

PPM Project

International Cluster Models and the Opportunities they Represent for North American Ports

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About the Author

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Mr. Billetdeaux has worked as in-house general counsel for the Port of Benton since 2017. Prior to that, Mr. Billetdeaux was a partner at the Cowan Moore Billetdeaux Law Firm in the Tri-Cities, Washington area, serving a number of municipal, water, and port districts.

As General Counsel for the Port of Benton, Mr. Billetdeaux oversees both human resources and issues of any legal nature. Mr. Billetdeaux has handled litigation for the Port of Benton at the local superior court level, as well as in Eastern District Federal Court, the 9th Circuit Court of Appeals, the National Surface Transportation Board, and in front of the Washington State Supreme Court, obtaining victories for the Port in every venue.

Within the port district, the Port of Benton generates \$665 million in payroll revenue annually, is responsible for over 10,000 jobs through direct and indirect Port District companies, and contributes \$327 million in value-added agriculture annually to the gross state product through Port Facilities.

Mr. Billetdeaux earned his Juris Doctorate from Seattle University, graduating *cum laude* in 2011 and began his journey to obtain his Port Professional Manager Certification in 2021.

Abstract

International cluster models have emerged as effective economic development strategies, fostering the growth of interconnected industries within geographic regions. This PPM research paper explores the concept of international cluster models, with a specific focus on port authorities, and examines their success in various global contexts. Drawing from case studies of prominent port clusters like the Port of Rotterdam in the Netherlands, the Ports of Los Angeles and Long Beach in California, and the Northwest Seaport Alliance in the Pacific Northwest, this research highlights key characteristics that contribute to the success or failure of cluster models.

This research seeks to provide valuable insights into the dynamics of international cluster models and supply chain alliances, offering a comprehensive understanding of their critical success factors and potential pitfalls. By recognizing these factors, policymakers, industry stakeholders, and port authorities can make informed decisions to foster economic growth and competitiveness within their respective regions.

Introduction

Port cluster models refer to the concept of grouping multiple ports in a geographic area into a single entity or grouping multiple entities within a single port authority with the goal of optimizing the collective performance of the ports/entities and increasing competitiveness. This can involve coordination between ports/entities on issues such as infrastructure planning and investment, marketing, and resource allocation. The idea behind a port cluster is that the entities within the cluster can benefit from shared resources, reduced duplication of effort, improved communication, and collaboration between stakeholders. By working together, the ports in a cluster can better serve the needs of the shipping industry, cargo owners, and other customers.

The specific structure and governance of a port cluster can vary, but they often involve the creation of a coordinating body or organization to manage the cluster and facilitate collaboration among the member entities.

Internationally, the cluster model has seen great success. However, as anyone in the port industry has heard *ad nauseam*, "If you've seen one port, you've seen one port." So, can a north American port take a copy/paste approach to what other countries have done, or is that far too simplistic of an approach?

This paper also investigates the emergence of supply chain alliances as a complementary approach to cluster models. While sharing similarities in collaboration and coordination, supply chain alliances encompass a broader network of stakeholders beyond port operations, optimizing the flow of goods, information, and services across the entire supply chain. Despite numerous success stories, the research also underscores the challenges faced by underperforming clusters. These challenges arise from inadequate collective action in areas like innovation, marketing, hinterland access, internationalization, and education. For clusters to succeed, a robust "collective action regime" must be in place to address these critical issues.

This Professional Port Manager's project seeks to determine what features of international and domestic cluster models may be successfully integrated into North American ports. There will be additional cultural, financial, legal, and political differences that will have to be recognized and considered beyond the scope of this paper. The paper will discuss what features could work well in the United States port industry and what aspects of cluster models will be difficult to adapt to domestic ports, as well as why.

Why Cluster Models?

In the current landscape, there is an overarching aspiration among all ports to enhance their operational efficiency and effectiveness. In a time marked by the persistent discourse surrounding "supply chain issues," it becomes imperative for ports to proactively reassess their existing methodologies and be open to exploring innovative approaches that might lie beyond their conventional comfort zones.

Crucially, I believe that the industry itself is an essential stakeholder that warrants focused attention in this discussion. While a port might meticulously execute its operations, the realization of substantial improvements can often hinge on the synergistic collaboration with the broader industry ecosystem. Even when a port seemingly gets all its strategies right, without the necessary backing from the industry and an enabling regulatory environment, significant opportunities may inadvertently be overlooked or underutilized.

Therefore, it is of paramount importance to foster an inclusive dialogue involving both ports and the industries they serve. This multifaceted engagement serves as a conduit for aligning strategies, streamlining operations, and navigating the intricate maze of regulatory intricacies. Recognizing the symbiotic relationship between ports, industries, and regulatory frameworks is pivotal in ensuring that promising opportunities are not lost in the shuffle, and that advancements made in one sector can reverberate across the entire maritime landscape for the collective betterment of all stakeholders involved.

What are Ports?

A port authority is a government or quasi-government agency responsible for overseeing and managing a specific port or group of ports. They are typically responsible for tasks such as planning and economic development, maintenance and operations, security, and regulatory compliance for the port(s) under their jurisdiction. Port authorities often work with shipping companies, cargo handlers, and other stakeholders to ensure efficient and effective use of port facilities and infrastructure. The specific powers and responsibilities of port authorities can vary depending on the country, state or province, and local laws and regulations.

What are Cluster Models?

Meanwhile, Port cluster models refer to the concept of grouping multiple ports in a geographic area into a single entity, with the goal of optimizing the collective performance of the ports and increasing competitiveness. This can involve coordination between the ports on issues such as infrastructure planning and investment, marketing, and resource allocation. The idea behind a port cluster is that the ports within the cluster can benefit from shared resources, reduced duplication of effort, and improved communication and collaboration between stakeholders. By working together, the ports in a cluster can better serve the needs of the shipping industry, cargo owners, and other customers. The specific structure and governance of a port cluster can vary, but they often involve the creation of a coordinating body or organization to manage the cluster and facilitate collaboration among the member ports.

The key benefits of a port cluster model include:

1. Improved competitiveness: By pooling resources and working together, the ports in a cluster can increase their competitiveness and attract more shipping traffic and cargo.
2. Better use of infrastructure: Port clusters can help ensure that existing port infrastructure is used more efficiently and that investment in new infrastructure is better coordinated.

3. Increased collaboration: Port clusters encourage greater collaboration and communication between the ports, as well as with other stakeholders such as shipping companies and cargo handlers.
4. Reduced duplication of effort: By working together, the ports in a cluster can avoid duplicating efforts and resources, which can help reduce costs and increase efficiency.
5. Improved service quality: Port clusters can help ensure that the ports in the cluster are able to provide high-quality services to customers, such as cargo handling, maintenance and repair, and security.

However, the implementation of a port cluster model can also face challenges, such as conflicting interests among the member ports, resistance to change, and difficulty coordinating the efforts of multiple organizations. It is important for the authorities responsible for implementing a port cluster model to carefully consider these challenges and to develop strategies to address them. Additionally, it is important to ensure that the benefits of a port cluster are shared fairly among the member ports and that the cluster is governed in a transparent and accountable manner.

International Cluster Models

International cluster models are a type of economic development strategy that focuses on fostering the growth and development of interconnected industries within a geographic region. In the context of port authorities, international cluster models refer to the coordination and collaboration among port-related industries to create a competitive advantage for the region. In this model, a port authority serves as a central hub for various industries that are related to the port, including shipping, logistics, warehousing, and manufacturing. By bringing these industries together, the port authority can help to create economies of scale, facilitate knowledge sharing and innovation, and promote regional economic development. Internationally, cluster models are a proven success.

Examples of Successful International Port Clusters

Port of Rotterdam

One example of an international cluster model related to port authorities is the Port of Rotterdam in the Netherlands. The Port of Rotterdam is one of the largest ports in the world and serves as a hub for a wide range of industries, including shipping, logistics, petrochemicals, and manufacturing. The port authority works closely with these industries to develop infrastructure, logistics, and technology solutions that support their growth and competitiveness. The Port of Rotterdam is a prime example of an international cluster model related to port authorities. Some key aspects of the Port of Rotterdam cluster:

- **Infrastructure:** The Port of Rotterdam is a highly developed and well-connected transportation hub. It has excellent road, rail, and waterway connections, making it an ideal location for businesses that require efficient and reliable transportation services. The port also has advanced technology solutions, such as automated container terminals and digital platforms that optimize supply chain operations.
- **Logistics:** The Port of Rotterdam is known for its advanced logistics solutions, which enable businesses to transport goods quickly, safely, and cost-effectively. The port offers a range of logistics services, including storage, warehousing, and distribution, and has a highly trained workforce that is skilled in supply chain management.
- **Petrochemicals:** The Port of Rotterdam is a major hub for the petrochemical industry, with a large concentration of refineries and chemical plants located in the area. These industries are highly interconnected, with many of the products produced in one plant serving as raw materials for another.
- **Manufacturing:** The Port of Rotterdam is also home to a significant manufacturing industry, with a focus on high-tech and sustainable products. The manufacturing industry in the port cluster benefits from the availability of raw materials and skilled labor, as well as the advanced logistics and transportation infrastructure.

Overall, the Port of Rotterdam cluster is an example of how a port authority can foster economic growth and development by creating a highly interconnected and collaborative ecosystem of industries. By leveraging the strengths of each industry and promoting innovation and collaboration, the port cluster can continue to grow and thrive in the years to come.

Swedish Ports

Sweden has a number of port clusters. Swedish port clusters have been successful in improving the competitiveness and efficiency of the member ports. For example, the ports in the Gävle-Sandviken cluster and the Västra Götaland cluster have been able to increase their competitiveness by pooling resources and working together on issues such as marketing, infrastructure planning, and resource allocation.

Additionally, the ports in these clusters have been able to improve their efficiency by avoiding duplication of effort and improving communication and collaboration between the member ports. The Swedish government has been supportive of the development of port clusters, recognizing the benefits they can provide. However, the implementation of port clusters in Sweden, like in other countries, can also face challenges, such as conflicting interests among the member ports and difficulty coordinating the efforts of multiple organizations. To address these challenges, it is important for the authorities responsible for implementing a port cluster to carefully consider the specific needs and circumstances of each cluster and to develop strategies to ensure their success. In Sweden, a port governance model was put in place that allowed for more regional and national oversight, leading to a more cohesive strategy overall.

In addition to the benefits already mentioned, Swedish port clusters have found several other advantages, including:

1. Access to new markets: By working together, the ports in each cluster have access to new markets which increase their reach, leading to increased shipping traffic and cargo volumes.

2. Improved access to financing: Port clusters in Sweden have experienced an increased ease in accessing financing for infrastructure development and improvement projects, as the cluster can often secure more favorable financing terms than individual ports.
3. Increased visibility and recognition: Port clusters are better able to increase the visibility and recognition of member ports, making them more attractive to shipping companies, cargo handlers, and other stakeholders.
4. Enhanced environmental sustainability: Port clusters can encourage member ports to adopt more environmentally sustainable practices, such as reducing emissions and minimizing waste.
5. Enhanced security: By working together, the ports in a cluster can enhance their security, which is increasingly important in today's global shipping environment.

Swedish ports have taken note that the success of a port cluster will depend on the effective management and governance of the cluster, as well as the willingness of the member ports to collaborate and work together. To ensure the long-term success of a port cluster, it is important to involve all relevant stakeholders in the planning and implementation process, and to ensure that the cluster is governed in a transparent and accountable manner.

[Port of Belledune, Canada's Green Energy Hub](#)

The Belledune Port Authority (BPA) is a bulk port shipping twenty-seven different bulk products while transforming itself with an eye towards becoming the Province's first green energy hub. The Port is rising to the challenge of climate change and working in advance of the Government of Canada's commitments to reducing greenhouse gas emissions to 40-45% below 2005 levels by 2030. The Government of New Brunswick aims to meet and exceed this while reaching the federal and provincial target of net-zero GHG emissions by 2050. These targets have prompted new policies, including the nation's phase-out of coal-fired electricity by 2030.

The Port has long been a key driver of climate-friendly energy sources. The past decade has seen the BPA become the largest biomass exporter in Eastern Canada thanks to its exporting of

wood pellets. In 2020, the BPA launched its long-term planning process that led to a 30-year Master Development Plan. A centerpiece of that plan is the Green Energy Hub, a specialized development district on Port lands welcoming green energy projects and complementary, low-carbon industries. BPA has wasted no time launching several green energy initiatives including:

- Partnering with Cross River Infrastructure Partners on the building of a hydrogen production facility.
- Signing memorandums of understanding with Germany's Port of Hamburg and Port of Wilhelmshaven to supply clean fuels and green products to Germany and other European nations. These agreements support the MOU between Canada and Germany that will establish an energy partnership aiming to achieve net-zero emissions by 2050. They also support Canada-Germany Hydrogen Alliance signed in August 2022 in Newfoundland.
- Signing MOUs with two advanced small modular reactor (SMR) technology companies alongside its partners at Pabineau First Nation – ARC Clean Technology and Moltex Energy. The port has been identified as the second area for deployment of the technology as an industrial energy supply.
- Increasing volume of wood pellet exports. New conveyor systems and expanded warehouse space, a result of approximately \$25-30M in the last three years, have made this expansion possible.

Two years ago, BPA, Pabineau First Nation, Eel River Bar First Nation, and Mi'gmawé'l Tplu'taqnn Inc. signed an Impact Assessment Act (IAA) Protocol, the first of its kind in Canada and a complementary document to the Relationship, Engagement & Consultation Protocol, a previous first of its kind agreement signed five years ago. This means the Port's First Nation partners are part of the Port's development plan and Green Energy Hub activities. The Port has one of the few nuclear plants in Canada, the country's only LNG terminal, the largest refinery in the country, and is actively pursuing SMRs and hydrogen energy.

Examples of Current North American Port Clusters

LA/Long Beach

The Ports of Los Angeles and Long Beach, both municipal operations run by their respective cities, are located directly adjacent to each other within San Pedro Bay, California. Early development of harbor facilities began on the Los Angeles side of the bay in the mid-19th century and accelerated after 1871 once the federal government began to invest in infrastructure. Long Beach did not begin to develop its port until after 1900 and only received federal aid beginning in 1919. Both Ports became municipal operations of their respective cities by acts of the California State Legislature in 1911 after an aborted attempt to combine the ports under state control. Both cities created semi-autonomous harbor departments, governed by citizen commissions charged with overseeing the development of harbor facilities.

Initially fierce competitors, the two ports were forced into a situation in which collaboration became the best option. Cargo volumes dropped in the latter half of 2014 and early 2015 due to multiple issues such as increasing ship sizes and chassis shortages that led to the congestion of container terminals at both ports. This loss of cargo and the increased reputational risk triggered a comprehensive collaboration between the two ports in the area of supply chain management despite the fact that the issues were operational, and solutions were primarily within the auspices of the ports terminal operators and not the port administrations. However, like the terminal operators, the ports have significant infrastructure investments to protect.

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Major Inland Terminal Clusters in North America

Figure 1 – Examples of North American Port Clusters

Northwest Seaport Alliance

Nearer to the author's location is the Northwest Seaport Alliance. The Northwest Seaport Alliance (“NWSA”) is a marine cargo operating partnership that was formed in August 2015 between two major port authorities in the Pacific Northwest region of the United States: the Port of Seattle and the Port of Tacoma. It was established to combine the resources and strengths of these two neighboring ports and to enhance their competitiveness in the global shipping industry. Under a port development authority, the NWSA manages the container, breakbulk, auto and some bulk terminals in Seattle and Tacoma.

The NWSA operates in the Puget Sound region of Washington state, which is strategically located on the West Coast of the United States. The proximity to major trade routes, such as

¹ Credit -Notteboom, T., Pallis, A., & Rodrigue, J-P. (2022). Port Economics, Management and Policy

those connecting the Pacific Rim to the U.S. Midwest, makes this area a crucial gateway for international trade.

The NWSA is responsible for the management, operations, and marketing of the marine cargo terminals owned by the Port of Seattle and the Port of Tacoma. These terminals handle a wide range of cargo, including containers, bulk cargo, breakbulk cargo, project cargo, and automobiles. The alliance oversees several container terminals, including those at both the Port of Seattle (e.g., Terminal 18, Terminal 5) and the Port of Tacoma (e.g., Husky Terminal, Washington United Terminals). These facilities are equipped to handle large container vessels, contributing to the region's role as a major container gateway on the U.S. West Coast.

The NWSA plays a vital role in the regional economy. It generates significant employment opportunities and contributes to the economic well-being of the Puget Sound area and the state of Washington as a whole. Both the Port of Seattle and the Port of Tacoma, as members of the alliance, are committed to sustainable and environmentally responsible practices. They work to reduce the environmental footprint of port operations, such as through the use of cleaner fuels and the implementation of environmental programs.

The NWSA serves as a key conduit for imports and exports moving between the Pacific Northwest and global markets, with strong trade connections to Asia, particularly China. By collaborating under the Northwest Seaport Alliance, the ports of Seattle and Tacoma can pool resources, infrastructure investments, and expertise, enabling them to better compete with other West Coast ports, such as those in California. This collaborative approach also aims to improve the efficiency and cost-effectiveness of cargo movement through the region.

The NWSA is governed by a managing members committee consisting of elected officials and representatives from both port authorities. The leadership works together to make decisions and set strategic directions for the alliance.

Inland Ports

The concept of co-location plays a pivotal role in enhancing the operational efficiency of inland ports within North America. This efficiency is closely tied to a hierarchical distribution system that is influenced by factors like accessibility and connectivity, where locations in the Midwest emerge as prominent distribution hubs. Rail terminals, in particular, are strategically concentrated around these distribution hubs, underscoring their significance as central points for handling inland cargo.

Numerous inland port initiatives across North America are capitalizing on this advantage. The planning and establishment of new intermodal rail terminals are undertaken concurrently with logistics zone projects. This collaborative approach essentially acts as a litmus test for the commercial viability of the project, as both parties must commit to their respective investments in terminal facilities and commercial real estate. Co-located logistics zone projects tend to be considerably larger than conventional logistics zones served solely by road. This trend is a result of the alignment between rail companies' need to develop substantial terminals for economies of scale and the capital-intensive nature of such investments. Consequently, partnerships have formed with major commercial real estate developers who possess both the financial resources and expertise to create expansive logistics zones.

A noteworthy example is CenterPoint Properties, which, following its acquisition by a division of CalPERS (California public employees' retirement fund) in 2006, has become actively engaged with several rail operators in the development and management of logistics zones. While, in most instances, CenterPoint initiates a project following the announcement of a terminal development project, the prevailing trend is shifting toward simultaneous planning of intermodal rail terminals and logistics zones. In a specific case, namely Crete, Illinois, CenterPoint chose to develop a logistics zone in advance, subsequently attracting the rail operator CSX to join in through its National Gateway Program.



Figure 2 - CenterPoint Locations

Railroad companies are making infrastructure investments to appeal to businesses seeking innovative intermodal transportation solutions. CenterPoint's Intermodal Centers are ideal for companies seeking to take advantage of significant cost-savings by locating near heavy rail volume in our state-of-the-art facilities. We all know that shipping by rail provides tremendous efficiency and cost-saving benefits versus moving freight by truck as an entity can move *more* freight 24/7. CenterPoint's claim is that by using rail-adjacent warehouses, businesses can cut drayage costs by an average of 25%, which is attractive enough to bring additional outside businesses into port districts to be competitive.²

Chelan Douglas Regional Port Authority

The Chelan Douglas Regional Port Authority is the first of its kind in the State of Washington. The Port of Chelan County and the Port of Douglas County voted to functionally consolidate as of January 1, 2020 and operates as an independent government entity under the provisions of

² <https://centerpoint.com/media/the-railway-forward-study/>

Title 53 of the Revised Code of Washington (RCW). The Chelan Douglas Regional Port Authority is the principal economic development agency for Chelan & Douglas Counties.

The initial proposition for the merging of the ports came from a task force looking into long-term planning for the regional Pangborn Airport. The Ports jointly owned and operated the airport, which was millions of dollars in debt and running at an annual deficit. To try to close that gap, the community task force recommended a functional consolidation of port staffing, economic development projects and budgets. The compromise that led to a unanimous vote by all six Commissioners across the two Boards? That each Port's board would remain separate and elected by their district's voters. Officials at the two Ports claim that they will save upwards of half a million dollars a year by consolidating.

The Board of Directors consists of three commissioners from Douglas County and three commissioners from Chelan County who meet regularly on the second and fourth Tuesday of each month. The Chelan Douglas Regional Port Authority states that their mission is to "Work Together to Enhance the Economic Vitality of North Central Washington".³

Comparison of Supply Chain Alliances and Port Clusters

Port clusters and supply chain alliances share similarities in that they both involve collaboration and coordination among multiple entities to enhance efficiency, competitiveness, and overall performance within a maritime context. In areas that do not lend themselves to Port clusters, it appears that regional supply chain alliances are very similar in nature to port clusters and emulating aspects of a port cluster could help ports in those areas streamline and grow their economic systems.

Port Clusters: Port clusters refer to the grouping of multiple ports in a specific geographic area or within a single port authority to collectively improve their performance and increase their competitive advantage. The ports within a cluster collaborate on various aspects, such as infrastructure planning, marketing, resource allocation, and shared services. The primary goal

³ <https://www.cdrpa.org/get-to-know-us>

of a port cluster is to leverage shared resources, reduce duplication of efforts, and foster communication among ports, ultimately leading to enhanced efficiency and competitiveness.

Supply Chain Alliances: Supply chain alliances, on the other hand, encompass a broader concept that involves collaboration among various entities along the supply chain, which includes ports but extends to manufacturers, suppliers, distributors, and other intermediaries. Supply chain alliances aim to optimize the flow of goods, information, and services across the entire supply chain network. The focus is on streamlining processes, reducing costs, and improving overall supply chain performance. Such alliances can involve sharing resources, information, best practices, and technologies among the member entities.

In essence, while both port clusters and supply chain alliances emphasize collaboration and coordination among multiple entities, port clusters are more specific to port operations and their interactions within a particular region, while supply chain alliances encompass a broader spectrum of stakeholders involved in the entire supply chain process, which may or may not be confined to a particular geographic area.

Internationally, Port Clusters and the supply chain models that occur within those clusters have existed and matured to a point that they are worth emulating.

Ties to My Port

Washington State Initiatives

At the Port of Benton, we are dipping our metaphorical toes into the water of cluster models and doing so originally due to the availability of a Washington State grant opportunity. The Innovation Cluster Acceleration Program (“ICAP”) ⁴ grant is a program offered by the State of Washington to provide funding and development strategies for cluster growth in the State's ports. The purpose of the ICAP grant is to support and grow more industries with the potential to change the world and become economic engines for Washington communities.

⁴ <http://icapwashingtonstate.org/programs>

Washington state is leading a multi-year innovation cluster development program to help promising industry sectors assemble the ingredients they need to grow, such as access to capital, the latest research and support for entrepreneurs.

This program provides comprehensive support for clusters and organizations. It includes funding options for covering administrative costs and assistance with securing federal grants and other funding opportunities. Additionally, it offers access to potential future project funding. Cluster strategy workshops are a key component, featuring high-impact sessions tailored to specific cluster topics. Depending on a cluster's maturity level, up to four workshops are held annually, engaging the full board and management team of each cluster. Leadership development is another focus, with a hands-on program designed for cluster CEOs and managers. Four sessions are conducted each year, facilitating networking with fellow cluster CEOs and global experts.

For board chairs, there's a dedicated onboarding program that includes three sessions in the initial 90 days and an opportunity to connect with other cluster ICAP board chairs.

The program also supports branding and communication efforts, offering assistance in amplifying communications, planning branding events for 2022-2023, and providing guidance on effective branding and communication strategies. Lastly, it ensures 1:1 cluster support by offering technical assistance from the ICAP Team and access to cluster coaching sessions as needed. This holistic approach aims to empower clusters to thrive and succeed in their endeavors.

By supporting the development and improvement of Washington state ports, the ICAP grant helps to ensure that these ports are able to provide the high-quality services that are essential to the state's shipping and transportation industries. The Port of Benton is administering this grant by creating an entity known as Washington Vertical.

Washington VERTical Cluster Grant

Washington VERTical⁵ is an entity created by the Port of Benton through the US Economic Development Association (“EDA”) Innovation Cluster Acceleration Program (“ICAP”) grant that is committed to the development of US-based energy suppliers, supply chains that accelerate deployment of clean noncarbon-emitting advanced reactor, and small modular reactor (“SMR”) nuclear power technologies for a sustainable future contributing to economic growth, ecological health, and thriving communities. As the drive to decarbonize the US economy is accelerating, Washington State is uniquely poised to assert itself as a global leader in advanced nuclear power generation and sustainability while fostering a growing economy in an increasingly competitive national and international marketplace.

VERTical’s strategy was created by stakeholders to ensure that Washington State be home to world-class thriving, sustainable clean energy industry through accelerating innovation. The initiative brings key power generation and supplier stakeholders together to forge a collaborative strategy that creates the most sustainable advanced clean energy industry in the U.S. by 2045, one that is aligned with the State’s plans for deep de-carbonization, innovation and workforce development.

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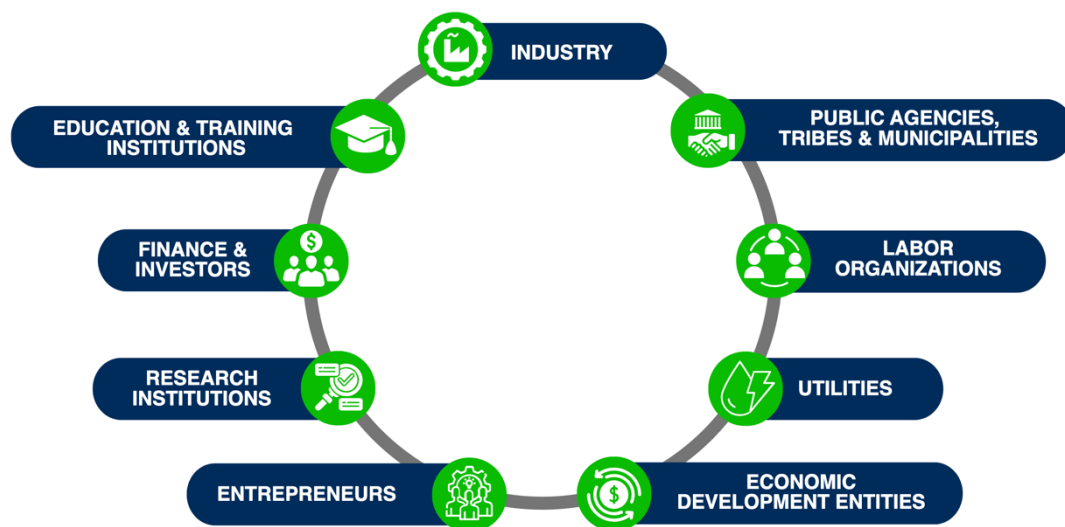


Figure 3 - Washington VERTical Supply Chain Alliance

⁵ Vert in French translates to green

⁶ <https://www.washingtonvertical.com/>

Located in Richland, Washington, the alliance is known for its discerning selection of organizations positioned to make substantial contributions to the advancement and expansion of the VERTical advanced reactor and SMR supply chain. Their overarching mission centers around the stimulation of economic development in the Central Washington region through the enhancement of projects such as the TRi Energy Partnership advanced reactor initiative, along with comparable endeavors across the Western and Northwestern United States. Within this framework, the alliance demonstrates a clear preference for enterprises dedicated to establishing an enduring presence within the community.

The vitality of the local economy relies heavily on visionary entrepreneurs who exhibit a strong enthusiasm for fortifying the community in the wake of the post-pandemic recovery. The alliance extends a priority consideration to entities that exhibit a profound understanding of the existing business landscape and actively contribute to the growth of these businesses while pursuing their own objectives.

The community is distinguished by a demonstrable appetite for innovation. Because the primary goal of the Port of Benton's ICAP grant is the development of a more robust supply chain alliance, it remains of utmost importance that the alliance fosters a harmonious coexistence with all stakeholders, a fundamental step towards nurturing a robust and thriving community.

Underperforming Clusters

With so many examples (above) of successful port clusters, why isn't this the new norm? Surely there have been failed, or at least less successful clusters?

Peter W. de Langen and Evert-Jan Visser researched unsuccessful clusters through a case study in which they primarily compared the Lower Mississippi Port Cluster ("LMPC"), an underperforming cluster, to that of Rotterdam, an overperforming cluster. Their conclusion was

that for a cluster to succeed, a “collective action regime” needs to be in place that looks at five important collective action problems.

The research showed that using throughput volume as the primary performance indicator for ports is a mistake. That approach overly narrows focus and overlooks the port's broader role as a hub for diverse economic activities. Consequently, it places disproportionate importance on factors such as depth, location, and terminal handling charges, potentially overshadowing other critical elements that exert an indirect yet increasingly substantial influence on the overall performance of the port cluster. These factors encompass aspects like the availability of specialized knowledge, the quality of hinterland access (that is, the ability to reach a hinterland, which is the region that uses a port to send or receive goods from overseas ports. Hinterlands can be accessed by road, rail, inland waterways, and by pipeline), and the skill level of the workforce. Enhancing these frequently underestimated elements requires collaborative endeavors involving various stakeholders within the port cluster, all operating within what deLangen and Visser refer to as a 'collective action regime.'

The five most impactful collective action problems found to exist in seaports are: training and education, innovation, marketing and promotion, hinterland access, and internationalization.

A variety of individuals and firms need to provide resources to support these regimes, which include not only financial and managerial inputs, but also what can be referred to as political and relational contributions. As common sense may suggest, the level of resource investment correlates with the quality of the regime in question, with higher investments leading to superior regime quality.

Taking a look at the five collective action areas of the LMPC, the researchers found the following:

- In the LMPC, there's a notable absence of collective innovation initiatives, and firms lack innovation due to their limited autonomy within branch affiliations. The absence of leader firms and ineffective public actor involvement hinder progress in these areas, making the LMPC less competitive compared to Rotterdam.
- The competitiveness of the LMPC hinges on the quality of its hinterland access, particularly due to the substantial transit cargo it handles. There have been no collaborative efforts to enhance this access. Despite a strategic partnership between the Port of New Orleans and the inland Port of Memphis, no joint initiatives have emerged to improve connectivity between Memphis and the LMPC. While road access and barge shipping function well, especially for bulk shipments, there's a need for collective action in two specific areas: container transport by barge and upgrading rail access to the port. Challenges persist in container transport via barges, primarily due to insufficient cooperation to generate cargo and investment funds. Although various Class I railroads serve the port, they haven't invested in improving accessibility, citing limited container volumes resulting from the LMPC's modest position in the container market.
- The LMPC's marketing regime has three main issues - individual port authorities lack resources for effective cluster-wide marketing, private firms and associations aren't structurally involved, and there's a shortage of market intelligence. These shortcomings emphasize the need for leader firms, better organizational infrastructure, and a more significant role for public actors, particularly the Port Authority of New Orleans.
- The LMPC's internationalization program is crucial due to its trade reliance on Latin America. However, challenges exist, including limited business participation in trade missions and insufficient focus on the LMPC by third party organizations. The regime's effectiveness is hindered by the absence of leader firms.

- The LMPC's education infrastructure for port-related jobs is inadequate. Specific courses are not offered by schools, and training mainly happens on the job. Irregular job contracts for employees further hinder educational investment, with the port community showing limited involvement in improvement efforts.

In essence, the fundamental issue at hand revolves around a lack of inter-entity communication within the cluster's leadership and a reluctance to invest in areas that may primarily benefit other entities. This myopic perspective overlooks the broader principle that collective progress benefits all involved. To address this challenge, fostering improved communication, implementing long-term master planning, and enhancing training programs are essential steps in developing the necessary infrastructure for success. Subsequently, success hinges on effective marketing strategies targeting external firms. Once both infrastructure and marketing are effectively established, building trust and reliability among customers and external entities will solidify the cluster's position.

What Makes a Cluster or Supply Chain Thrive, and What Characteristics Cause it to Fail

In researching supply chains and port clusters that are thriving, there were several characteristics that the entities had in common:

1. **Proximity and Critical Mass:** Port clusters benefit from being in close physical proximity to each other. This allows for easy sharing of resources, knowledge, and talent. Additionally, having a critical mass of firms within the cluster fosters competition and innovation.
2. **Specialization and Expertise:** Clusters often develop expertise in a particular industry or technology. This specialization can lead to a competitive advantage, as firms within the cluster become known for their expertise.

3. **Collaboration and Networking:** Successful clusters encourage collaboration and networking among firms, research institutions, and government agencies. This can lead to the exchange of ideas, innovation, and access to resources.
4. **Access to Inputs and Resources:** A thriving cluster has easy access to necessary inputs, such as raw materials, skilled labor, and infrastructure. This reduces costs and improves efficiency.
5. **Government Support and Policies:** Supportive government policies, such as tax incentives, research funding, and infrastructure development, can greatly benefit clusters.
6. **Education and Workforce Development:** A well-educated and skilled workforce is essential for the success of a cluster. Investing in education and workforce development can ensure a continuous supply of talent.

Unfortunately, there are even more factors that can have detrimental impacts on areas looking to implement a cluster or supply chain model:

1. **Lack of Critical Mass:** Clusters with too few firms may struggle to achieve economies of scale and face limited opportunities for collaboration.
2. **Complacency:** Success can lead to complacency, causing firms within a cluster to become resistant to change and innovation.
3. **Resource Scarcity:** A lack of access to essential resources, such as raw materials or skilled labor, can undermine the competitiveness of a cluster.
4. **External Shocks:** Economic downturns, natural disasters, or global crises can disrupt supply chains and negatively impact clusters.
5. **Lack of Innovation:** Failing to adapt to new technologies and market trends can cause a cluster to lose its competitive edge.
6. **Inadequate Infrastructure:** Poor infrastructure, such as transportation and communication networks, can hinder the efficient functioning of a supply chain.

7. **Regulatory Barriers:** Excessive regulations, trade barriers, or unfavorable government policies can stifle cluster growth and competitiveness.
8. **Global Competition:** Intense global competition can put pressure on local clusters, making it difficult for them to thrive.
9. **Lack of educational infrastructure:** Without a skilled workforce, all the dredging and complex cranes and machinery in the world won't matter.

The success of a cluster or supply chain is influenced by a complex interplay of factors. Proximity, specialization, collaboration, and access to resources are key drivers of success, while factors like complacency, resource scarcity, and external shocks can lead to failure. Government support and favorable policies can play a crucial role in nurturing thriving clusters and supply chains.

Conclusion

In conclusion, the concept of cluster models, whether in the context of port authorities or supply chain alliances, represents a powerful strategy for enhancing competitiveness, fostering innovation, and driving economic growth. This paper has explored various examples, both domestic and international, that illustrate the potential benefits of cluster models in different settings.

- International cluster models, exemplified by the Port of Rotterdam and Swedish port clusters, have shown how collaboration among geographically proximate ports can lead to improved infrastructure, logistics, and economic vitality. These clusters leverage shared resources and expertise to attract shipping traffic, enhance efficiency, and promote sustainability. However, it is crucial to address challenges such as conflicting interests and governance issues to ensure long-term success.
- Within North America, some cluster models, as seen in the case of the Northwest Seaport Alliance, highlight the advantages of combining the strengths of neighboring ports to compete effectively in the global shipping industry. By working together, these alliances can offer seamless services, attract international trade, and contribute significantly to regional economies.
- Supply chain alliances, while broader in scope, share common principles of collaboration and coordination. They optimize the flow of goods, information, and services across the supply chain network. Lessons from successful port clusters and international models can inform the development of supply chain alliances, especially in areas where port clusters may not be feasible.
- Inland ports, with their focus on co-location and efficiency, underscore the importance of strategic location and infrastructure investments. Co-locating logistics zones with

intermodal rail terminals has proven beneficial in enhancing the operational efficiency of inland ports.

- The Chelan Douglas Regional Port Authority's consolidation serves as a local example of how port authorities can achieve cost savings and foster economic development through functional consolidation while retaining independent governance.
- Washington VERTical's innovative approach to developing a sustainable clean energy industry within the state reflects the importance of partnerships and collaboration in achieving ambitious economic and environmental goals.

Ultimately, thriving clusters and supply chain alliances share common characteristics such as proximity, specialization, collaboration, and access to resources. However, they must also navigate challenges like complacency, resource scarcity, and regulatory barriers. Government support, favorable policies, and investment in education and workforce development are essential ingredients for their success.

Clusters represent more than geographical concentrations of businesses in a specific industry. They are dynamic ecosystems that go beyond physical proximity. Clusters are defined spatially as regions or areas where there is a higher concentration of value-added activities within a particular industry or domain. However, they are distinct from mere industrial districts or geographic concentrations of firms by virtue of their formal networking platforms and a degree of cooperation and collective governance among the constituent entities.

These networks and cooperative mechanisms in clusters foster innovation, knowledge sharing, and competitiveness. Firms within a cluster benefit not only from their physical closeness but also from their ability to collaborate, exchange ideas, access shared resources, and collectively address common challenges. This formalized cooperation often leads to greater overall

economic efficiency and a higher level of value creation compared to isolated firms operating in the same industry.

In essence, clusters are more than just geographic co-location; they are the result of intentional efforts to leverage proximity and create a collaborative environment that enhances the competitiveness and growth of businesses within the cluster. This concept highlights the importance of both physical and social proximity in fostering economic development and innovation.

In a rapidly changing global landscape, where competition is fierce and sustainability is paramount, the lessons learned from successful cluster models and supply chain alliances provide valuable insights into how regions and industries can thrive, adapt, and innovate. As we look to the future, the continued development and refinement of these models will play a pivotal role in shaping economic growth and resilience.

Reflections on Learning

I am interested in delving deeper into understanding which specific regions and categories of ports appear to be the most optimal fit for adopting this cluster-oriented structure. I am particularly interested in uncovering whether the driving factors behind the success or failure of such clusters stem from the inherent nature of the industries they serve (such as energy, fuel, break bulk, manufacturing, etc.), other less readily apparent geographical characteristics of the ports, local regulatory frameworks, or if there are other key variables at play that dictate the efficacy of such cluster models.

There is an intricate interplay between these various elements that cannot be easily teased out without significant additional research. Still, I believe it is an interesting topic, the answers of which would shed light on the determinants that shape the outcomes of cluster-based strategies within the maritime industry. The fact that Sweden has in some respects nationalized Port governance, to their success, and the EDA ICAP grant is an attempt by Federal and State to develop clusters gives me hope that the United States may be on the right path. More research, more educational outreach and development, and more collaboration will be necessary to ensure the continued growth and success of ports nationwide.

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