



Measuring port performance: lessons from North American research

Public Lecture: University of Antwerp

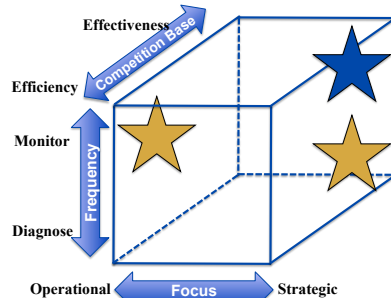
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Agenda

- Thinking about performance measurement for ports and how the AAPA's Port Customer Service Initiatives of 2012 and 2014 fit in a bigger picture of serving port customers and users elsewhere.
- The development of the AAPA metrics and reports—understanding different customer and user groups for making strategic investments in infrastructure and marketing
- Interpreting results and future possibilities
- A brief exploration of more recent efforts to examine fluidity in Canada and Port Performance in the U.S.
- My conclusion: It is better for all ports to invest in benchmarking information as a group rather than to invest alone as U.S. and Canadian ports do.

Measuring Effectiveness is Different than Measuring Efficiency



Source: Variant of Griffis et al. (2007). "Aligning logistics performance measures to the information needs of the firm." *Journal of Business Logistics*, 28, 2, 35.



The AAPA's Port Customer Service Initiative Vision

- An independent third-party assessment of customers and users to enhance your ability to improve port service delivery.
- An individualized report to each port that provides "best practice" scores and the port's scores to provide context to user "importance" **and that** enables benchmarking for assessing resource allocation
- The first study was done in 2012 and we repeated it in 2014.



Making Strategic Improvements that Pay Off!

- ① Identify your port's customers' and users' criteria for assessing service quality (They all also see satisfaction as correlated with customer service—effectiveness of service delivery).
- ② Evaluate the port's performance on both the criteria you control and what you influence
- ③ Determine what needs to be fixed based on those items of importance to the customer and determinant in their assessment of your port's service quality performance
- ④ Via information-sharing, coalition-building, and identifying financial support and sources, you should be able to help your tenants and suppliers to change services under their control
- ⑤ You have the ability to differentiate the port and take control of the narrative about what you do well.



Identifying the Right Service Metrics by User Type

Phase 1: Evaluate via focus groups over 80 metrics (2007)

Canadian Port
Users
3 Cdn & 2 US
Ports

U.S. East Coast
Port Users
5 US Ports

U.S. West Coast
Port Users
5 US Ports

Phase 2A: Same Instrument:
2 publications in 2011—
Maritime Policy & Management
and *Transportation Research*
Record plus
1 publication in 2014 in
Maritime Policy & Management

Phase 2B: Reduced
and Modified
Instrument for 2012
AAPA survey

DALHOUSIE UNIVERSITY **Phase 3: Service Metrics in 2012 Survey**

User Group	Criteria for Determining Service Quality Performance Effectiveness
Shipping line	19 specific service criteria plus two cost criteria
Cargo owners & agents	11 specific specific criteria plus two cost criteria
Supply chain partners	15 specific service criteria

Criteria were “plug and play” based on previous research for this initiative.

DALHOUSIE UNIVERSITY **Illustrative Metrics 2012**

Cargo Interest Examples (5 of 10)	Shipping Line Examples (5 of 18)	Supply Chain Partner Examples (5 of 14)
Provision of adequate, on-time information	Provision of adequate, on-time information	Provision of adequate, on-time information
Terminal operator responsiveness to special requests	Incidence of cargo damage	Accessibility to port premises for pick-up & delivery (gate congestion)
Availability of direct service to destination	Timely vessel turnaround	Efficiency of documentary processes
Incidence of cargo damage	Connectivity/operability to rail/truck or warehousing	Ocean carrier schedule reliability/integrity
Choice of truck/rail/warehousing	Terminal operator responsiveness to special requests	Speed of stevedore's cargo loading/unloading

DALHOUSIE UNIVERSITY **How It Works (1)**

Platform: Survey hosted on its own web address on a secure Dalhousie server (not subject to the U.S. Patriot Act)

What did we measure?

- The overall performance rating of each port by their users on effectiveness of service delivery (7 point scale)
- Importance of each service criteria to the specific user group (7 point scale)
- The performance of up to three ports used by that user rated on those service criteria (7 point scale)

Other data collected?

- Type of user
- Usage data
- Open-ended concerns
- Company demographics

DALHOUSIE UNIVERSITY **How It Works (2)**

What did we get as outputs?

- The determinants of the effectiveness of service delivery score for each particular port (using NPE—normalized pairwise estimation) **SCORE INFLUENCERS**
- A gap analysis (importance minus performance) for each user **SERVICE GAPS**
- Direction to each port on their particular ratings and results, including their relative score in comparison with the other ports in the survey. **BENCHMARK**
- Open-ended comments and demographics of the survey participants **INDIVIDUAL FEEDBACK**

Perspective is Important to Effectiveness Measurement: Who Do Ports Deliver Services To?

- Cargo interests**, defined as those responsible for the purchase of some of the transportation services for (a) goods they sell/buy or (b) on behalf of some importer and/or exporters.
- Shipping lines**, defined as companies supplying container ship services that call ports with container-handling facilities.
- Supply chain partners**, defined as (a) warehouse operators that service port(s) with container handling facilities, (b) asset-based logistics service suppliers that use port(s) as part of the services provided and/or (c) trucking or rail companies that service port(s) with container-handling facilities.
- [ESPO's Portopia initiative also include **port services suppliers** (pilots, towage, bunkering, etc) but these were not validated in SEAPort instrument (Schellinck & Brooks, 2016).]

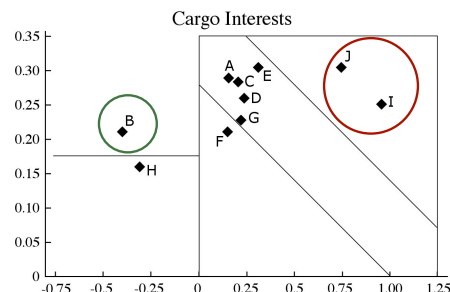
DALHOUSIE UNIVERSITY **What We Did With the Data Collected?**

© Schellinck and Brooks, 2014

Evaluation Report Card by Cargo Interests for the Mystery Port on 9 of 10 Criteria

Evaluative Criteria	I-P Gap	Performance Mean	Lowest	Highest	NPE	Relative Score
A Criterion A	0.16	5.16	4.21	6.09	0.289	51%
B Choice of rail/truck/ warehousing companies	-0.40	5.96	5.25	6.12	0.211	82%
C Criterion C	0.21	5.63	4.50	5.89	0.283	81%
D Criterion D	0.24	5.80	5.19	6.11	0.259	66%
E Criterion E	0.32	5.37	4.55	6.1	0.305	50%
F Criterion F	0.15	5.77	5.38	6.33	0.211	41%
H Criterion H	-0.31	6.00	5.50	6.61	0.158	45%
I Provision of adequate, on-time information	0.96	5.50	5.00	6.08	0.250	46%
J Terminal operator responsiveness to special requests	0.75	5.19	4.44	5.9	0.304	49%

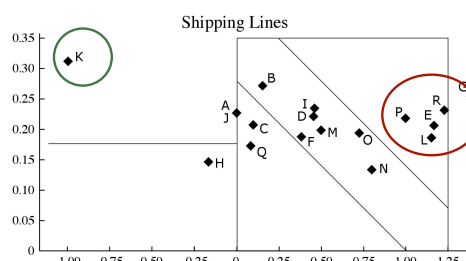
Determinance I-P Gap Space for Cargo Interests for the Mystery Port



Evaluation Scores by Container Shipping Lines for the Mystery Port (on 10 of 18 Criteria)

Evaluative Criteria	I-P Gap	Performance Mean	Lowest	Highest	NPE	Relative Score
B Criterion B	0.154	6.08	4.29	6.08	0.271	100.0%
D Criterion D	0.455	5.64	4.29	6.22	0.221	69.9%
E Criterion E	1.167	4.92	3.00	6.18	0.206	60.4%
F Incidence of cargo damage	0.385	5.23	5.22	5.80	0.187	1.7%
G Criterion G	1.385	5.15	4.29	5.80	0.253	57.0%
I Provision of adequate, on-time information	0.462	5.38	5.14	5.89	0.234	32.0%
K Quality of rail/truck/ warehousing companies	-1.000	5.90	5.14	5.90	0.311	100.0%
N Criterion N	0.800	4.80	4.73	6.30	0.133	4.5%
P Timely vessel turnaround	1.000	5.50	4.64	6.11	0.218	58.5%
R Criterion R	1.231	5.00	4.83	6.08	0.231	13.6%

Determinance I-P Gap Space for Shipping Lines for the Mystery Port 2012



Open-Ended Comments Provide Feedback

For oversize/weight cargo [Port of Mystery] has very good inland capability and vessel ro-ro service; however charter vessel availability/cost is a problem. Also port infrastructure is a limiting factor.

Extremely important that port efficiency is at highest possible achievable level. Speed of turnaround times, cost effectiveness & inland distribution capabilities are critically important.

Truckers seem less knowledgeable regarding the container pick up & delivery so takes more time to deal ex [Port of Mystery].

Excellent infrastructure and ocean connections but the inland clearances are a significant disability.

We are a specialized trucking company ... The [Port of Mystery] is not realistic with their hours of operation; they try to serve an industry that operates 24/7 with basically office hours. ... Some days our trucks spend in excess of 4 hours waiting to get into the port and load/unload.



With the Reports, Port Managers Can Improve Port Performance if...

- They know the **importance/relevance** of attributes
- They know user's **perceptions** of port performance overall (e.g., effectiveness in service delivery) and by attribute (e.g., cargo handling)
- Therefore, they identify **performance gaps**
- They uncover the **determinance** of attributes for effectiveness in service delivery
- Have combined this information using a **Determinance – IP Gap Analysis** to identify where to concentrate service delivery improvement efforts (translation: where to allocate resources!!) or where they can market their superior performance to users (because they have a perceptible gap)
- We provide the information needed for investment, marketing and stakeholder discussion...



Our Commitments to Participating Ports Was...

- We promised to not share each port's contact list, to keep it confidential and inaccessible, and to not say to those we contact which port provided the contact information
- Each port providing a contact list received a report indicating the determinants of their score, identifying the attributes that most contribute to their particular overall scores by user type.
- Each port that provides a contact list of **sufficient size** to generate an adequate response rate would see their own score, and the best practice score on each attribute. Ports in 2012 and 2014 provided 550+ names; the more names the better.
- We did not name the ports in a published report. (Mystery Port, Port A, B...)



What We Found in 2012

- Port user groups rate a port's effectiveness in service delivery differently, i.e., a port that is rated highly by the shipping lines may score poorly when rated by cargo owners or its own supply chain partners, or vice versa.
- No port excelled in serving all three user groups
- The pattern of performance gaps were different on the various criteria for each port.
- In all cases, the initiative identified criteria for targeted improvement for each user group—Cargo Interests, Shipping Lines, and Supply Chain Partners. Each port had a unique portfolio of factors to repair by investing for improvement, and many ports found a usable "market for awareness" opportunity.
- The report gave ports talking points for their discussions with suppliers.



What We Found in 2013's Further Data Analysis

- Cargo Owners who book their own transport arrangements are a distinct sub-group from those who act as Agents for owners on five of 13 criteria.
- Cargo Agents are more influenced traditional CRM 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.
- We have learned enough to focus the Shipping Line criteria more tightly in future surveys.
- 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.



Introducing ... SEAPORT

**Service
Effectiveness
Assessment for
PORT managers**

We used SEAPORT in 2014; the criteria are published in Schellinck and Brooks (2016). *International Journal of Logistics Research and Applications*, 19 (2), 143-157

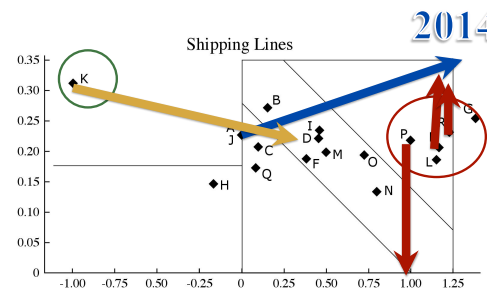


Service Delivery Effectiveness Performance Measures

User Group	Statements in AAPA 2012 Initiative	Statements in SEAPORT 2014
Shipping line	19 criteria	13 criteria
Cargo owners & agents	11 criteria	8 criteria
Supply chain partners	15 criteria	8 criteria

Cargo owners and agents are 2 sub-groups; same criteria, different patterns of use

Determinance I-P Gap Space for Shipping Lines for the Mystery Port ~~2012~~ 2014





What Did We Learn in 2014...

- Environmental changes can rapidly alter what is critical to your customers. This was true for all user groups.
- The West Coast surge and labour challenges altered the determinance score of some criteria substantially, even for east coast ports.
- When customers are really unhappy, they use a broader response scale to relay their concerns, and fill in even more open text comments. (We did not cap the number of words and got an earful of constructive criticism and useful ideas.)



Concluding Lessons for the SEAPort Program

- Periodic assessment of the quality of service delivery in ports leads to better decision-making by ports on where to invest for improvement and what to market for awareness, and therefore success through customer service.
- A volatile market may lead to surprising results.
- Remember: Even if you choose to do your own in-house, not all users have experience with all attributes.

Why Did We Move On?

Lack of Cooperation
A different Focus in Canada

Transport Canada's Current Fluidity Indicators are Efficiency Indicators

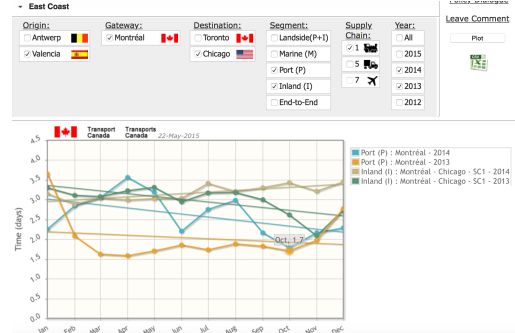
Intermodal Indicators (containers)	Bulk Indicators
Average truck turnaround time (in minutes)	Average vessel turnaround time (in hours)
Berth utilization (in TEU/ metre of workable berth)	Berth occupancy rate (%)
Vessel turnaround time (in seconds per TEU)	Gross berth productivity (in tonnes / berth hour)
Average truck turnaround time (in minutes)	Total tonnes
Vessel turnaround time (in hours)	Number of vessel calls
Average container dwell time (in days)	Average tonnes per vessel call
Dwell target (% under 72 hours)	Average time at anchor (Vancouver only)
Port productivity (in TEU per gross hectare)	
Vessel on-time performance (%)	
Crane productivity (in lifts per hour)	
Number of vessel calls	
Container throughput (in TEU per month)	
Average TEU per vessel call	

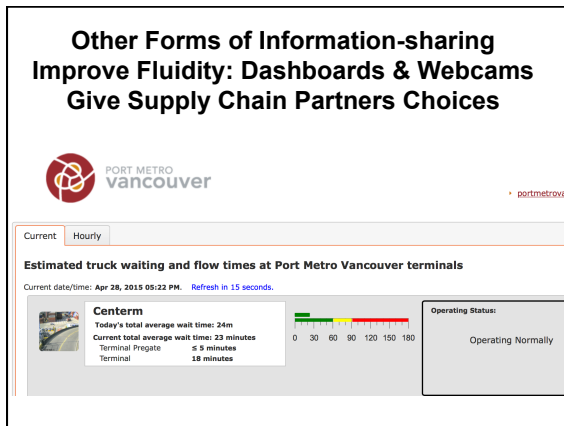


“Without knowing the best practice benchmark, complacency is more likely to set in and innovation less likely to happen.”

Monitoring a Route's Fluidity (1)

Monitoring a Route's Fluidity (2)





Possible Future Fluidity Indicators Not Now Collected in Canada

- Gate accessibility (perceived by supply chain partners, an **effectiveness** indicator)
- [Perceived] availability of dockworkers (an **effectiveness** indicator for shipping lines)
- [Perceived] timeliness of port services (pilotage, mooring, etc, an **effectiveness** indicator for shipping lines)
- [Perceived] vessel turnaround time (an **effectiveness** indicator for shipping lines)
- Maritime fluidity (between two geo-fenced channel points or from anchorage to berth approaches, an **efficiency** indicator)
- [Perceived] berth availability (an **effectiveness** indicator for shipping lines)
- [Perceived] crane availability (an **effectiveness** indicator for shipping lines)

Relevant Conclusions of Report to CTAR Panel (2015)

- Efficiency** metrics are concluded to be mostly complete but their adoption has not happened at all Canada Port Authorities or the largest non-CPA ports (who might like the opportunity to participate).
- The challenge of an **inconsistent approach to service metrics** was discussed and suggestions were made to make the metrics profile holistic.
- The report also explores questions for further discussion by the Panel about Canada's transport policy in terms of:
 - who collects the data,
 - whether it should be voluntary or mandatory, and
 - if it should be in the public domain. (If industry must ask and wait, it can be neither nimble nor innovative.)

Relevant Conclusions of Report to CTAR Panel (2)

- Effectiveness:** The challenge is that while some Canadian ports conduct customer surveys, they are few in number. Ports see their results in isolation and not compared with other ports.
- These questions have not been researched in a cogent and significant way:
 - What is the service quality provided by Canadian ports?
 - Does it meet the expectations of service delivery by Canadian manufacturers and retailers?
 - Does it meet the expectations of Canadian port users and logistics service suppliers, like those in trucking and rail companies?
 - Does it meet the requirements of foreign flag shipping lines?

US Port Performance (Report to Congress 2017)

- Port Throughput
 - Tonnage, TEU, Calls, Top 5 commodities
 - Container vessel dwell time
- Port Capacity
 - Channel depth & air draft
 - Length of container berths, number of cranes and terminal size
 - Rail connectivity

Is this performance as would be interpreted by other industries?

Questions?

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