

Harnessing port-led development: Strategic insights for vizhinjam seaport from global success stories

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Abstract

Port-led development plays a pivotal role in boosting regional economies, facilitating trade, and fostering industrial growth. This article focuses on the Vizhinjam International Seaport, a strategic maritime infrastructure in Kerala, India, and explores its potential to transform the regional economy. By drawing lessons from globally successful countries such as China, Singapore and Colombo, the study identifies key strategies that can guide Vizhinjam's development into a thriving maritime hub. The study emphasizes critical success factors, including multi-modal transportation, logistics, supply chain networks, policy frameworks, and integration with hinterland development. The findings highlight actionable insights for policymakers and stakeholders to harness Vizhinjam's full potential and position it as a catalyst for India's maritime economy.

Keywords: *Port-led development, Vizhinjam Seaport, Transshipment hub, Economic growth, Trade connectivity*

1. Introduction

Ports are critical nodes in global trade networks, serving as gateways for the movement of goods, people, and services (Gu & Liu, 2023; Verschuur et al., 2021). Beyond their traditional role in logistics and transportation, modern ports have evolved into engines of economic growth and industrial development, driving regional prosperity and fostering

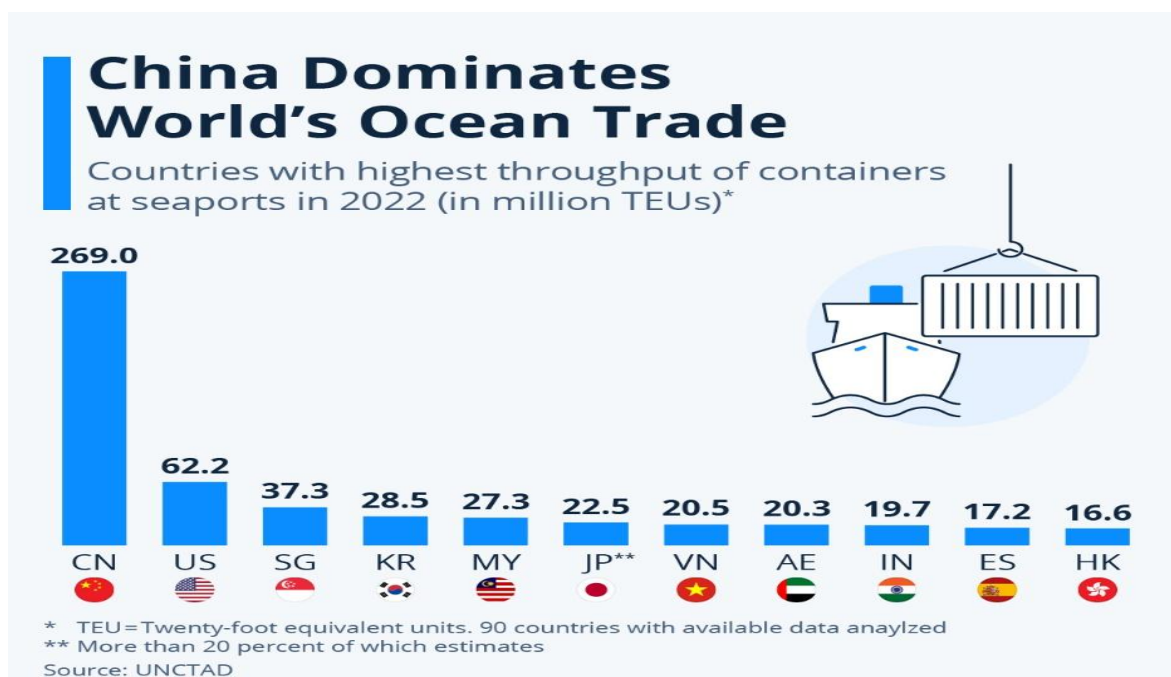
international trade competitiveness (Lonza & Marolda, 2016; Mishrif et al., 2024; Munim & Schramm, 2018; Song, 2024). The concept of port-led development leverages the strategic importance of ports to stimulate industrialization, infrastructure expansion, and socio-economic transformation (Hanson & Nicholls, 2020; Robinson, 2002; Verschuur et al., 2022).

Vizhinjam International Seaport, located along the southern coastline of Kerala, India, holds immense potential to become a key player in India's maritime economy. Its strategic position on the international shipping route, proximity to major trade hubs, and natural deep-water capabilities make it a promising candidate for global transshipment activities.

This paper explores the lessons learned from globally successful ports from countries such as China, Singapore and Colombo, offering strategic insights for the sustainable development of Vizhinjam Seaport. By analysing best practices and examining the challenges faced by leading ports, the study aims to provide a comprehensive framework for maximizing the seaport's potential and integrating it into India's broader blue economy ambitions.

As data from the United Nations Conference on Trade & Development (UNCTAD) shows, for international trade, India relies heavily on seaports. In 2022, Indian ports handled 19.7 million twenty-foot equivalent container units (TEUs), landing the country in the top 10 in container throughput worldwide. However, China remains at the top of the list with 269 million TEUs, owed largely to its thriving business of exporting electronics, fashion and other consumer goods. The rest of the list of countries and regions with the highest container throughput is also dominated by regions and countries in Asia. The only entrants in the top 11 not located on the Asian continent are the United States (62 million TEUs), the United Arab Emirates (20 million TEUs) and Spain (17 million TEUs).

Figure 1 shows the countries with the highest throughput of containers.

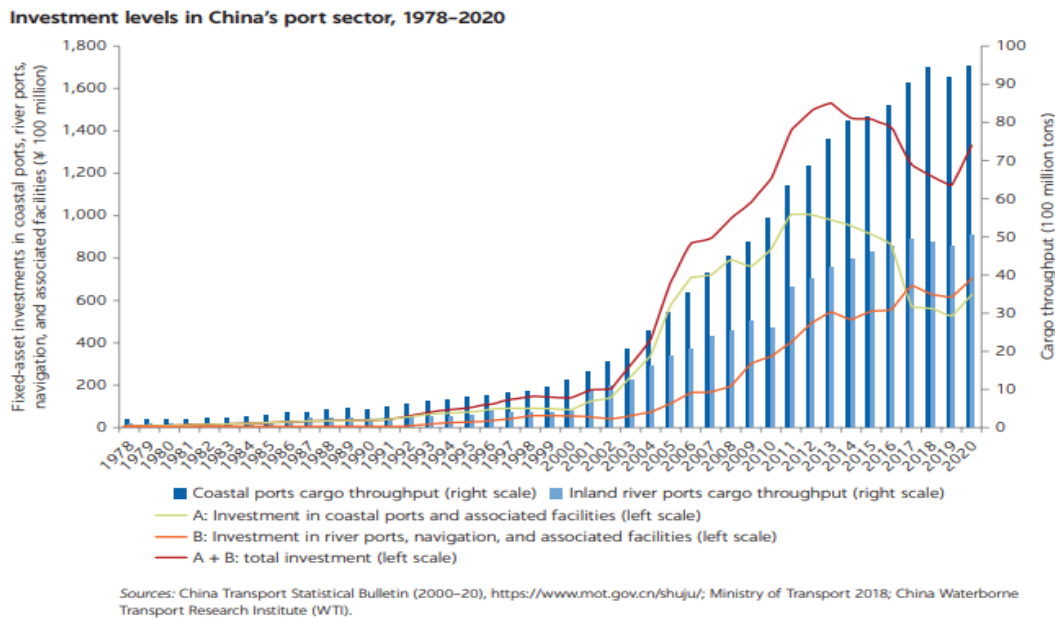
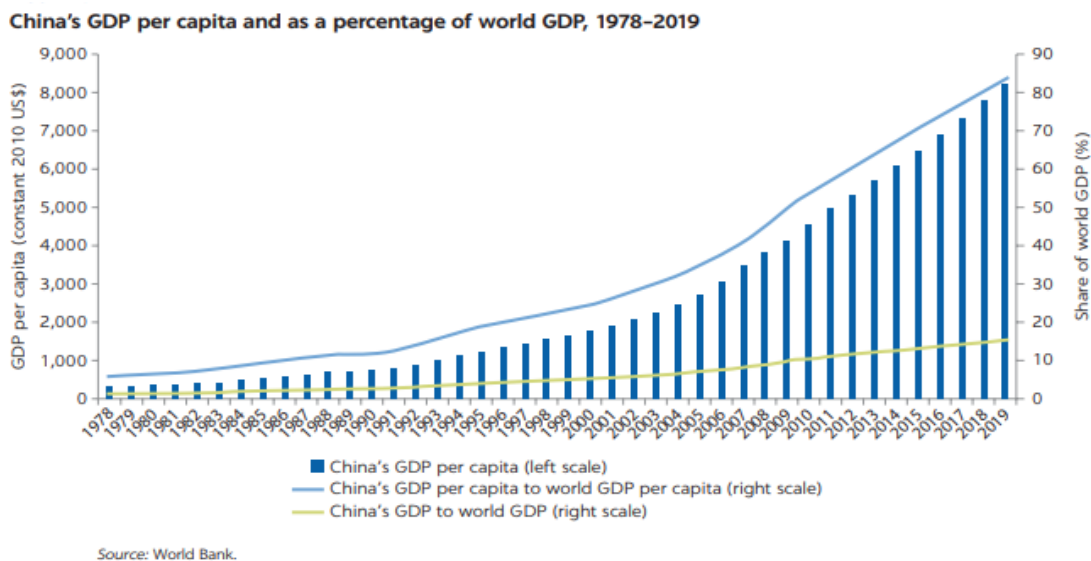


2. Lessons from major players

2.1 China's port development

China has capitalized on its strategic geographical location and role as one of the world's leading manufacturing regions over the last 40 years. China owns more than half of the world's top 50 ports. The rapid development of China's ports was vital to the country's impressive economic progress. The transport industry is a critical component of China's growth story because it serves as the backbone for growth drivers. During the period of rapid growth, China expanded its transportation system and infrastructure at unprecedented pace and size.

Between 1990 and 2021, China built more than 120,000 kilometers of railways, 130,000 kilometers of expressways, 3 million kilometers of highways, and 125,000 kilometers of navigable inland canal transportation. Gateway ports were critical to China's economic transition, which began with the expansion of coastal regions. 14 coastal communities began accepting foreign direct investment in 1984, with gateway ports serving as the fulcrum of coastal economies (Fig 2). As a result, these cities experienced substantial economic development.

Figure 2 Investment levels in China's port sector**Figure 3** China's GDP per capita (as a percentage of world GDP)

The sharp increase in both GDP per capita and China's share of world GDP from the mid-2000s onward suggests a period of rapid economic development and integration into the global economy. Furthermore, China's investments in coastal regions extended beyond the three major port groups—the Yangtze River Delta in the center, the Pearl River Delta in the south, and the Bohai Rim in the north—to the interior hinterland. As per the latest report by world Shipping council, China was indeed home to seven of the world's ten busiest ports, with major ports like Shanghai, Ningbo-Zhoushan, Shenzhen, Guangzhou, Qingdao, Tianjin,

and Hong Kong being included in this list. Along with other smaller ports on the coast and inland ports, the port system was critical to overall national economic growth and the spread of prosperity. (Bernard Aritua, 2022). Transferable lessons from China's experiences in accelerating economic advantages through strategic transportation infrastructure development.

- Holistic port development should take into account in the macroeconomic backdrop, which includes logistics, trade, and transportation. Connectivity between ports and their neighbouring cities and regions through multimodal transportation networks is very significant. Efficient port growth necessitates striking the appropriate balance between central coordination and local initiative.
- Long-term port competitiveness is dependent on effective multimodal linkage with the hinterland. This process has resulted in the development of huge logistics and manufacturing clusters in the hinterland, with dependable and reasonably priced intermodal services to ports. A multimodal strategy should thus be included in planning for port-hinterland connectivity.
- Human capital development and innovation have the potential to significantly increase port productivity and efficiency. Rapid technological advancements in port operations have made port workers a more valuable resource, necessitating ongoing investment in their training and professional development.
- Innovation in information technology has become another driver of efficiency at Chinese ports. New technology is resulting in significant efficiency benefits by coordinating the operations of numerous participants in port supply chains and allowing each worker to accomplish more.

2.2 Singapore's port development

Singapore's transformation into a global maritime hub offers valuable insights for Vizhinjam. Singapore invested heavily in port infrastructure, implemented efficient regulatory policies, and focused on transshipment. Singapore is known as "the premier global hub port". "The most technologically advanced and efficient shipbuilding and ship repair facilities in Southeast Asia", "Asia's largest transshipment center", and "one of the world's largest bunkering ports", are all labels of the Port of Singapore. After being overtaken by Shanghai Port in 2005, the Singapore Port has steadily maintained its second position as the busiest port in the world, accounting for one-fifth of global freight trade. Due to its composite

operations strategies, Singapore Port and its transshipment business have grown in importance to Singapore's economic and social development, contributing not only to about 7% of Singapore's GDP but also creating around 170,000 jobs.

As of 2023, Singapore's Gross Domestic Product (GDP) was distributed across various sectors as follows:

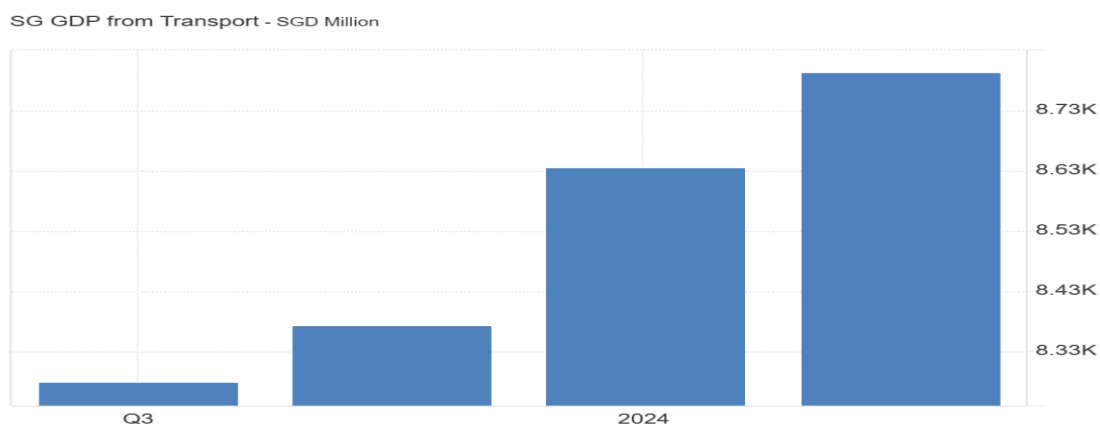
Table 1 Gross domestic product across sectors

Sector	Percentage of Nominal GDP
Wholesale Trade	22.3%
Manufacturing	18.6%
Finance and Insurance	13.8%
Other Services Industries	10.0%
Information & Communications	6.6%
Transportation & Storage	6.4%
Professional Services	6.2%
Construction	4.4%
Administrative & Support Services	2.5%

Source: Economic Survey of Singapore 2023

The maritime sector which is a part of transportation & storage contributes approximately 7% of Singapore's GDP, making it a key pillar of the country's economy and establishing Singapore as a major global maritime hub; this includes services like shipping, bunkering, and related maritime services.

Figure 4 : Singapore GDP from transport



Source: tradingeconomics.com | Statistics Singapore

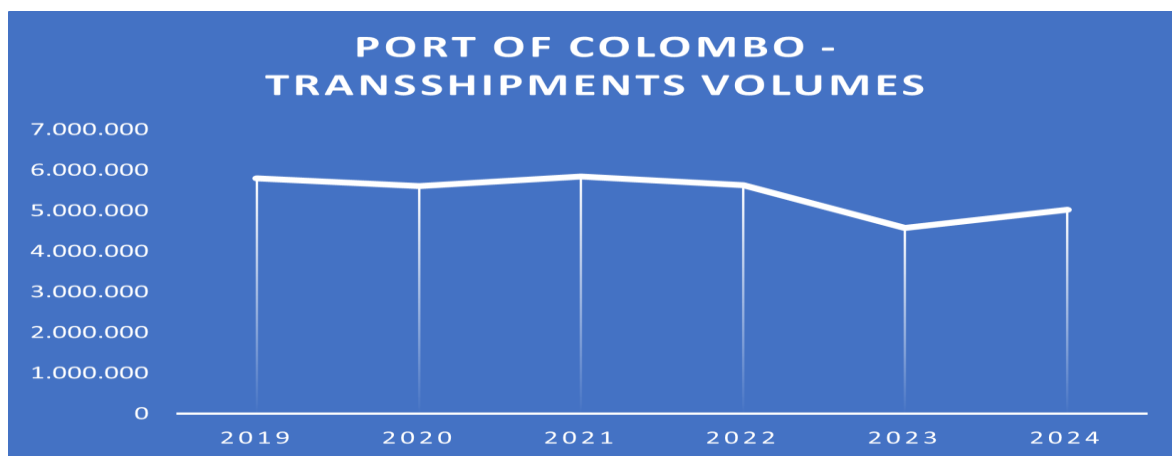
Source: Tradingeconomics.com

Singapore's expenditure on transport represents approximately 3-7% of its GDP; with the transportation and storage sector contributing around 17.9% to the overall GDP, highlighting the significant role of transport including the ports in the nation's economy. GDP from Transport in Singapore increased to 8.9K SGD Million in the third quarter of 2024 from 8.28K SGD Million in the third quarter of 2023.

2.3 Colombo port- supremacy in Indian ocean transshipment market

A study was carried out by Container News to evaluate Colombo Port- Supremacy in Indian Ocean Transshipment Market. For the reason that of its advantageous location along the main shipping route that connects the Middle East to East Asia, the analysis shows that Colombo Port continues to be the key transshipment hub in the Indian Ocean. For their cargo movements, a number of important international ports, including Chittagong, Yangon, Kolkata, Visakhapatnam, Chennai, Cochin, Mumbai, Karachi, and Fujairah, depend on Colombo as a major transshipment hub. However, important performance metrics including transshipment volumes and the Port Connectivity Index raise worries about a possible drop in transshipment volumes at Colombo Port, which has been linked to the development of Indian ports.

Figure 5: Transshipment volume of Columbo port



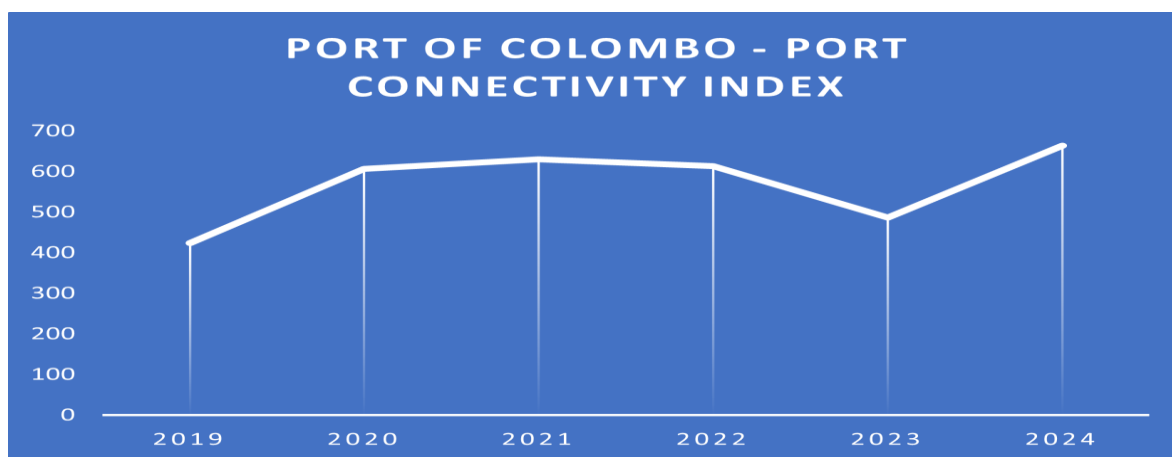
Source: <https://container-news.com/>

According to the data, Colombo saw consistent volume inflows, with a minor decline in 2022–2023 again rebounding in 2024.

Similar trends may be observed in the Port Connectivity Index, which increased in 2019, stabilized, and then declined in 2022–2023. There is a clear similarity between these two

falls. Transshipment volumes and connectivity have both started to rise again by 2024. The Sri Lanka Ports Authority (SLPA) emphasizes that the current reduction in cargo handling is not specific to Colombo but has also impacted other ports abroad, attributing it to seasonal fluctuations as well as more general global economic and social issues.

Figure 6: Port connectivity index of Colombo



Source: <https://container-news.com/>

According to SLPA, changes in transshipment volumes should be considered in the broader framework of how global supply and demand dynamics impact ports all over the world.

3. Potential of Vizhinjam International Port

The port was authorized by the shipping ministry in April 2024 to function as India's first transshipment port, in line with the country's ambition to become a major hub for global manufacturing, according to the Vizhinjam Port Authority. Adani Ports and SEZ (APSEZ), India's largest port operator, emphasizes that the port has cutting-edge infrastructure that can handle Megamax container ships and sophisticated technology for rapid vessel turnaround. With ambitions to grow to 6.2 million TEUs in subsequent phases, Vizhinjam was initially expected to handle one million TEUs per annum in Phase I of the project.

Remarkably, the Vizhinjam Seaport managed to accommodate 23 ships berthing in October 2024 alone, processing over 50,000 TEUs of container cargo. This brought the cumulative cargo throughput to 1.08 lakh TEUs as of November 2024. With the completion of the yard and the addition of a second berth, the port's monthly handling capacity is projected to increase to 0.5 lakh to 1 lakh TEUs starting next month. Furthermore, the port aims to achieve a significant total volume of 5 lakh TEUs in the current fiscal year, far surpassing the

initial target of 60,000 TEUs. The exchequer has generated ₹7.4 crore in tax revenue during the trial run period by facilitating the berthing of 46 ships and handling over 1 lakh TEUs.

In the world of shipping, location is key. No port exemplifies this better than Vizhinjam, India's first deep-water container trans-shipment hub. It is only 10 nautical miles away from the east-west international route, close to two of the world's busiest shipping lanes - the Straits of Hormuz and Malacca - and has a natural draft of 20 m, sufficient to accommodate ultra-large container ships and mega crude carriers.

Reliance on foreign ports like Singapore, Colombo, and Jebel Ali will largely cease as Vizhinjam reaches its full capacity. Vizhinjam could reverse this trend by enhancing the efficiency of other Indian ports and bringing back to Indian shores, as 85% of trans-shipment cargo that now passes through ports abroad. It is estimated that logistics accounts for 13-14% of India's GDP. A trans-shipment port within its shores will reduce India's logistics cost by about 4-6% (K M Chanrashekar,2024).

Vizhinjam Port's can develop into the Indian Ocean's primary transshipment hub. Vizhinjam's location at a key chokepoint allowed it to gain access to secondary routes, especially those coming from the quickly expanding Southeastern Asia region, as well as other important chokepoints like the Strait of Malacca, Bab el-Mandeb, and the Strait of Hormuz. Due to delays brought on by cargo congestion and work disruptions at Colombo Port, international shipping lines are becoming more interested in using the recently opened Vizhinjam Transshipment Terminal.

Around 75 per cent of India's container traffic is gateway containers, which operate directly from the port of origin to the port of destination, while 25 per cent are transhipped enroute to the destination. Currently, nearly 75 per cent of India's transhipped cargo is handled by transshipment hub ports such as Colombo (and now, also, Hambantota), Singapore, Salalah (Oman), Jebel Ali (DP World's flagship port in Dubai), and Tanjung Pelepas and Port Klang (Malaysia). The Ports of Colombo, Singapore, and Klang handle more than 85 per cent of this cargo, with 45 per cent of this cargo handled at Colombo Port, according to Ministry data.

The dependence on foreign ports is a disadvantage for the economy. Indian ports lose up to \$200-220 Mn of potential revenues each year on transshipment handling of cargo either originating or destined for India. Transshipment adds to the cost incurred by the Indian industry. The transshipment cost also leads to higher logistics cost to the shipper, where the

additional freight and handling cost get loaded to the overall cost. A good transshipment port in India would not only facilitate the movement of its own originating and destined traffic but also play a pivotal role in handling traffic along the major routes connecting India, such as traffic between the US/Europe and the Indian subcontinent, US/Europe and the Far East, and Africa and the Far East.

Out of this, Vizhinjam in Kerala have made headway in the direction of becoming transshipment hubs. It has adequate natural draft , which is crucial to getting large vessels and mother ships.

4. How vizhinjam international seaport contribute to economic growth?

With the capacity to accommodate megaships with a capacity of over 24,000 twenty-foot equivalent units (TEU) and more, the Vizhinjam International Deepwater Multipurpose Seaport is set to grow into one of India's biggest ports. Larger ships have been becoming more common in the world's maritime industry as of 2023, which has made ports that can handle them necessary. Vizhinjam has a competitive advantage due to its advantageous location close to the international shipping route and its 20-meter-deep draft.

Improving port infrastructure, incorporating advanced supply chain and logistics technologies, and creating effective multimodal transportation networks are all part of the development agenda. The port is expected to create significant economic advantages, including direct employment and indirect employment.

Additionally, the port's growth is in line with India's Sagarmala project, which promotes prosperity led by ports. Positive spillovers to the trade, manufacturing, and service sectors demonstrate that the economic influence goes beyond the maritime industry. In order to revolutionize the marine industry, the 20-year Sagarmala-2015 also aims to modernize ports and improve connectivity throughout the nation. Port modernization, port connectivity, port-led industrialization, coastal community development, and coastal shipping/inland water transportation are the five pillars of "port-led development" that Sagarmala-2015 envisions. With nearly 600 kilometers of coastline, Kerala has to concentrate again on the growth and completion of Vizhinjam Seaport and related industries.

Spices, coir, rubber, seafood, tea, and coffee are the goods that Kerala exports in large quantities. The state can obtain direct access to global markets with the growth of Vizhinjam Seaport, which will drastically cut export transit times and logistics expenses.

In order to secure public investment in ports, hinterland development is essential. In order to create jobs and promote economic growth, attention may be directed toward port-connected industrial, marine clusters, smart industrial port cities, and industrial corridors. Plans for cross-sectoral programs and initiatives should be coordinated with departments and marketing organizations in the fields of industry, tourism, power, roads, and fishing, among others.

5. Port-led initiatives at Vizhinjam port vicinity

- A. Develop multimodal transportation networks (road, rail, and air) to connect the port with key industrial hubs and metropolitan centers.
 - i. Improve Road networks, including highways and feeder roads, to facilitate cargo transportation.
 - ii. Rail Linkages: Expand the rail network to connect the port to national and international commerce routes.
 - iii. Enhance air cargo facilities at Trivandrum International Airport.
- B. Port-Related Industrial and SEZ Development
 - i. Create Special Economic Zones (SEZs) to attract global manufacturing corporations in industries like as electronics, textiles, shipbuilding, and renewable energy.
 - ii. Industrial Clusters: Establish clusters for high-value manufacturing, such as automobile components, shipbuilding, engineering, and food processing.
 - iii. Shipbuilding and Marine Engineering: Encourage shipbuilding, port machinery manufacturing, and marine equipment production.
- C. Logistics Hub and Warehousing.
 - i. Set up logistics parks near ports for warehousing, cold storage, distribution hubs, and multimodal freight terminals.
 - ii. Integrated Freight Handling: Create efficient logistical facilities for handling dry and perishable products.
- D. Sustainable Energy Infrastructure.
 - i. Green Port Technologies: Use energy-efficient and renewable energy sources like solar and wind to power port operations and nearby industrial areas.
 - ii. Promote renewable energy manufacturing, including solar panels, wind turbines, and battery storage devices.

- iii. The United Nations (UN) and International Maritime Organization (IMO) advocate methanol as an alternative fuel to reduce the use of fossil fuels and address climate change. As a result, there is a growing preference for ships powered by methanol. If Kerala can deliver methanol as an alternative fuel, Vizhinjam harbor might become a methanol bunkering hub. Kerala's high urban and agricultural trash may easily produce enough methanol to meet the demands of Vizhinjam's seaport. Vizhinjam seaport's methanol bunkering hub can boost India's international competitiveness.

E. Tourism and Coastal Development.

- i. Use Vizhinjam's coastline location to promote eco-tourism, resorts, and cruise tourism.
- ii. Cultural and Heritage Tourism: Promote Kerala's cultural heritage and boost tourism activities in the port region.

F. Enhancing Skills and Human Capital

- i. Vocational Training: Establish training facilities for port operations, logistics management, and specific industrial skills (e.g. shipbuilding, electronics).
- ii. Establish research and development centers for logistics, port technology, and green technologies.

Suggestive measures of union government towards development of vizhinjam port

The Union Government should provide significant support to the Vizhinjam Port project, both in terms of financial assistance and regulatory approvals after considering the strategic importance of this project to the country as a whole. The assistance and support are required in the areas of:

- Viability Gap Funding (VGF): The Union Government has approved a VGF of ₹817.80 crore for the Vizhinjam Port project. This funding is part of the Scheme for Financial Support to Public Private Partnerships (PPP) in infrastructure projects. However, there has been a contentious issue regarding the repayment of this VGF. The Union Government has insisted that the Kerala government repay the VGF in Net Present Value (NPV) terms through premium sharing from the 15th year of port operations. This condition has been a point of contention between the state and the central government.

- **Regulatory Approvals:** The Shipping Ministry has approved Vizhinjam Port's operation as India's first transshipment port. This approval is crucial for the port's role in handling international cargo and enhancing India's position in global trade. The port is also expected to receive environmental clearance for its second and third phases of expansion by March 2025. This clearance is essential for the port's capacity expansion plans.
- **Infrastructure Development:** The Union Government needs to support infrastructure development around the port, including road and rail connectivity because a multimodal transport system is one of the key success factors in countries that are leading in port-led development. In addition, Kerala faces a significant disadvantage of infrastructure cost disability. The cost is 3 times higher than the national average in terms of infrastructure development. These factors need to be taken care of by the Union government.
- **Strategic Importance:** The Union Government must recognize the strategic importance of Vizhinjam Port in reducing India's reliance on foreign ports for transshipment. About 75% of India's transshipment cargo is currently processed at foreign ports like Colombo and Singapore. Vizhinjam Port aims to capture a portion of this market, thereby saving foreign exchange and boosting domestic economic growth.
- **Economic Impact:** The port is expected to drive economic growth in Kerala and India by creating job opportunities, boosting tourism, and attracting foreign investments. The Union Government's support is aimed at maximizing these economic benefits and positioning Vizhinjam as a major hub in the global shipping and logistics sector.

6. Conclusion

Kerala's strategic location along international maritime routes offer immense potential for transforming the state into a prominent maritime hub. Adopting a port-led development strategy, with Vizhinjam Seaport at its core, can catalyze economic growth and position Kerala as a vital player in South Asia's trade and logistics landscape. Drawing inspiration from global port-centric models like those in China and Singapore, the focus should be on expanding and modernizing port infrastructure to enhance trade connectivity and attract foreign investments.

The systematic development of ancillary industries, including shipbuilding, warehousing, and logistics services, can generate employment and foster regional economic activity. Furthermore, improving hinterland connectivity and integrating advanced technologies are essential steps to optimize port operations and supply chain efficiency.

By prioritizing Vizhinjam Seaport and aligning with national initiatives like Sagarmala, Kerala can unlock new opportunities in the maritime sector, strengthening its role in global trade networks and driving sustainable economic growth.

References

- Aritua, Bernard, Hei Chiu, Lu Cheng, Sheila Farrell, and Peter de Langen (2022). *Developing China's Ports: How the Gateways to Economic Prosperity Were*. International Development in Focus. Washington, DC: World Bank.
- Gu, B., & Liu, J. (2023). Port resilience analysis based on the HHM-FCM approach under COVID-19. *Ocean & Coastal Management*, 243, 106741. <https://doi.org/10.1016/J.OCECOAMAN.2023.106741>
- Hanson, S. E., & Nicholls, R. J. (2020). Demand for Ports to 2050: Climate Policy, Growing Trade and the Impacts of Sea-Level Rise. *Earth's Future*, 8(8). <https://doi.org/10.1029/2020EF001543>
- Lonza, L., & Marolda, M. C. (2016). Ports as Drivers of Urban and Regional Growth. *Transportation Research Procedia*, 14, 2507–2516. <https://doi.org/10.1016/J.TRPRO.2016.05.327>
- Mishrif, A., Antimiani, A., & Khan, A. (2024). Examining the Contribution of Logistics and Supply Chain in Boosting Oman's Trade Network. *Economies* 2024, Vol. 12, Page 70, 12(3), 70. <https://doi.org/10.3390/ECONOMIES12030070>
- Munim, Z. H., & Schramm, H.-J. (2018). The impacts of port infrastructure and logistics performance on economic growth: the mediating role of seaborne trade. *Journal of Shipping and Trade* 2018 3:1, 3(1), 1–19. <https://doi.org/10.1186/S41072-018-0027-0>
- Robinson, R. (2002). Ports as elements in value-driven chain systems: The new paradigm. *Maritime Policy and Management*, 29(3), 241–255. <https://doi.org/10.1080/03088830210132623>

Song, M. (2024). Research on the Coordinated Development of Port Logistics and Regional Economy. *Scientific Journal of Economics and Management Research*, 6(12), 198–204. <https://doi.org/10.54691/W3S60M45>

Verschuur, J., Koks, E. E., & Hall, J. W. (2022). Ports' criticality in international trade and global supply-chains. *Nature Communications*, 13(1), 4351. <https://doi.org/10.1038/S41467-022-32070-0>

<https://vizhinjamport.in/visl/>

<https://globalmaritimehub.com/reports-presentations>

<https://www.worldshipping.org/>

<https://shipmin.gov.in/>

<https://www.mpa.gov.sg/home>

<https://www.slpa.lk/port-colombo/colombo>

<https://www.thehindu.com/news/national/kerala/vizhinjam-poised-to-clock-half-a-million-cargo-throughput-this-fy-eight-times-higher-than-targeted-volume/article68852724.ece>

<https://timesofindia.indiatimes.com/city/thiruvananthapuram/kerala-cm-slams-centre-over-loan-conditions-for-vizhinjam-port-funding/articleshow/116144300.cms>

<https://pib.gov.in/PressReleasePage.aspx?PRID=2042027>