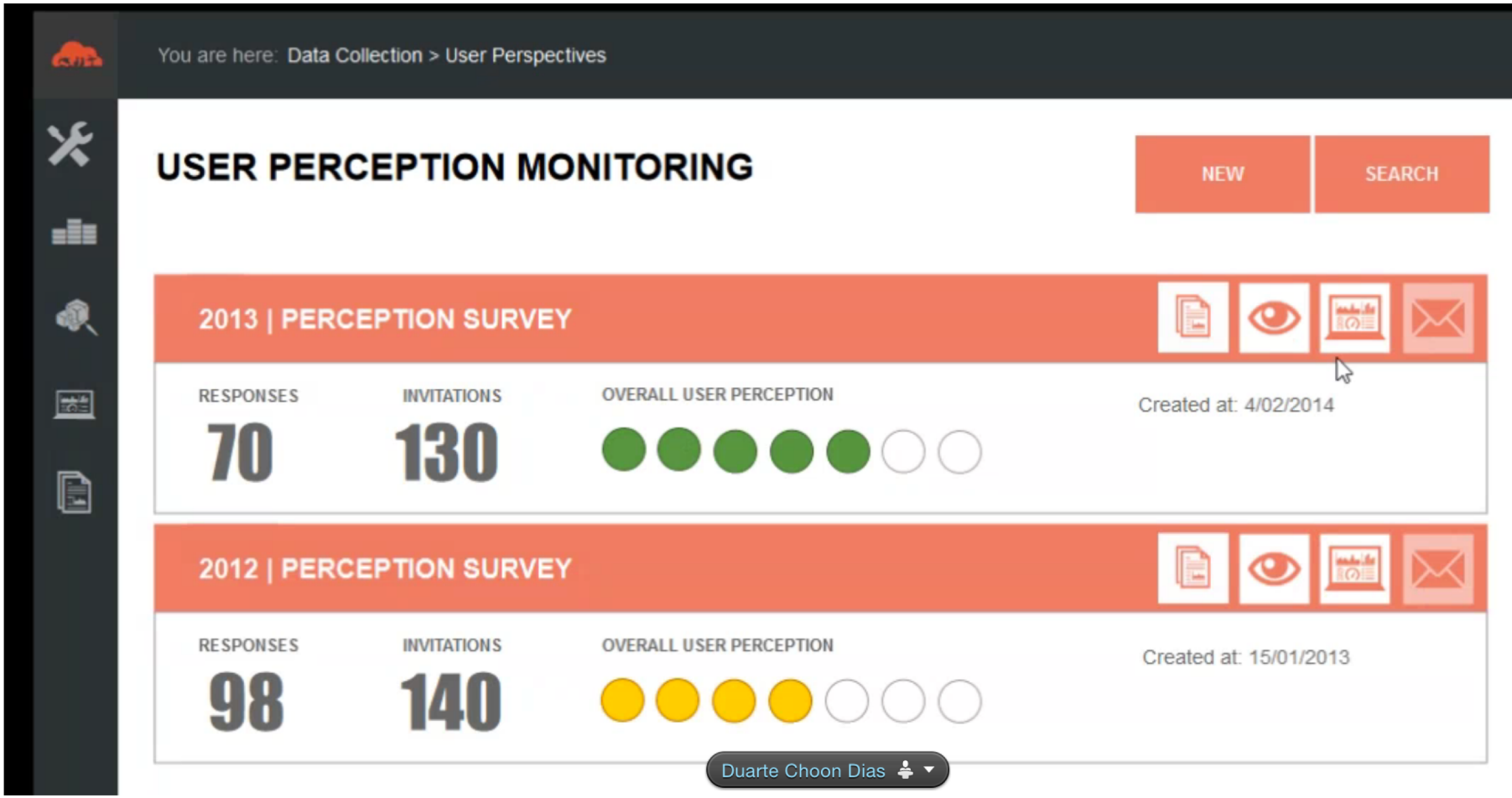
Expanded group of port users

(1) Shipping Lines

(2) Cargo Owners / Cargo Agents

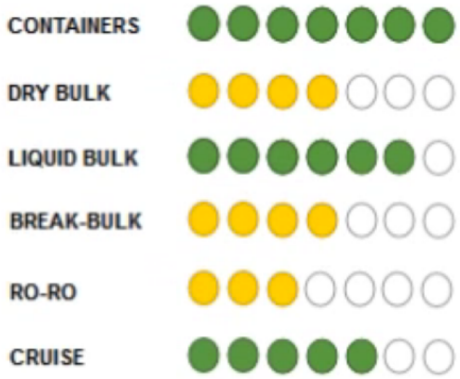
(3) Hinterland Transport Service Suppliers

(4) Port Services Providers


You are here: Data Collection > User Perspectives
USER PERCEPTION MONITORING
NEW
SEARCH
2013 | PERCEPTION SURVEY
RESPONSES
70
INVITATIONS
130
OVERALL USER PERCEPTION
Created at: 4/02/2014
2012 | PERCEPTION SURVEY
RESPONSES
98
INVITATIONS
140
OVERALL USER PERCEPTION
Created at: 15/01/2013
Duarte Choon Dias

USERS RATING

RATING BY MARKET



RATING COMPANY TYPE

MORE DETAILS

Satisfaction vs Importance

Users are most satisfied by:

Question	Satisfaction	Importance
Ship to port interface » Efficiency (Quality-Cost) of Bunkering	6	6
Ship to port interface » Port operating hours	5	7
Port » Port security	5	6
Port » Port safety	5	6
Port to hinterland interface » Connectivity to road network	5	6

Users are least satisfied by:

Question	Satisfaction	Importance
Ship to port interface » Feeder container services	2	7
Port » Number of operational stacking equipment	2	6
Port » On-time information	3	6
Ship to port interface » On-time arrival	3	6
Ship to port interface » On-time departure	3	6
Port » Accuracy of information	3	6
Port » Storage capacity for reefer containers	3	6
Port » Container storage cost	3	6
Port » Services for containers (added value services, emptying-filling a container etc)	3	6
Port to hinterland interface » Customs operating hours	3	6

Lessons learnt

- Resistance of ports to be part of exercises that might reveal deficiencies
- Subjectivity of users' perceptions provides a strong alibi for not going ahead with measurement of effectiveness - in contrast with what happens in other industries
    - ICAO AIRPORT PERFORMANCE: PASSENGER SURVEYS ON QUALITY OF AIRPORT SERVICES
    - SKYTRAX AIRPORT AWARDS: BASED ON SURVEY QUESTIONNAIRES COMPLETED BY AIRLINE CUSTOMERS
    - RAIL SATISFACTION SURVEYS: PASSENGER AND CARGO
- Thus port effectiveness measurement was abandoned (for the moment?)

The legacy of PORTOPIA: PortinSights Platform

PortinSights

A port monitoring platform including:

1. Rapid Exchange (of Traffic Data) Module
2. Governance data module
3. Environmental module

The legacy of PORTOPIA-II
I. Environmental Management Index

A. Existence of a Certified Environmental Management System –EMS

B. Existence of an Environmental Policy

C. Environmental Policy makes reference to ESPO's guideline documents

D. Existence of an inventory of relevant environmental legislation

E. Existence of an inventory of Significant Environmental Aspects (SEA)

F. Definition of objectives and targets for environmental improvement

G. Existence of an environmental training program for port employees

H. Existence of an environmental monitoring program

I. Environmental responsibilities of key personnel are documented

Environmental Management Index =

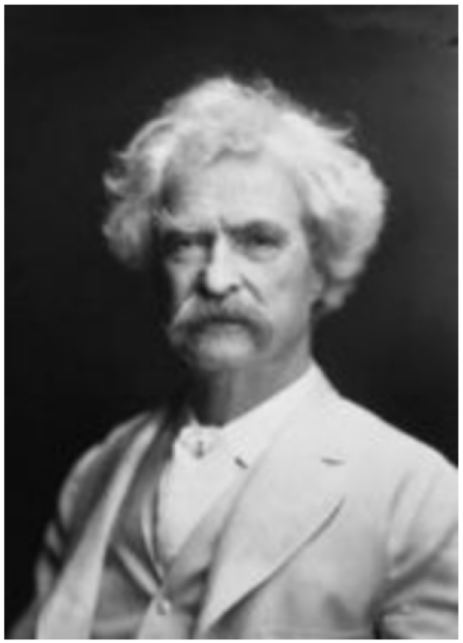
$$A*\mathbf{1.5} + B*1.25 + C*0.75 + D*1 + E*\mathbf{1} + F*\mathbf{1} + G*\mathbf{0.75} + H*1 + I*1 + J*\mathbf{0.75}$$

(Numerical value of each letter is the percentage of positive response divided by 100)

Even when (traffic) data are collected

- **Several ports opt not to participate:**
  - How representative is the sample?
  - How to involve more ports?
  - Which ports to involve?
- Discontinuous time series - a number of ports do not provide data regularly.
- Questionable reliability of the data provided - Each port uses its own methodologies
- **Data quality** remains an issue

A final note of caution:
We also need to be cautious on how we use measurements



"Most people use statistics like a drunk man uses a lamppost; more for support than illumination"

– Mark Twain

Thank you!

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