Plan For Success, Research To Assess
Master Planning and Research Session

AAPA Capital Projects Seminar
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TYPES OF RESEARCH

• **Basic** - Basic, pure, fundamental research conducted largely for knowledge enhancement without immediate commercial potential. Main motivation is to expand knowledge, not create or invent something.

• **Applied** - Designed to solve practical problems of the modern world rather than acquire knowledge for knowledge's sake. Goal is to improve the human condition. Focuses on analysis and solving social and real life problems and is generally conducted on a large scale basis.

• **Quantitative** – Based on numeric figures or numbers. Aim is to measure quantity or amount and compares it with past records and tries to project for future period. In social sciences, “quantitative research refers to systematic empirical investigation of quantitative properties and phenomena and their relationships”. Objective of quantitative research is to develop and employ mathematical models, theories or hypothesis pertaining to phenomena.

• **Qualitative** - Qualitative research presents non-quantitative analysis. It’s about collecting, analyzing and interpreting data by observing what people do and say. Types include: historical, descriptive, analytical, short term, fundamental, exploratory, case study and empirical,
Planning & Research Group Priorities

• Forecasting and assessing trends in vessel sizes and technologies across all cargo types and their impacts on port development and operations.

• Forecasting and assessing long-term trends in finance and capital funding for port and connecting transportation infrastructure development.

• Forecasting and assessing trends in port governance, including inter-port cooperation, increasing public accountability, privatization and regionalization.
Many kinds of research

- LOGICAL (mathematics, philosophy)
- EVALUATION (judging, appraising)
- INVESTIGATIVE (law, government hearings, journalism)
- DEMOGRAPHIC (economics, census, polling)
- MODUS OPERANDI (forensics, medical diagnosis)
- EMPIRICAL/SCIENTIFIC (social science, education, physical science)
Why Conduct Research In Planning?

- Every project needs a plan and every plan needs research to back it
- Follow Executive/Board directives
- CIP are investments into a port.
- Marine investments require planning of projects
- Project planning may require holistic approach in project selections
- Best practices in Master Planning (nationally and internationally)
- Research is power (information)
- Planning is key. Both needed? Yes? Already doing?
- Master planning as one model/approach to getting at that information
Port Administration Models: 4 Categories

Public Service Port: the public port authority offers all the services required for the functioning of the seaport system.

Tool Port: the port authority manages the port infrastructure and heavy superstructure, with private cargo-handling companies providing commercial services.

Landlord Port: the port authority acts as a regulatory body and as a landlord. Port operations are carried out by private companies.

Fully Privatized or Private Service Port: the port is privately owned, operated and sometimes self-regulated.
TYPICAL PORT FUNCTIONS

• Infrastructure landlord
• Regulator of economic activities and operations
• Planning for future development
• Marketing and promotion of port services
• Operation of nautical services
• Supplier of cargo-handling and storage services
• Provider of ancillary facilities
Do We Need To Formally Plan Port Projects?

• Do we need to plan, or fail if we don’t?
1) Identify Drivers/Framework goals
2) Collect Data
3) Analyze Data
4) Identify/analyze Options
5) Prioritize Options/Stakeholder Inputs
6) Evaluate Projects/Programs against Funding
7) Select Projects/Programs
8) Update Master Plan and Distribute to the “right” Stakeholders
9) Manage and Track Projects/Programs

Master Planning Steps

Feedback to Data Inputs

Master Plan Document

CIP Budget Needs

O & M Budget Needs

O & M Budget Needs
BEST PRACTICES: AUSTRALIA

- Port master planning must be based on a ‘beyond the port’ methodology, rather than the traditional ‘introspective’ approach;
- Policy alignment must be achieved through National-State-Region-Local planning frameworks;
- Port master planning frameworks should be generally consistent between jurisdictions;
- Enhanced governance support must be provided at the jurisdictional level and within organizations, to assist with comprehensive port master planning;
- Land Use Plans, Development Codes must support the Master Plan at the operational, ‘on the ground’ level;
- Regulatory/policy frameworks regarding ‘strategic assessments’ of master plans should be further examined to improve the identification, protection and management of environmental values and to address the need for regulatory streamlining.
BEST PRACTICES: AUSTRALIA (cont’d)

Figure 2.3: Broader considerations essential during port master plan development
BEST PRACTICES: PORT METRO VANCOUVER

• Master Planning by Port Metro Vancouver (via ‘scenario testing’)
• The process involved expert panel member sessions, comprehensive internal engagement, and external collaboration with key stakeholders via scenario-building workshops and ongoing dialogue.
• Ultimately, 4 scenarios were developed:
  • ‘Local Fortress’ (gateway growth constrained, focus on regional economy, local resilience and well-being)
  • ‘Missed the Boat’ (emerging market growth is strong, but the gateway misses opportunities and doesn’t live up to expectations, due to supply chain issues, poor coordination, lack of community support and diminishing industry support, etc)
  • ‘Rising Tide’ (continued growth, but in a context of increased volatility due to resource conflicts and climate instabilities)
  • ‘The Great Transition’ (a paradigm shift in the industry – a rapid transition to a post-industrial model).
BEST PRACTICES: DUBLIN PORT

• Port of Dublin (via the inclusion of a parallel ‘strategic environmental assessment’ of the Master Plan) provide valuable examples
• Port of Dublin Strategic/Master planning undertaken at the Port of Dublin
• Key features of the master plan were the Strategic Environmental Assessment (SEA) process
• The inclusion of the SEA as part of the master planning process provides a contemporary example of broader consideration of key spatial and environmental issues – beyond the port’s defined boundaries.
BEST PRACTICES: DUBLIN PORT (cont’d)

• Plan for future sustainable growth and changes in facilitating seaborne trade in goods and passenger movements to and from Ireland and the Dublin Region

• Provide an overall context for future investment decisions

• Reflect and provide for current national and regional guidelines and initiatives

• Ensure there is harmony and synergy between the plans for the Port and those for the Dublin Docklands Area, Dublin City and neighboring counties within the Dublin Region

• The master plan’s foundation is detailed capacity and demand analysis – which in turn allows a staged approach to development in forward years.

• The Dublin Port Company has also made it very clear that ‘societal integration’ is a key issue – with a primary master plan aim of ‘reintegrating’ with the city of Dublin after many years of separation and fragmentation.
BEST PRACTICES: PORTS OF AFRICA

• **Kenya**: Preparation of interim integrated regional development plans where the lead planner is an “embedded lead expert”

• **Ghana**: The use of community labor and local materials as counterpart contributions to project implementation. The use of peer review and learning sessions among and between communities

• **Uganda**: The declaration of special planning areas, for example, the Albertine Graben Physical Development Plan in a new oil-drilling region. Specific plans for disaster prone areas, such as the mountainous areas of Elgon.
BEST PRACTICES: NIGERIAN PORTS AUTHORITY

• February 2017 Nigerian Ports Authority (NPA) 25-year Port Master Plan

• Port sees their business as international and, therefore, requires that they constantly keep abreast with global developments and cutting edge technology in shipping developments.

• Introduced the Port Service Support Portal (PSSP) to streamline/reduce lag in time of doing business

• Re-assessing existing national and procurement policies pertaining to the port
Regardless of the methodology used to develop port master plans, it is very clear that we must move away from port master plans being developed in isolation – simply addressing ‘within boundary’ issues.

Broader, ‘whole of network thinking’ is becoming more and more evident in the global seaport industry.

This is what brings about project selection and implementation successes.
AAPA Capital Projects Seminar, Norfolk, Virginia

Plan for Success Research to Assess

Thomas Ward, PE/SE, D.PE Director, US Maritime Planning

May 8, 2018
"In preparing for battle I have always found that plans are useless, but planning is indispensable."

_Dwight D. Eisenhower_
PLANNING ELEMENTS

➢ Water
  ▪ Approach Channel
  ▪ Anchorage
  ▪ Turning Basin
  ▪ Harbor Channel
  ▪ Berth

➢ Marine Terminal
  ▪ Quay
  ▪ Quay Equipment
  ▪ Terminal Equipment
  ▪ Storage Yard Layout
  ▪ Gate
  ▪ Rail Working Yard
  ▪ Rail Storage Yard
  ▪ Civil Infrastructure
  ▪ Telecomm Network
  ▪ Operating Systems
  ▪ Power Systems

➢ Port Area
  ▪ Road Network
  ▪ Rail Network
  ▪ Access Roads
  ▪ Rail Working Yard
  ▪ Rail Storage Yard

➢ Hinterland
  ▪ Road Network
  ▪ Rail Network
  ▪ Highways
  ▪ Distribution Centers
STAKEHOLDERS

➢ Sovereign Agencies
  ▪ USACE
  ▪ USCG
  ▪ Federal Aviation / Airport
  ▪ Port Authority
  ▪ Harbor Agency
  ▪ Pilot Service
  ▪ Customs & Border Patrol
  ▪ Air Quality Regulator
  ▪ Water Quality Regulator
  ▪ Permitting Authority
  ▪ Metro Planning Organization
  ▪ Host City Government
  ▪ State DOT

➢ Private Enterprise
  ▪ Vessel Liner
  ▪ Tug Operator
  ▪ Marine Terminal Operator
  ▪ Rail Terminal Operator
  ▪ Rail Switching Entity
  ▪ Rail Class I Operator
  ▪ Warehouse / DC Operator
  ▪ Trucking Company
  ▪ Chassis Pool Operator
  ▪ Support Service Provider
  ▪ Utility Company
  ▪ Beneficial Cargo Owner

➢ People
  ▪ Pilots & Tug Crews
  ▪ Longshore Labor
  ▪ Rail Operating Labor
  ▪ Truck Drivers
  ▪ Boaters
  ▪ Neighbors
### STAKEHOLDERS

<table>
<thead>
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<th>Planning Elements</th>
<th>Sovereign Agencies</th>
<th>Private Enterprise</th>
<th>People</th>
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<tbody>
<tr>
<td><strong>Water</strong></td>
<td>USACE USCG</td>
<td>Vessel Liner</td>
<td>Pilots &amp; Tug Crews</td>
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<td>Approach Channel</td>
<td>Port Authority</td>
<td>Tug Operator</td>
<td>Utility Company</td>
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<td>Anchorage</td>
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<td>Turning Basin</td>
<td>Harbor Agency</td>
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<td>Berth</td>
<td>Customs &amp; Border Patrol</td>
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<td>Truck Drivers</td>
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<td><strong>Marine Terminal</strong></td>
<td>Air Quality Regulator</td>
<td>Warehouse / DC Operator</td>
<td>Boaters</td>
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<td>Quay</td>
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<td>Quay Equipment</td>
<td>Permitting Authority</td>
<td>Chassis Pool Operator</td>
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<td>Terminal Equipment</td>
<td>Metro Planning Organization</td>
<td>Support Service Provider</td>
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<td>Storage Yard Layout</td>
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#### Stakeholder Influence
- **Stakeholder Influence = 2**
  - USACE
  - USCG
  - Federal Aviation / Airport
  - Port Authority
  - Harbor Agency
  - Pilot Service
  - Customs & Border Patrol
  - Air Quality Regulator
  - Water Quality Regulator
  - Permitting Authority
  - Metro Planning Organization
  - Host City Government
  - State DOT
  - Vessel Liner
  - Tug Operator
  - Marine Terminal Operator
  - Rail Terminal Operator
  - Rail Switching Entity
  - Rail Class I Operator
  - Warehouse / DC Operator
  - Trucking Company
  - Chassis Pool Operator
  - Support Service Provider
  - Utility Company
  - Beneficial Cargo Owner
  - Pilots & Tug Crews
  - Longshore Labor
  - Rail Operating Labor
  - Truck Drivers
  - Boaters
  - Neighbors

- **Stakeholder Influence = 1**
  - USACE
  - USCG
  - Federal Aviation / Airport
  - Port Authority
  - Harbor Agency
  - Pilot Service
  - Customs & Border Patrol
  - Air Quality Regulator
  - Water Quality Regulator
  - Permitting Authority
  - Metro Planning Organization
  - Host City Government
  - State DOT
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  - Utility Company
  - Beneficial Cargo Owner
  - Pilots & Tug Crews
  - Longshore Labor
  - Rail Operating Labor
  - Truck Drivers
  - Boaters
  - Neighbors
WITH SUCH CLARITY...

What could possibly go wrong?
“I KNOW JUST WHAT TO DO”

➢ If you focus on what seems simple to solve...

➢ ...you’ll likely miss something important
“WE ARE COMMITTED TO THIS SOLUTION”

➢ If you commit to a plan before knowing all the facts...

➢ ...you may not be able to back out.
“THE COMMUNITY WILL BUY IN”

➢ You may not believe in stakeholders...

➢ ...but they believe in YOU!
“THAT’S NOT MY TURF”

➢ Just because they don’t work for you...

➢ ...doesn’t mean you are not responsible for them.
“THEY’LL NEVER GET THAT BIG”

➢ “Prediction is hard...

➢ ...especially about the future” - Berra
YES. AND?

DON’T PANIC
**PROJECT SPECIFIC**

**Planning**
- **Initiate**
  - Project Goals & Objectives
  - Data Collection
  - Stakeholder Engagement
- **Quantify**
  - Existing Conditions
  - Project Drivers
  - Project Needs
- **Form**
  - Project Context
  - Alternatives Development and Analysis*
  - Refinement of Reasonable Alternatives

**Feasibility**
- **Measure**
  - Physical and Operational Performance
  - Market and Financial Performance
  - Impacts*
  - Risk
- **Evaluate**
  - Evaluation Approach
  - Alternatives Comparison
  - Recommended Project

**Financing**
- **Strategize**
  - Investment Approach
  - Project Due Diligence
  - Credit/Debt Profile
- **Structure**
  - Business Models
  - Finance Alternatives
  - Financial Modeling
  - Debt Implementation & Management
  - Public Private Partnerships
  - Grants
  - Government Loans

**Implementation**

**Monitoring/Evaluation**

*Port Planning and Investment Toolkit Focus*

Strategize

- Investment Approach
- Project Due Diligence
- Credit/Debt Profile

Structure

- Business Models
- Finance Alternatives
- Financial Modeling
- Debt Implementation & Management
- Public Private Partnerships
- Grants
- Government Loans

Implementation

Monitoring/Evaluation
559,000 TEUs in 2017
18% Growth on 2016
HALIFAX TOOK THE TIME TO GET IT RIGHT

➢ “Leave no stone unturned”
➢ “Assume everything is feasible”
➢ “Bring no preconceptions”
➢ “Draw no conclusions”

➢ Ships, barges, trucks, trains, roads, bridges, rail lines, rail yards, cruise, dry bulk, cranes, air spaces, tunnels, trenches, parks, city traffic, intersections, oil docks, tank farms, navigation, pilotage, tugs, fueling, dray market, dray costs, capital cost, cash flow, resiliency, sustainability, private properties, social license to operate

➢ A balanced, feasible solution is now in hand
REMEMBER:

“They will forget if it is *late*,
They will forget if it *cost* too much,

They will *never* forget if it *does not work*.”

Guy Buzzoni
Global Container Terminals
Bayonne Bridge raised to clear 14,000 TEU container ships into Newark Bay
Opens the whole East Coast to these ships
Halifax is Canada’s Atlantic Gateway

MacKay and MacDonald Bridges cannot be raised
Fairview is inaccessible to 10,000+ TEU ships
Only one Ultra Class ship at a time, at Halterm

Without a second Ultra Class berth south of the bridges, Halifax port volume will stagnate, then decline, raising costs for importer and exporters

A new Ultra Class berth south of the Bridges is needed
Halifax traffic:
- 50% by regional truck
- 50% by long-haul rail

All local container traffic at Halterm, south of the Bridges, moves via downtown streets

The truck count is not huge, but is very visible

Shifting local traffic off of Halifax’s city streets was a major criterion
FEASIBILITY

- **Dartmouth + Rail Bypass**
  - CAD 1,415 M for 1,250,000 TEUs / year
  - *Issues: Lead time, First cost, Oil Terminal*

- **Halterm East**
  - CAD 654 M for 650,000 TEUs / year
  - *Issues: High capacity, Complex phasing*

- **Halterm South**
  - CAD 423 M for 650,000 TEUs / year
  - *Issues: Point Pleasant Park*

- **Halterm North**
  - CAD 401 M for 650,000 TEUs / year
  - *Issues: Simplicity, Cruise & Dry Bulk displacement*
FINANCE

Conceptual Cost Estimate
Cash Flow Model
Investment Model
Benefit-Cost Analysis
NTCF Grant Funding
Categories of Risk Analysis

- **Organizational** – Leadership and Accountability
- **Commercial** – Market Demand and Public Benefits
- **Financial** – Capital & Operating Costs
- **Construction** – Site, Technology, Design, Regulatory and Procurement
- **Operational** – Before, During and After Construction
Port of Long Beach

Middle Harbor Container Terminal, Long Beach, California

$1.5 B/3.3 M TEU Automated Container Terminal for Largest Vessels

- Organizational: POLB/OOCL partnership share
- Commercial: OOCL assumes
- Financial: OOCL assumes
- Construction:
  - Site geotech and utilities POLB assumes
  - Technology and equipment integration OOCL assumes
  - Operational fluidity during & after construction OOCL assumes
- Project strength is the continuous learning loop among organizational, commercial, financial, construction and operational risk managers
Georgia Ports Authority
*Mason Mega Rail, Garden City Terminal, Savannah, Georgia*

$127 M / 1M annual lift Capability  *NS/CSX  Intermodal Facility with Unit Train Capability*

- **Organizational:** GPA assumes
- **Commercial:** GPA/CSX/NS share and minimize with detailed hinterland & discretionary cargo analysis
- **Financial:** GPA assumes with $44M FASTLAME grant
- **Construction:** GPA assumes
  - Site, Geotech, Utilities & Equipment
  - Technology integration
- **Operations:** GPA/CSX/NS share
  - Fluidity during construction
  - Shared facility between two Class 1 RR
- **Project strength** is the single owner & operator of all marine and rail terminals
Port of Virginia and US Army Corps of Engineers
Craney Island Eastward Expansion & Marine Terminal, Portsmouth, Virginia
$4 Billion/5 Million TEU Dual Function Project for Long Term Dredge & Cargo Needs

- **Organizational**: USACE/VPA partnership share
- **Commercial**: USACE/VPA share and minimize through public benefit and long term demand forecast
- **Financial**: USACE/VPA share
  - 50/50% cost-share to expand dredged material capacity requires USACE & Congressional funding & coordination
  - Marine terminal (100% VPA funded)
- **Construction**: VPA assumes terminal geotech risk including
  - Fill with dredged material
  - Soft clay foundation
  - Time constraints for filling (dredged material) and ground improvements (4+ years)
- **Operations**: USACE/VPA share
- **Project Strength**: Blue Ribbon Panel of experts & best practices from similar construction projects
Research and Risk Analysis

• **Organizational** – Leadership and Accountability
  - *Do decision makers have the authority, resources and incentives for a successful & sustainable project?*

• **Commercial** – Market Demand and Public Benefits
  - *Is there a clear demonstration of market demand? Are there quantitative or qualitative public benefits?*
  - *Does the project have long term performance indicators?*

• **Financial** – Capital & Operating Costs
  - *Does the cost model include both capital and operating costs?*
  - *Does the construction cost include an adequate contingency?*
  - *Do funding partners participate in the contingency?*
Research and Risk Analysis

- **Construction** – Site, Technology, Design, Regulatory and Procurement
  - Are your NEPA and permit schedules realistic?
  - How detailed is your Geotech analysis?
  - Has the design been reviewed for operational efficiency? Can it accommodate changes or delays in technologies?
  - Have you explored alternative procurement techniques?

- **Operational** – Before, During and After Construction
  - Do you have a simulation model or an internal operations group involved in all project decisions?
  - Have you included construction impact on cargo operations and cargo operations impact on construction?
QUESTIONS

• How do tenants’ and ports’ interests interact in the “landlord” port model, and how do results differ for the “operating” port model?
• To what degree should we consider labor contracts in the port authority master plan?
• How should the port governance structure play a role on which capital projects move to implementation?
• Not all ports have a formal “master planning” process. What role does a formal master plan play in port performance?
• You highlighted examples in which research helped in project success. What about some unsuccessful projects?
• Does the current global trade situation affect project development?