Transportation Policy Brief #5

Port Competition and Best Practices

Panama Canal Authority

Panama Canal Authority

Texas Ports Association

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Transportation Policy Brief #5

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FOREWORD

The Lyndon B. Johnson School of Public Affairs at The University of Texas at Austin has established interdisciplinary research on policy issues as the core of its education program. A major part of this program is a nine-month policy research project (PRP), in the course of which two or more faculty members from different disciplines direct the research of 10 to 20 graduate students of diverse backgrounds on public policy issues of concern to a government or nonprofit agency.

During the 2016–2017 academic year, the Texas Department of Transportation (TxDOT) funded, through the Center for Transportation Research (CTR), a PRP addressing six key transport/logistics policy issues related to Texas international trade with foreign countries and domestic trade with other U.S. states. Overall direction and guidance was provided by Roger Schiller (TxDOT Maritime Division), who participated in classroom discussions at the beginning of the academic year.

As a consequence, the following policy issues were selected for study:

1. Panama Canal Utilization;
2. Texas Ports and the Panama Canal: Commodities and Infrastructure;
3. Global Logistics Hubs in Texas;
4. Texas-Latin American Trade;
5. Port Competition and Best Practices; and
6. Transportation and Trade Forecasts.

The findings of each policy issue are presented within the context of separate policy briefs. This particular policy brief, “Port Best Practices and Competition” was researched and written by Cristina Mendez and Noah Oaks.

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EXECUTIVE SUMMARY

Texas ports vary in size, function, and specialty, but all Texas ports are tasked with ensuring supply chain efficiency for imports and exports in the US. This task is difficult when ships continue to grow in size, port congestion increases, and funding for expansion is limited. While there is always a need for long-term capital projects like deeper channels or infrastructure upgrades, many stakeholders interviewed for this brief pointed to a critical lack of visibility as the primary factor hindering efficiency and generating congestion in the supply chain.

This policy brief analyzes the benefits and challenges of port stakeholder roundtables, information-sharing technologies, initiatives by the US federal government, and innovative approaches by individual ports to address congestion and increase visibility. To update port best practices, encourage visibility, and promote Texas ports' competitive advantage in the US supply chain over other domestic ports, this report provides the following three recommendations to Texas Department of Transportation (TxDOT):

- **Facilitate regional and local roundtables with stakeholders across the supply chain:** To strengthen lines of communication between ports and stakeholders, roundtables will allow for exchange of best practices, and gain an in-depth understanding of the challenges ports face.
- **Expand partnerships:** TxDOT should continue to search for untapped sources of funding and innovation through strategically expanding partnerships with academia and nonprofits while continuing to work with traditional private and public sector entities. These sources provide a wealth of potential knowledge that can be employed in the creation of best practices.
- **Strategically support information technology development:** Texas ports should strategically develop and implement information-sharing technologies and port community platforms that support the exchange of operational status data elements to relevant stakeholders. These initiatives may be catalyzed through the partnerships and roundtables discussed in the first two recommendations.

Incorporating these recommendations should have a direct impact on Texas' competitive standing. While some Texas ports have already begun similar projects and engaged partners, this policy brief suggests that all ports implement the recommendations as a uniform best practice.

BACKGROUND

The goal of this brief is to examine the current best practices Texas ports employ in their daily operations while simultaneously assessing Texas port competitiveness with other domestic ports. It will also provide a number of recommendations aimed to update those current best practices and strengthen Texas ports' competitive position.

It is important to first recognize the diverse nature of ports within the state of Texas. For instance, the Port of Houston is considered a large container port[1] while the Port of Harlingen deals largely in commodities like liquid fertilizer, liquid bulk products, and products like grain and sugar.[2] Due to the diverse nature of Texas ports, it remains difficult for government

[1] "Welcome to Port Houston." Port Houston. February 11, 2017. http://porthouston.com/portweb/.

[2] " The Port of Harlingen Authority." Port of Harlingen Authority. February 11, 2017. http://portofharlingen.com/

agencies, such as TxDOT, to create performance measures that accurately and fairly represent the work that these ports do every day. Since it is nearly impossible to operationalize across ports, this brief focuses its scope on areas that TxDOT would be able to implement across all ports in Texas to promote port and economic growth while concurrently minimizing congestion both into and out of ports.

Texas ports identified a number of barriers to growth in the 2014 Texas Port Report to TxDOT. Two primary barriers were considered: 1) a lack of funding for dredging and infrastructure projects, and 2) port congestion.[3] Unfortunately, with the current budget shortfall in Texas, expensive infrastructure projects do not seem financially viable and would take much longer to implement. The issue of port congestion needs an immediate fix and this brief will assess certain best practices that could reduce port congestion in the short term, while still recognizing the long-term need for dredging and infrastructure projects.

While continuing to recognize the importance of long-term projects, a number of initiatives begun at the federal level suggest information-sharing technology (IST) may be the most cost-effective way for Texas ports to not only maintain their competitive position in the short term, but perhaps provide an advantage that will pay dividends in the long run. Over the last few decades, the influx of new IST and digital platforms has provided a gateway for increased visibility and efficiency for a wide range of industries in the global supply chain. When those in the supply chain increase these aspects of visibility and efficiency with among stakeholders through updated IST or new digital platforms, many of the issues that plague the system, like congestion, are resolved. Texas ports, like ports around the nation, have struggled to implement new systems to track the movement of goods more efficiently, as the management of such public and private information poses security and proprietary concerns for some.

Over the last few years, a number of federal and state agencies have looked into port IST infrastructure and how it can be better used to streamline the flow of goods in the supply chain without compromising the confidentiality and competitiveness of port-related activities. Specifically, the US Department of Commerce's (DOC) US 21st Century Port Initiative and the Federal Maritime Commission's (FMC) Supply Chain Innovation Initiative have provided frameworks for Texas ports to consider. Employing these frameworks could lead to an even greater position for Texas in the US economy.

This brief will delve into these initiatives, and others, to derive a set of recommendations that TxDOT may consider in their strategy regarding this important area of the supply chain. In addition, TxDOT should continue to search for increased funding to aid the necessary long-term dredging and intermodal infrastructure projects requested by the ports of Texas.

VISIBILITY AS BEST PRACTICE

Port congestion is one of the most severe problems supply chain stakeholders face in the current system. The root of port congestion is the lack of visibility in the supply chain. Public port authorities, marine terminal operators, beneficial cargo owners, ocean transportation intermediaries, liner shipping companies, drayage trucking companies, longshore labor representatives, rail officials, and chassis providers all have pointed to the lack of information as the driving factor of congestion.[4] Bar code information on containers, departure and arrival times, and container availability are just a few types of information that can be made more visible to port operators. Visibility has its limits due to the competitive nature within the supply chain. Since some information is considered more valuable than other information as it relates to visibility, voluntary public information provided to the right individual stakeholders at the

[3] "Texas Port Report" *TxDot.gov* 2014. https://ftp.dot.state.tx.us/pub/txdot-info/tpp/giww/2014-port-report.pdf

[4] "FMC Supply Chain Innovation Teams Interim Status Report." *FMC.gov*, 2016. http://www.fmc.gov/news/supply_chain_interim_status_report.aspx

necessary time may enhance visibility without giving other individuals a competitive advantage. Examples of the types of information to be shared are provided in Figure 1. The *Port Information Integration* section below provides specific examples of how the Port of New York/New Jersey and the Port of Los Angeles use this information effectively.

The DOC's Advisory Committee on Supply Chain Competitiveness (ACSCC) recently released recommendations relating to the types of pertinent information necessary to facilitate more fluid movement of information to supply chain actors. Through improving coordination and communication between actors, public information is provided more efficiently, theoretically leading to greater visibility and thus less congestion. The ACSCC broke down this information into two distinct categories, each with two sub-categories, as shown in Figure 1.

Import Cargo

Pre-Arrival at Port	*Post-Arrival at Port*
Vessel name and voyage number	Vessel actual time of arrival (date / time)
Arriving terminal and port	Vessel discharge (date / time)
Vessel estimated time of arrival (date / time)	CBP status (cleared vs. non-cleared and exam type)
Cargo identification number (i.e. container number / barge ID)	Other holds (government or commercial)
Equipment size and type	Terminal gate exit (date / time)
Expected availability (based on stow / discharge plan)	Mode of exit (e.g., dray, rail, barge, etc.)
Empty status conditions (drop and pick ups)	Actual availability, container (date / time)
Rail volume (RR, inland rail terminal destination, box size/type)	Empty container availability (by container as they are available)
Destination	Last free day
	Chassis availability by size
	Permit required (overweight or out of gauge cargo)

Export Cargo

Pre-Arrival At Port	*Post-Arrival at Port*
Vessel name and voyage number	Vessel actual time of departure (date / time)
Vessel estimated time of departure (date / time)	Status with CBP and other government agencies
Arriving terminal and port	Mode of exit (e.g., dray, rail, barge, etc.)
Cargo identification number (i.e. container number / barge ID)	Container loaded (date / time)
Equipment size and type	Last free day
Cargo cutoff (date / time)	
Terminal gate entry (date / time)	
Mode of entry (e.g., dray, rail, barge, etc.)	
Booking status	

Figure 1. Operational Maritime Cargo Data Status Elements proposed by the ACSCC[5]

The informational elements outlined in Figure 1 can be made public through a secure platform with careful screening of proprietary issues. Any information given by the various

[5] "Advisory Committee on Supply Chain Competitiveness Recommendation to The Secretary of Commerce Regarding U.S. Supply Chain, Seaport and Stakeholder Information-Sharing." Trade.gov, September 7, 2016.

stakeholders should continue to be provided through voluntary action. Breaking down the information into the two distinct categories—goods being imported and goods being exported—will produce a streamlined approach for the necessary stakeholders to find the important information that will increase visibility and reduce congestion. This information could be accessed through a number of potential outlets; this brief advocates for digital platforms as the optimal outlet through which to publish this information.

PORT INFORMATION INTEGRATION

To better show how a port may integrate digital information, this report will discuss a few examples of port digital platforms currently in use at the Port of New York/New Jersey and at the Port of Los Angeles, providing greater operational context. As the reader will see, port stakeholders and supply chain actors worked together to create an information-sharing system to benefit the port and present a portal for individuals to retrieve vital information.

PORT OF NEW YORK/NEW JERSEY

In 2015, the Port of New York/New Jersey implemented the Terminal Information Portal System (TIPS) to more efficiently provide information to stakeholders throughout the supply chain. TIPS is a web portal that allows users to check public information pertinent to their role in shipping goods in a quick and efficient manner.[6]

The initial functionality of TIPS provides port actors with specific port and terminal information, important container availability, export booking inquiries, vessel schedules, and empty container information. For example, this information can be securely accessed by truckers, cargo owners, and other providers through the PortTruckPass program.[7] This program is designed to decrease the number of trouble tickets, or areas where incoming or outgoing cargo is delayed at gates, which equate to more congestion and longer wait times at container terminals.[8] TIPS resolves seven of the top-ten reasons for trouble ticket regions in the port.[9] Per the Council on Port Performance, TIPS has received strong reviews from many port stakeholders. It is worth noting that TIPS is only in its second full year of operation.

PORT OF LOS ANGELES

Similar to the Port of New York/New Jersey, the Port of Los Angeles partnered with GE Transportation to create a new pilot IST system. This digital platform aids visibility throughout the port and increases coordination of shippers and port operators in regards to larger ships coming to port. The pilot program was established in November 2016 and was directly supported by former US Secretary of Commerce Penny Pritzker. The digital platform enables stakeholders to better plan the movement of goods through the port weeks in advance. For example, information regarding types and sizes of cargo as well as the chassis needed is given to the port where the ship is going to stop. This allows the receiving port to prepare in advance and thus optimize its resources. This efficient use of information will allow the Port of Los Angeles to

[6] "Port of New York/New Jersey launches terminal portal." Port of New York/New Jersey, September 1, 2015. http://www.americanshipper.com/main/news/port-of-new-yorknew-jersey-launches-terminal-porta-61362.aspx#hide

[7] Field, Alan M. "*Port of NY and NJ Inaugurates TIPS System*." Port of New York and New Jersey Council on Port Performance. September 2015

[8] Ibid.

[9] Ibid

handle larger ships with little delay or congestion. Also, similar to the Port of New York/New Jersey's TIPS, the Port of Los Angeles' project has been operational only for a very short time.

FEDERAL INITIATIVES

This brief will go into further detail about notable efforts by a number of federal and state actors studying port best practices and implementing initiatives based on the results. Two separate initiatives at the federal level by the DOC and the FMC will be highlighted due to their strategic focus on the supply chain, congestion, and visibility as these topics relate to ports. With extensive input from the private sector and cooperation from the public sector, the DOC and FMC continue to invest in innovative practices, such as those outlined in this section, in order to support local ports.

21ST CENTURY US PORT COMPETITIVENESS INITIATIVE

Under the leadership of Penny Pritzker, the 38th Secretary of Commerce, the department initiated Phase One of the 21st Century US Port Competitiveness Initiative. This effort primarily focuses on assessing best practices and modernizing the IST of port operations. The Initiative's deliverables include the ACSCC's 2016 recommendations, the convening of regional roundtables with port officials, and a government partnership with the University of Southern California[10]. Interestingly, each of these deliverables centralizes the harnessing of data, IST integration, and optimization of supply chain operations in their efforts to increase competitiveness. The following paragraphs will expand on the Initiative's key deliverables to analyze the federal report's recommendations in practice.

ACSCC RECOMMENDATIONS

The December 2016 report titled *Improving American Competitiveness: Best Practices by US Port Communities* was informed by an open call for best practices from port stakeholders. With a wide variety of input sources, this report compiled innovative initiatives that have worked throughout the country to increase efficiency and effectiveness. The Committee's reported best practices can be grouped into the following six categories:

1. Formulating working groups with participation from a diverse set of port stakeholders;
2. Strengthening of information infrastructure and IST;
3. Streamlining port operations to decrease congestion and increase overall efficiency;
4. Developing sustainable streams of funding to ensure financial security;
5. Investing in workforce development to support IST structures and establishing educational partnerships to create pathways for recruitment; and
6. Creating a culture of agreement and buy-in if port benchmarks are adopted.

Key points of the Committee's report are outlined above to highlight two main insights. First, the majority of best practices require promotion of both information infrastructure and IST. For example, Category Three includes suggestions such as the creation of a scheduling

[10] "21st Century U.S. Port Competitiveness Initiative: U.S. Supply Chain Excellence, Phase One." *Commerce.gov*, January 24, 2017. https://www.commerce.gov/news/blog/2016/10/21st-century-us-port-competitiveness-initiative-us-supply-chain-excellence-phase.

platform for truck drivers and the development of a mobile app for drivers to check in to their appointments and see live traffic updates. Remote check-in enables the appointment system to move faster and smoother. Secondly, these best practices are highlighted to underscore how closely federal best practice recommendations align with recommendations for best practices in Texas ports from this brief. This alignment speaks to the wide applicability of best practices throughout ports in Texas and the United States.

REGIONAL ROUNDTABLES

The remainder of the 21st Century US Port Competitiveness Initiative's programs—regional port roundtables and hackathons—reflect the ACSCC's best practices in action at the federal level. This was intentionally done by the ACSCC as each of their current initiatives is guided by and designed according to the 2016 report, which acts as a strategic framework. The first regional roundtable occurred at the Port of Los Angeles; it is likely this site was chosen due to the debilitating 2015 labor strikes the port experienced. Communication amongst stakeholders, primarily between labor forces and ports, was found to be the biggest concern. In response to this, the first roundtable announced efforts to extend the West Coast Longshore Contract before its 2019 expiration, signaling a commitment by port stakeholders to enhance communication.[11]

Regional roundtables generated a set of best practices, as a diverse set of stakeholders and members of the port community attended to discuss concerns and establish lines of dialogue. A roundtable that is regional in scope allows area ports an opportunity to exhibit their initiatives and increases awareness of regional issues through the interaction of local and national level actors. Regional roundtables thus connect ports with possible solutions and ensure that policymakers at the national level understand the legislative challenges faced by the wide variety of public and private port stakeholders.

HACKATHON

The DOC kicked off a technology competition to develop IST for the port community at the Marshall Center for Global Supply Chain Management at the University of Southern California. The November 2016 challenge brought in dozens of private stakeholders, as well as researchers in teams, to compete for a $15,000 prize. Teams were supplied with a data set and within twenty-four hours were expected to present a prototype for port digital IST systems, which included supply chain IST, data and analytics, and the Internet of Things.[12] To build upon its prior initiatives, the DOC also provided the ACSCC maritime cargo data status elements as guidelines for the prototype products. Winning products will be shared; however, as of February 2017 the DOC has yet to issue details about the prototypes. This hackathon is a valuable example of a simple, cost-effective competition that harnesses the existing human capital, increases awareness of port challenges, and propels innovation.

[11] "U.S. Secretary of Commerce Penny Pritzker Holds First in Series of Meetings with Key U.S. Ports to Improve U.S. Supply Chain Competitiveness." *Commerce.gov* (web log), April 21, 2016. https://www.commerce.gov/news/blog/2016/04/us-secretary-commerce-penny-pritzker-holds-first-series-meetings-key-us-ports.

[12] "SCDT Hackathon." USC Global Supply Chain Management. http://uscsupplychain.com/home/digitalsc/hackathon/.

FEDERAL MARITIME COMMISSION SUPPLY CHAIN INNOVATION INITIATIVE

Much like the DOC's 21st Century US Port Competitiveness Initiative programs, the FMC has been researching port congestion and visibility at a federal level in an attempt to boost US commerce. In its research, the FMC has produced reports relating to supply chain issues. However, for the purposes of this brief, the focus will be mainly on the FMC Supply Chain Innovation Initiative due to its best practice correlation and the notion that Texas ports could utilize the structure of the forums the FMC implemented in Phase One of the initiative.

Commissioner Rebecca Dye of the FMC was directed to begin the Supply Chain Innovation Initiative in May 2016. The initiative's mission involved bringing together representatives from stakeholders across the supply chain to generate innovative ideas that will produce better practices and improve the overall system flow.[13] This effort is currently in Phase One, which is focused primarily on import-side supply chain activities. Phase One convened three teams of 12 individual industry representatives, including public port authorities, marine terminal operators, beneficial cargo owners, ocean transportation intermediaries, liner shipping companies, drayage trucking companies, longshore labor representatives, rail officials, and chassis providers. These supply chain teams also split into sub-groups of actors to resolve any operational challenges that interfered with access to the information.[14]

The Phase One supply chain teams developed lists of critical information needs by actors, sources of that information, timing requirements, and expected operational improvements resulting from the access to that information.[15] The supply chain team members listed port/marine terminal operations (such as container availability, chassis availability, and more efficient drayage trucking operations) as high priority critical information that could aid the flow of goods more smoothly and reliably through the system.[16] Furthermore, the development of a national integrated digital portal for access to this information was discussed and could become an option to pursue over the coming years by the FMC. As the initiative moves into Phase Two in May 2017, the focus will shift towards export goods.

LESSONS LEARNED

Key to the functionality of the DOC's 21st Century US Port Competitiveness Initiative is that it operates on an open loop. That is, the DOC receives feedback from the port community, disseminates the knowledge, and bases future endeavors upon the gathered information. Imperative to the DOC Initiative's success is that each effort builds upon past efforts with continuous improvement measures implemented by a diverse set of stakeholders. Additionally, central to the ACSCC's recommendations are the considerations of monetary and infrastructure constraints. Being cognizant of these constraints has allowed for the development of technology-based best practices that streamline operations and optimize the use of existing infrastructure.

Similarly, the FMC Supply Chain Innovation Initiative brought together stakeholders from across the supply chain to determine what hinders efficiency in the overall system. Visibility and clear access to information were critical to Phase One of the initiative and should continue to be researched into Phase Two. Lastly, voluntarily participation in the supply chain groups and providing voluntary information do not compromise the competitive nature between ports and stakeholders while simultaneously smoothing out the supply chain congestion issues.

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[13] "Statement of Commissioner Dye on Supply Chain Innovation Teams." *FMC.gov*, July 20,2016. http://www.fmc.gov/statement_of_commissioner_rebecca_dye_on_supply_chain_innovation_teams_/

[14] Ibid.

[15] Ibid.

[16] Ibid.

CHALLENGES TO INCORPORATING INFORMATION

FUNDING SHORTFALLS

Current budgetary concerns limit the possible deliverables that TxDOT and the state of Texas can provide to ports and surrounding infrastructure. Additionally, population growth within the state continues to put pressure on lawmakers to concentrate resources toward easing congestion for constituents now, rather than long-term planning for ports. Given the high costs of new infrastructure, upgraded digital platform systems, dredging, or any other port-related investment, it is imperative that TxDOT and port authorities spend what little discretionary funding is available in the most cost-efficient ways possible. The authors are cognizant that IST upgrades and implementing digital platform systems not currently in place carry substantial upfront investment and maintenance costs. In the long term, however, we suggest that the initial investment will pay dividends over the lifetime of the investment and could be funded through joint stakeholder efforts—particularly through TxDOT, the ports, and the state.

PORT SKEPTICISM

Another challenge in incorporating information systems into the supply chain is the apparent skepticism from many stakeholders. The prevailing opinions from some of the industry members, who provided input for this brief, revolve around increased funding for dredging, transportation infrastructure, and chassis availability rather than IST digital platform systems. This trend to prioritize capital expenditures rather than IST system upgrades has been noted in several surveys that were provided by ports and stakeholders in the 21st Century US Port Competitiveness Initiative. While many responses alluded to the need for better communication among all actors, most were quick to discuss physical infrastructure and capital goods before digital needs.

It should also be noted here, and throughout this brief, that the inter-port competition may perpetuate skepticism about IST and digital platforms. The need for ports and other stakeholders to have proprietary information is essential for their business. However, the 21st Century US Port Competitiveness Initiative surveys and discussions from the FMC Supply Chain Innovation Initiative show a glaring need to produce the critical, public information to the right stakeholders as soon as possible.

TEXAS PORT COMPETITIVENESS

Texas ports face several competitors within the state, at locations in the Gulf, and throughout the US Atlantic seaboard. Since this brief focuses on the Texas port competition with US ports, the discussion will revolve around a range of issues that Texas ports currently face as they relate to this competition. The advantages of the West and East Coast ports (discussed below), coupled with a general lack of sufficient funding for expansion, dredging, or infrastructure projects, leaves Texas ports in need of alternative solutions.

WEST COAST PORT ADVANTAGES

Most West Coast ports have the advantage of deeper drafts and are capable of accommodating mega-ships that handle 18,000 TEUs (twenty-foot equivalent units, a measure used for capacity in container transportation). The Port of Los Angeles/Long Beach, for

example, has a channel depth of 53 feet compared to the Port of Houston or the Port of Corpus Christi, which both have a channel depth of only 45 feet.[17] Furthermore, West Coast ports have inherent advantage in their location, as they are closer to the large Asian markets. Lastly, the creation of pilot programs that establish digital platforms, like the program at the Port of Los Angeles, provides efficiency advantages while bringing in larger vessels. Other West Coast ports have also implemented digital platforms to assist with their operations; these platforms identify key performance indicators and aid the fluidity of processing cargo. [18] As other ports are advanced in their implementation of cost-maximizing digital solutions, investing in digital platforms coupled with physical infrastructure improvements may prove to be essential in bolstering Texan port competitiveness.

EAST COAST PORT ADVANTAGES

A number of East Coast ports have depths of more than 45 feet, keeping them with or ahead of numerous Texas ports. Several ports, such as the Port of New York and the Port of Miami, are already dredged to 50 feet deep. Additionally, the governor of New York recently announced that over $27 million of funding was available to go towards rail and port infrastructure projects.[19] The Port of New York, as mentioned above, has also implemented its own IST system upgrade, the TIPS program, which gives this particular port potential advantages in regard to delays and congestion. With a very tight budget over the next biennium, it does not appear as though Texas will be able to afford that kind of investment into its ports in the near term.

POTENTIAL TEXAS ADVANTAGES

Texas ports have two critical advantages. First, the state population is large, growing, and broadly concentrated within a 250-mile range of deep water ports. Second, Texas refineries have benefited from large investments in a range of natural gas and oil facilities that are the most competitive in the world. The 45-ft. channels allow a 10,000 TEU ship to reach terminals and load/unload. If additional dredging faces a lack of available discretionary funding, this brief suggests that Texas should consider deploying similar measures reported in the US 21st Century Port Initiative and FMC Supply Chain Innovation Initiative. Texas can take steps towards building its own competitive advantage, while also noting that long-term projects in dredging and infrastructure should still be considered when applicable. Implementing updated information infrastructure and IST, the supply chain through Texas will be able to compete with ports like the Port of Los Angeles and Port of New York even without the capability of accommodating mega-ships. Furthermore, the Texas Ports Association (TPA) provides an existing framework for bringing together many ports in Texas to stimulate a dialogue to determine the key information that would benefit Texas ports in digitized platforms.

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[17] "Channel Depth at Major North American Container Ports." *Hofstra.edu*, February 12, 2017. https://people.hofstra.edu/geotrans/eng/ch4en/conc4en/uswaterwaysystem.html

[18] Hutchins, Reynolds. "The Great Divide. Two new reports-one from the government and one from industry-take divergent paths to measuring port productivity." The Journal of Commerce. February 6, 2017.

[19] "Governor Cuomo Announces $27.9 Million for Rail and Port Infrastructure Improvements." *Governor.ny.gov*, September 14, 2016. https://www.governor.ny.gov/news/governor-cuomo-announces-279-million-rail-and-port-infrastructure-improvements

BEST PRACTICES

This section will discuss the top recommendations this policy brief advocates as the most pertinent best practices for Texas ports to adopt. This brief recognizes that the application of these best practices may look different as each port has a diverse set of stakeholders and operational conditions. The existing efforts by organizations like the TPA to further collaborative communication between ports should also not go unrecognized. The TPA should be commended and remain an essential voice for the member ports in Texas while playing an integral role in following recommendations. The following proposed best practices, informed by the work of the TPA and other such organizations, should be viewed as a springboard that ports may use to spur action and innovation within their communities. These three recommendations for best practices serve as guidelines and suggestions based on what has yielded optimized operations across the nation and the world.

RECOMMENDATION 1: REGIONAL AND PORT-SPECIFIC ROUNDTABLES

Communication between the port community and amongst port stakeholders has proven to be a vital component to easing not only congestion, but also other challenges ports face. It is important to note that some Texas ports have roundtables in place such as the Port Houston Steel Round Table[20] and the Corpus Christi Freight-Industry Round Table[21]. However, it is imperative that all ports, regardless of size, develop such roundtables. Furthermore, to ensure effectiveness, roundtables established to outline best practices should be held frequently to enable fluid communication, continuous improvement, and strategic planning. We recommend Texas ports ensure they have the following two roundtable structures in place to equip themselves with the mechanisms necessary to tailor best practices to their specific port needs.

USE A MODEL WITH DEMONSTRATED EFFECTIVENESS

First, at the individual port level, we recommend a model that has been effective at the national level for the ACSCC. While the ACSCC is an advisory committee, their model can be adapted to port roundtables, which act similarly to advisory committees. The ACSCC structure is composed of the following key elements:

- **Clear mission:** Within the DOC, the ACSCC provides technical and policy advice to the Secretary.[22] Similarly, the Texas roundtables should provide technical and policy insight regarding port operations as well as the effects of local, state, and national policies on the port community.
- **Diverse members:** 45 executive-level members compose the committee. As per the ACSCC charter, the committee should have at least one of each of the following member types: a supply chain firm; user of a supply chain; freight transportation provider; representative of a port; and an academic expert.[23] Additionally, when

[20] "Port Houston Steel Round Table." Port Web Event. February 02, 2017. http://porthouston.com/portweb/event/port-houston-steel-roundtable/.

[21] Communications, PortCC. "Transportation Industry Round-Table Discussion and Media Tour." News. November 02, 2016. http://portofcc.com/transportation-industry-round-table-discussion-and-media-tour/.

[22] "Advisory Committee on Supply Chain Competitiveness about the ACSCC." Trade.gov. http://trade.gov/td/services/oscpb/supplychain/acscc/.

[23] "Advisory Committee on Supply Chain Competitiveness Committee Charter." Trade.gov. http://trade.gov/td/services/oscpb/supplychain/acscc/charter.html.

possible, the roundtable should include local government officials, state and local agencies, and technology industry representatives, such as those mentioned in recommendation 2.

- **Frequent meetings:** Averaging five meetings a year, the ACSCC is able to develop useful materials to inform its mission. Typically, meetings last half a day with business dictated by a strict agenda.[24] This agenda may include at least one subcommittee presentation of accomplished work, growth points, and request for future support. It is important for Texas ports to include subcommittee recommendations within the broader roundtable so as to fortify channels of communication and to take advantage of the expertise individual stakeholders hold.
- **Targeted subcommittees***:* To deepen understanding of the diverse needs of ports, it is recommended that the subcommittee under the main port roundtable at least include Finance and Infrastructure, Workforce Development, and Information Technology and Data.

These elements are fundamental to the success of roundtables. To ensure diverse perspectives, ports should invite private stakeholders, local governments, academia, regulatory bodies, and even state agencies. These bodies are especially useful when, for example, one member of the port community changes their operations or when port regulations change. Port roundtables can act as change management agents to mitigate the impact of otherwise unforeseen circumstances.

CREATE REGIONAL COLLABORATION

The second suggestion is to implement regional roundtables. TxDOT should play a central role in coordination, facilitation, and collaboration. While recognizing the efforts of the current Port Authority Advisory Committee appointed by the Texas Transportation Commission, it is possible that there are more inter-port communication opportunities that have yet to be utilized. Regional roundtables should operate similarly to port-specific roundtables. While regional roundtables may happen less frequently, they allow Texas ports to showcase their innovations and strategies while sharing best practices at their discretion. A strong example of collaboration to facilitate operational optimization can be found in the development of the San Pedro Bay Chassis Pool project via roundtables between the Port of Long Beach and the Port of Los Angeles. Promoting a culture of communication at the local and state level helps Texas ports increase visibility and spreads the use of best practices in an organic manner.

RECOMMENDATION 2: EXPANDED PARTNERSHIPS

As evidenced by the first recommendation, communication is the key to leverage existing port community resources. This second recommendation considers another best practice to build up communication through strategic partnerships with community stakeholders. While the DOC Initiatives highlighted the partnerships between the federal government and the University of Southern California, this section stresses partnerships within and beyond academia. With the following examples of partnerships, Texas ports should pay special attention to capitalizing their current network to strategically enhance their partnerships.

[24]"Advisory Committee on Supply Chain Competitiveness Committee Meetings." Trade.gov. http://trade.gov/td/services/oscpb/supplychain/acscc/meetings.html.

- **Academia:** With a particular focus on workforce development and general research, some Texas ports, such as the Port of Houston and the Port of San Antonio, have strong relationships with their local academic community. While partnerships should be mutually beneficial, they are not solely restricted to port operations. For example, the Texas A&M University of San Antonio and the Port of San Antonio partnership focuses on alleviating flooding issues in the south end of the Port.[25] Another example of a promising initiative is the Texas Automated Vehicle Proving Ground Partnership. As part of Texas' efforts to become a smart state, the Port of Houston may serve as a testing ground for these technologies.[26] Finally, it is important to note that partnerships should also be forged with community and technical colleges as these entities also have the academic and technical capacity to support ports. The Port of Houston has even partnered with independent school districts to supplement maritime education and careers.[27] Considering the State of Texas' robust academic community, more could be done to reach out to this under tapped resource of innovation.
- **Nonprofits:** Another untapped public sector area for partnerships is the nonprofit sector. For example, both the Port of Los Angeles and the Port of Rotterdam have established partnerships to house technology startup incubators and test sites. Within Texas, the Port of Houston, in particular, has made strides towards establishing this nonprofit model of partnerships.[28] Nonetheless, Texas ports would greatly benefit from at least a statewide incubator promoting the strengthening of port technology enterprises. The Port of Rotterdam has a diverse portfolio of partnerships it leverages to gain technical and operational support. Additionally, Rotterdam's partnerships help it attract other businesses that seek innovation-driven ports.[29]

RECOMMENDATION 3: STRATEGIC SUPPORT OF IST DEVELOPMENT

The third recommendation urges Texas ports to strategically develop digital IST and enhance port community systems through dedicated partnerships or communication forums. The IST conversation must become a cornerstone for port initiatives. In the quest for the integration of information technologies, it is a best practice for ports to develop a strategic framework for analyzing the most effective ways to integrate IST into their functions. Below is an outline developed after multiple conversations with port officials, supply chain experts, and IST technicians to provide an overview of how ports begin to develop a strategic framework to further IST development within their boundaries.

1. **Survey needs of internal and external port stakeholders:** As mentioned within the second recommendation, it is imperative ports survey needs and suggestions of the

[25] Barrios, Patricia. "University, Port San Antonio Form Partnership." *The Mesquite*, February 16, 2011. http://www.mesquite-news.com/port-san-antonio-partnership/.

[26] "Texas Automated Vehicle Proving Ground Partnership: How Collaboration Will Redefine Automation." December 20, 2016. https://tti.tamu.edu/2016/12/20/texas-automated-vehicle-proving-ground-partnership-how-collaboration-will-redefine-automation/.

[27] Ramirez, Gilda. "America's Distribution Hub for the Next Generation." Port of Houston Authority. April 11, 2016. http://trade.gov/td/services/oscpb/supplychain/acscc/Meetings/2016April/April%202016/ACSCC_4.21.2016_PRES_REV_4.19.2016.pdf.

[28] Ibid.

[29] "Partnerships." Innovation: Smartest Port. February 06, 2017. https://www.portofrotterdam.com/en/business-opportunities/smartest-port/partnerships.

entire port community. This survey of the community also allows for ports to reach out to non-traditional stakeholders (e.g., technology sector, community colleges) in an effort to include them in future endeavors. Additionally, assessing local needs allows Texas ports to determine the direction and overall goals of their strategic IST plan.

2. **Evaluate existing information technologies:** A basic inventory to assess best practices and present initiatives ensures ports do not duplicate efforts. In conducting this overview, port authorities will also connect to the individuals and sectors of the supply chain most knowledgeable about port information technologies. This identification of experts and existing human and infrastructure capital will serve to catalog port strengths that may be leveraged in step three.
3. **Establish a strategic plan for implementation and investment specifically for IST:** While some ports may have an overall strategic plan, best practices indicate a separate strategic plan for IST allows for detailed planning. This plan can complement existing initiatives for capital expenditures and workforce development while providing overall support for other port goals.
4. **Determine a stable source of funding allocated for research, implementation, and upkeep of information-systems:** This step is crucial to the effectiveness of investments in IST. Within this step, TxDOT will have the capacity to establish guidelines and suggestions to support local ports applying for private and government grants. Compiling a state report of finance innovation and best practices specific to ports can provide a competitive advantage to Texas ports as they compete against other US ports to secure funding.
5. **Appoint a working group to facilitate IST transition:** To support the development and implementation, the port should consider leveraging its experts identified within the previous steps to establish an advisory committee or roundtable dedicated to the development of IST infrastructure. This roundtable would be responsible for facilitating change management and investment in innovative IST structures to optimize the investments made by ports.

Once again, this brief reiterates the flexibility of these best practices and recommendations within the implementation phase. Texas ports should adopt what their port community expertise dictates will be most effective and efficient for their needs. For example, some ports may wish to integrate platforms for information-sharing only within certain sectors of operations while others may want to integrate a complete digital port community system

It must again be reiterated the understanding that ports have capital expenditure infrastructure needs; however, research indicates that there is a necessity to upgrade the IST information systems and digital platforms to produce more visibility within the supply chain. It should also be understood that some ports may have already implemented upgrades to their information systems. However, ports that have not developed this sector may take on a priority role for this upgrade as it relates to appropriating funding for these necessary upgrades.

CONSIDERATIONS

As with any implementation of best practices, Texas ports should acknowledge that the optimal integration of information technologies will be a trial-and-error process. Not only must ports consider the creation of the information infrastructure, but also the systems update and maintenance they will have to factor in financially. Furthermore, if ports consider adopting a digital platform system for all of its stakeholders, this electronic platform will likely require

millions of dollars in immediate investment as a team of consultants to manage change, and a network of technicians will be especially vital in the beginning phases for successful integration. Because of these considerations, this brief advocates for information technology to be viewed as equivalent to port infrastructure. If information technology systems are considered infrastructure, sources for likely funding will expand. Additionally, equating IST to vital infrastructure will help prioritize strategic planning for and investment into this modernization tool.

CONCLUSION

Many solutions that would enable better efficiency in port operations have been discovered and implemented across the world. Federal initiatives opened the dialogue between all pertinent actors, helping identify the obstacles to efficiency. There were long-term issues of port capital infrastructure and short-term issues that related to visibility of information. After analyzing the costs associated with additional dredging, capital infrastructure, and hiring more labor to meet the demands of the state's currently robust financial climate, this brief concludes that laying the groundwork for upgraded digital platform systems now could pay dividends later. Additionally, the long-term capital projects of dredging or infrastructure, while still necessary when funding is available, do not get at the root of the visibility issue. To ensure better visibility, we recommend that TxDOT facilitate frequent roundtables to start the dialogue between supply chain users, freight transportation providers, ports, academics, and government agencies and officials. This brief also recognizes that upgrading, or even in some cases creating, information-sharing systems at ports will also carry its own expenses. This is why expanded partnerships are needed with under-tapped resources like academia and nonprofits to spur innovation. Finally, strategic development of IST systems in Texas ports would smooth out the supply chain visibility issues and should generate a competitive advantage over other domestic ports, securing Texas' place in the global market.

BIBLIOGRAPHY

"21st Century U.S. Port Competitiveness Initiative: U.S. Supply Chain Excellence, Phase One." *Commerce.gov*, January 24, 2017. https://www.commerce.gov/news/blog/2016/10/21st-century-us-port-competitiveness-initiative-us-supply-chain-excellence-phase.

"Advisory Committee on Supply Chain Competitiveness about the ACSCC." Trade.gov. http://trade.gov/td/services/oscpb/supplychain/acscc/.

"Advisory Committee on Supply Chain Competitiveness Committee Charter." Trade.gov. http://trade.gov/td/services/oscpb/supplychain/acscc/charter.html.

"Advisory Committee on Supply Chain Competitiveness Committee Meetings." Trade.gov. http://trade.gov/td/services/oscpb/supplychain/acscc/meetings.html.

"Advisory Committee on Supply Chain Competitiveness Recommendation to the Secretary of Commerce Regarding U.S. Supply Chain, Seaport and Stakeholder Information-Sharing." Trade.gov, September 7, 2016. http://trade.gov/td/services/oscpb/supplychain/acscc/Meetings/2016September/September2016/20164%20FREIGHT%20SUBCOM%20FINAL%20ACSCC%20Recommendation%20Cargo%20Data%20Elements%20for%20Information-Sharing.pdf.

Barrios, Patricia. "University, Port San Antonio Form Partnership." *The Mesquite*, February 16, 2011. http://www.mesquite-news.com/port-san-antonio-partnership/.

"Channel Depth at Major North American Container Ports." *Hofstra.edu*, February 12, 2017. https://people.hofstra.edu/geotrans/eng/ch4en/conc4en/uswaterwaysystem.html

Communications, PortCC. "Transportation Industry Round-Table Discussion and Media Tour." News. November 02, 2016. http://portofcc.com/transportation-industry-round-table-discussion-and-media-tour/.

Field, Alan M. "*Port of NY and NJ Inaugurates TIPS System*." Port of New York and New Jersey Council on Port Performance. September 2015

"FMC Supply Chain Innovation Teams Interim Status Report." *FMC.gov*, 2016. http://www.fmc.gov/news/supply_chain_interim_status_report.aspx

"Governor Cuomo Announces $27.9 Million for Rail and Port Infrastructure Improvements." *Governor.ny.gov*, September 14, 2016. https://www.governor.ny.gov/news/governor-cuomo-announces-279-million-rail-and-port-infrastructure-improvements

Hutchins, Reynolds. "The Great Divide. Two new reports-one from the government and one from industry-take divergent paths to measuring port productivity." The Journal of Commerce. February 6, 2017.

"Partnerships." Innovation: Smartest Port. February 06, 2017. https://www.portofrotterdam.com/en/business-opportunities/smartest-port/partnerships.

"Port Houston Steel Round Table." Port Web Event. February 02, 2017. http://porthouston.com/portweb/event/port-houston-steel-roundtable/.

“Port of New York/New Jersey launches terminal portal.” Port of New York/New Jersey, September 1, 2015. http://www.americanshipper.com/main/news/port-of-new-yorknew-jersey-launches-terminal-porta-61362.aspx#hide

Ramirez, Gilda. "America’s Distribution Hub for the Next Generation." Port of Houston Authority. April 11, 2016. http://trade.gov/td/services/oscpb/supplychain/acscc/Meetings/2016April/April%202016/ACSCC_4.21.2016_PRES_REV_4.19.2016.pdf.

“SCDT Hackathon." University of Southern California. Global Supply Chain Management. http://uscsupplychain.com/home/digitalsc/hackathon/.
“Statement of Commissioner Dye on Supply Chain Innovation Teams.” *FMC.gov*, July 20, 2016. http://www.fmc.gov/statement_of_commissioner_rebecca_dye_on_supply_chain_innovation_teams_/

"Texas Automated Vehicle Proving Ground Partnership: How Collaboration Will Redefine Automation." December 20, 2016. https://tti.tamu.edu/2016/12/20/texas-automated-vehicle-proving-ground-partnership-how-collaboration-will-redefine-automation/.

“Texas Port Report” *TxDot.gov* 2014. https://ftp.dot.state.tx.us/pub/txdot-info/tpp/giww/2014-port-report.pdf

"The Port of Harlingen Authority.” Port of Harlingen Authority. February 11, 2017. http://portofharlingen.com

"U.S. Secretary of Commerce Penny Pritzker Holds First in Series of Meetings with Key U.S. Ports to Improve U.S. Supply Chain Competitiveness." *Commerce.gov* (web log), April 21, 2016. https://www.commerce.gov/news/blog/2016/04/us-secretary-commerce-penny-pritzker-holds-first-series-meetings-key-us-ports.

"Welcome to Port Houston." Port Houston. February 11, 2017. http://porthouston.com/portweb/.