THE INDO-DANISH MARITIME BRIDGE

Transforming the Blue India with Green Danish maritime solutions

Danish Maritime

DI INDIA

ASIA HOUSE

INNOVATION CENTRE DENMARK

RedThread Consulting

SUPPORTED BY

THE DANISH MARITIME FUND

EXECUTIVE SUMMARY

This report is a product of the Indo-Danish Maritime Bridge, a pilot project supported by the Danish Maritime Foundation that set out to identify and map concrete leads and opportunities within the maritime sector in India and assess the interest amongst Danish and Indian stakeholders for further collaboration.

The initiative also seeks to leverage the increased maritime collaboration between Denmark and India, including the Green Strategic Partnership (which has a strong maritime focus), the planned Maritime Centre of Excellence (COE) on Green Shipping, and the fact that India is the third largest market for Danish shipowners.

The main focus of the report is shipbuilding and repair, including opportunities within the Indian Navy and Cruise industry. Other blue economy areas such as shipping, ports, offshore services, marine ecosystems and fishery are outside the scope of this project, but merit further investigation.

India's Maritime sector is small by global standards but expanding rapidly. The growth is fueled by structural and economic necessity and geopolitical changes in terms of security and supply chain diversification. In addition, global sustainability regulations are forcing Indian shipowners to either build new ships or retire their existing fleet. There is a strong demand from the market to understand the technology landscape for sustainable technologies onboard ships and for new energy saving solutions to be used onboard new and existing ships.

Therefore, now is a good time for foreign stakeholders to engage with the Indian maritime ecosystem. The sector is still nascent and relatively inconspicuous compared to the traditional maritime heavy weights (China, South Korea and Japan), yet most probably heading for rapid growth in the near future. Norwegian, Swedish and Dutch maritime companies are already successfully engaging with Indian shipyards with a strong international track record, especially in Cochin and Chowgule (Goa). Danish solution providers, however, are less visible (apart from large and well established companies like Hempel and MAN Energy Solutions).

Moving forward, the Danish maritime ecosystem might be inspired by the Norwegian approach, which emphasises a long term, cross institutional strategy. If Danish maritime companies are to successfully access the growing opportunities on the Indian market there is a need to radically rethink the entire strategy. This includes:

- Ensure mutual benefits for both Danish, Indian and Asian stakeholders - a traditional one-way export model will not yield optimal results.
- Form synergies with other Danish companies and boost the combined value proposition when positioning to Indian stakeholders.
- Include multiple stakeholders from the entire maritime ecosystem - academia, private and public organisations to replicate the success of the triple helix model widely practised in Denmark.
- Focus on a broad range of thematic areas across the maritime sector value chain to ensure multiple touchpoints for an ecosystemic approach.
- Funding solutions provided by the Export and Investment Fund of Denmark can often play a constructive role in unlocking foreign investments.
- Reap the synergies from interventions that cover trade, talent and sustainability

Asia House, Copenhagen, May 2023

STRUCTURE

INTRODUCTION

Maritime collaboration between Denmark and India is on the rise. In 2020, the Maritime sector was highlighted as one of six focus areas of the Green Strategic Partnership.[1] In March 2023 a maritime sector counsellor joined the Embassy of Denmark in Delhi, and later in 2023, Denmark and India will be opening a joint Maritime Centre of Excellence (COE) on Green Shipping.[2]

This strong official emphasis on maritime relations is both timely and relevant. India urgently needs to strengthen its maritime sector: imports, exports and industrial production are growing rapidly,[3] yet most freight is handled by foreign shipping companies. For Danish shipowners, India is the 3rd largest market. India's freight capacity, port infrastructure and inland waterways need a massive upgrade, and new sustainability regulations have increased the need for retrofitting of Indian vessels (estimated to be almost 50% of the existing fleet set to retire by 2026 due to sustainability and longevity regulations[4]).

Geopolitical changes are driving shipyards, ship owners and public authorities towards diversifying supply chains and providing the impetus for a rapid expansion of the Indian Navy. In addition, the Indian cruise industry[5] seems to be heading for a golden age on the back of a growing Indian middle class, creating new opportunities for inland waterway tourism and transportation.[6]

The Indian government is heavily prioritising the growth of the maritime sector, and its transition towards sustainability. In 2015 the government allocated DKK 835 billion for a modernisation of the maritime infrastructure, and in 2021, India launched its Maritime Vision 2030,[7] with a clear green agenda.

This report sets out to investigate commercial opportunities and limitations for Danish maritime companies looking to engage with the Indian shipbuilding industry, and design a strategy for further engagement.

The report builds on the insights and learning generated by the Indo-Danish Maritime Bridge, a pilot project supported by the Danish Maritime Foundation from November 2022 to May 2023. The partners behind the Maritime bridge include Asia House, Danish Maritime, Confederation of Danish Industries in Mumbai, the Innovation Centre Denmark in Bangalore, and RedThread Consulting in Bangalore.

THE INDO-DANISH MARITIME BRIDGE

The purpose of the Indo-Danish Maritime Bridge was to identify and map concrete leads and opportunities within the maritime sector in India, and assess the interest amongst Danish and Indian stakeholders for further collaboration.

The team interviewed a wide range of stakeholders across four locations in India (Mumbai, Delhi, Goa and Cochin), including on-site visits at numerous shipyards:

ORGANISATION	TYPE	LOCATION
21 Knots	Maritime design, engineering and consultancy firm	Mumbai
Cyber Marine	Maritime design and engineering firm	Mumbai
Ocean Trade Media	Leading maritime media firm	Mumbai
Zebec Marine	Marine consultancy firm	Mumbai
Vedam Design	Maritime design, engineering and consultancy firm	Mumbai
Torm Shipping India	Danish company	Mumbai
Indian Register of Shipping	Public organisation	Mumbai
Mantrana Maritime Consultants	Maritime consultancy firm	Mumbai
APM Terminals	Danish company	Mumbai
Shoft Shipyard	Indian Shipyard	Mumbai

ORGANISATION	TYPE	LOCATION
Buoyancy Consultants	Maritime design, engineering and consultancy firm	Goa
Konkan Maritime Cluster	Indian maritime cluster	Goa
Nirmon Designs	Maritime design, engineering and consultancy firm	Goa
Vijai Marine	Indian private shipyard	Goa
CII Goa State office	Indian industry organisation	Goa
Goa shipyard	Indian public shipyard	Goa
Chowgule shipyard	Indian private shipyard	Goa
DEMPO shipyard	Indian public shipyard	Goa
Institute of Maritime Studies	Indian maritime educational institution	Goa
Cochin shipyard	Indian Public - private shipyard	Cochin
Accurant Engineers & Consultants	Indian marine consultancy firm	Cochin
Zain Engineers & Technologies	Indian marine consultancy firm	Cochin
Shipyards Association of India	Indian industry organisation	Delhi
National Maritime Foundation India	Indian public organisation	Delhi

ORGANISATION	TYPE
MAN Energy Solutions	Danish company
Hempel	Danish company
Iron Pump	Danish company
Knud E. Hansen Vessel Design	Danish company

Following these meetings the project team organised an introductory webinar on 1 March 2023, presenting the Indian Maritime sector for a Danish audience. The purpose of the webinar was two-fold:

- To disseminate the insights gathered from the stakeholder meetings across India and extensive desk research for a wider audience
- To assess the interest from Danish Maritime companies towards India.

With up to 40 participants joining the event, including 20 Danish companies, the webinar was considered a success and justified a follow-up event with an Indian stakeholder. Thus, on 3 May 2023, the team organised an online event where six Danish maritime companies were selected to pitch their solutions to India's largest shipbuilding group in Cochin. A prerequisite for joining the pitch session was that the companies were unfamiliar to Cochin shipyard. The six Danish companies were:

- Lopolight ApS
- SH Defence
- Advent Technologies A/S
- Allset Industries A/S
- Iron Pump A/S
- Green Instruments A/S

The webinar also included presentations by:

- Cochin shipyard (Mr. Sivaram Swamy, General Manager, Business Development)
- Embassy of Denmark (Ms. Josephine Pallesen, Maritime Counsellor)
- Danish Maritime (Mr. Bjarke Wiehe Bøtcher, Director of International Affairs)

Based on the stakeholder meetings, desk research and the two webinars, it seems clear that further Indo-Danish activities are justified within the commercial and defence maritime space. However, as will be discussed in greater detail in the Recommendations section of the report, the methodology needs to be adjusted to certain structural challenges present in India. These have also been incorporated into the larger programme that the Maritime Bridge believes could spearhead actual Indo-Danish maritime collaboration and operationalise the Green Strategic Partnership between Denmark and India in this particular sector.

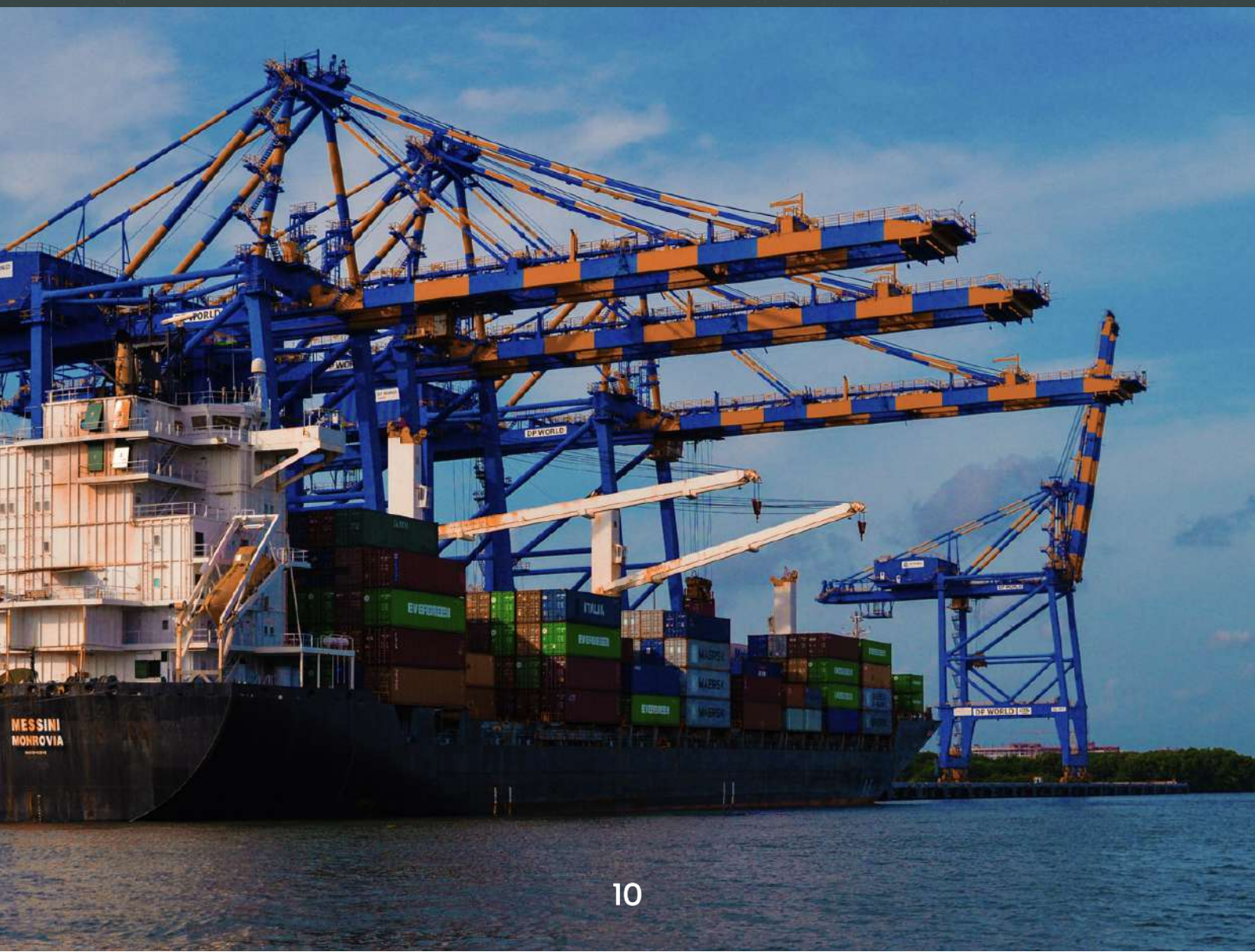
PRESENTING THE INDIAN MARITIME SECTOR

Though the maritime sector is often broadly defined as including shipping, shipbuilding and maritime equipment, ports, offshore services, marine ecosystems and fishery, this report will primarily focus on shipbuilding and maritime equipment.

This delimitation is not based on any assumptions that the other sub sectors are irrelevant for Indo-Danish collaboration, but is simply a reflection of the resourcing and core expertise of the Maritime Bridge partnerships. In fact, a deeper analysis of the other sectors are highly relevant and should be included in a follow-up project.

This analysis has subdivided shipbuilding into four main chapters:

- Shipbuilding
- Ship repair
- Navy expansions
- The Cruise industry



SHIPBUILDING

During the early 2000s, India built over 300,000 (GT) ships annually and ranked amongst the top 10 in the world. However, global changes in the shipbuilding industry have significantly impacted the Indian shipyards, and today India accounts for just 0.45% of the global shipbuilding market.[8] Several policy measures have since been undertaken by the Government of India to revive the shipbuilding industry, but presently the majority of shipbuilding orders to the shipyards are primarily from the Indian Navy.

Today India has 28 shipyards; eight in the public sector (mainly Defence) and 20 in the private sector. In 2021, these shipyards had orders of 280 ships with gross DWT 279,000 tonnes:[9]

- Public sector: 125 ships, 56,000 DWT, all domestic customers
- Private sector: 155 ships, 222,000 DWT, with 16 ships (187,000 DWT) for export and 139 ships (35,000 DWT) for domestic use.

The top-5 public shipyards in terms of orders 2021 were:

NAME	SHIPS ON ORDER	LOCATION
Cochin Shipyard	50	Kochi, Kerala
Goa Shipyard	25	Vasco, Goa
Garden Reach	17	Kolkata, West Bengal
Mazagon Dock	14	Mumbai, Maharashtra
Shalimar Works	10	Kolkata, West Bengal

The top-5 private shipyards in terms of orders 2021 were:

NAME	SHIPS ON ORDER	LOCATION
AC Roy & Co	36	Kolkata, West Bengal
Shoft Shipyard	26	Mumbai, Maharashtra
Sea Blue Shipyard	18	Kochi, Kerala
San Marine	14	Kakinada, Andhra Pradesh
Chowgule	14	Quelossim, Goa

The top-5 private shipyards in terms of export 2021 were:

NAME	SHIPS ON ORDER	LOCATION
Sea Blue Shipyard	9	Kochi, Kerala
Chowgule	2	Quelossim, Goa
Vijai Marine	2	Quelossim, Goa
Titagarh Wagons	1	Kolkata, West Bengal
Mandovi Dry Docks	1	Panaji, Goa

Note: All structured data is gathered from "Statistics of India's Ship Building and Ship Repairing Industry 2021-22" (Government of India, Ministry of Ports, Shipping & Waterways)[9].

LIMITATIONS

- **Indian clients are often very price sensitive**, and many are very focused on the immediate, short term savings rather than the long term benefit of quality solutions. Two reasons for this are that most ship owners tend to sell their ships before realising the operational ROI and a clear lack of financing for shipowners. A key focus for projects should be to identify Indian shipyards that cater to higher quality or environmental standards, or are inherently less price sensitive, e.g. shipyards with strong export focus or navy suppliers.
- **Indian clients lack financing** to implement new and more sustainable solutions. Present interest rates in India are as high as 8% and are collateralised, making it difficult for shipowners to invest in newer ships and sustainable solutions onboard existing ships.
- **Government subsidies for shipbuilding are often difficult to access** in reality. The subsidies are limited to SME shipyards, which sometimes do not have the technical capacity to take on large orders. This lack of capacity often translates to a sparse orderbook, leading to subsidies being under utilised.
- The largest private Indian shipyards went bankrupt during the downturn, and haven't been revived.[10] Hence, **large and medium-sized ships are rarely being built**. However, the Indian capacity is on the rise- many of the older shipyards are being acquired and rejuvenated. E.g. Chowgule has just acquired a shipyard that gives them the capability to build ships of over 200 metres in length.[11]
- Though equipment for ships are exempt from import duties, **the cost of imported machinery is inflated by transportation costs** and cost incurred by long wait times for goods to arrive at port. In addition, locally manufactured goods cost less due to cost arbitrage and local production costs.[4]
- **Indian shipowners are postponing orders due to global recession fears** and uncertainty on which sustainable technologies to select. Guidelines and knowledge on which technologies and fuel alternatives will shape the future are lacking, and thus many ship owners are in wait and watch mode until perhaps 2026.[4]

OPPORTUNITIES

- **Age limits to an ageing fleet:** The Indian government has announced the introduction of new rules that limit the age of Indian ships. Thus, bulk carriers, tankers and general cargo ships older than 25 years will be deregistered and won't be allowed to enter Indian ports. The same applies for gas carriers, offshore vessels and boxships older than years. Considering the fact that 44% of the Indian fleet is over 20 years old, there will be strong demand for new ships in India in the near future. According to the Greek data firm MarineTraffic, there are currently 753 ships built prior to 2003, which are registered under the Indian flag, 133 of which are tankers and 61 bulkers. The new ship age limits are designed to improve safety and environmental performance within shipping in India. Under the new rules, owners will not be able to locally flag any secondhand acquisitions that are 20 years old or older.
- **Geopolitical changes in Asia:** the geopolitical landscape in Asia is rapidly changing and a lot of US and Western European industries are increasingly considering their dependency on a single or few providers in e.g. China. This is already gradually affecting the maritime industry and might, in due time, also impact the location of shipbuilding. Several Asian countries are keen to seize a share of the market, but if Indian yards can increase efficiency, India might, thanks to its young, well-educated and large population, have solid opportunities to seize a share of the market.
- **Uncompetitive shipyards:** An inherent challenge for certain parts of the Indian shipbuilding industry is low productivity and quality, making it uncompetitive on the global market. In some places, this is no longer the situation and market opportunities may exist. In general, there is a high demand for equipment and technology that may augment production methods and quality, eg. automatic cutting, and robotic welding.
- **Maritime India Vision priority:** Five vessel segments have been identified for domestic production at global standards, to disincentivize the influx of used foreign tonnage: Port Crafts, Tugs, Small dredgers, Offshore vessel, Coastal cargo, Inland cargo.[7] The intention of the Indian government is to encourage indigenous development of such vessels while enforcing cabotage regulation thereby building local capabilities and preventing India to become a second hand market for used vessels.

- **Energy efficiency & decarbonization:** Energy efficiency and renewable energy, biofuels and other sustainable technology are a priority area for the Indian shipping industry. Especially biofuels, which entail limited implementation costs as these don't require extensive change of machinery. Also alternative fuels like methanol, hydrogen and ammonia are in demand. Cochin shipyard recently built a 98 passenger battery-operated ferry,[13] and now they are working on a hydrogen fuel-cell commercial ferry.[12]
- **Marginal ancillary industry:** One major limitation mentioned by various stakeholders interviewed by the project as well as in the report Shipbuilding – A Larger National Perspective that might be considered a general advantage for Danish companies was "the absence of a domestic ancillary industry", e.g. electrical machinery and equipment used for the building of ships. Danish companies would be able to export their products as white label solutions by partnering with Indian clients that have been empanelled.
- Government incentives and subsidies: the Indian government has announced 30% financing, reduced by 3% annually for the building of green ships. Vessels for the offshore wind energy industry are also being added to the shipbuilding assistance programme which provides assistance for specialised vessels built in the country. Wind turbine installation vessels, semi-submersible heavy life vessels for the wind sector, and service and maintenance vessels will now be eligible for the programme.[25]

NORTHERN EUROPEAN SHIP BUILDING ACTIVITY IN INDIA

Fig. 1: *Ships ordered by Northern European operators in India from 2019 to 2027.*

	BHARATI DEFENCE RATNAGIRI	**CHOWGULE SHIPYARD**	**COCHIN SHIPYARD**	**TEBMA SHIPYARDS** UDUPI	
Denmark				1	1
Germany		6	8		14
Netherlands		6			6
Norway	2		2		4
Sweden		12			12
Total	**2**	**24**	**10**	**1**	**37**

At present, 37 ships, with an accumulated GT of 165,370, have been ordered by Northern European operators in India from 2019 to 2027. Denmark is by far the least active of the Northern European countries in terms of ship building in India.

Fig. 2: *Northern European operators active in India, and the type of ships they are ordering.*

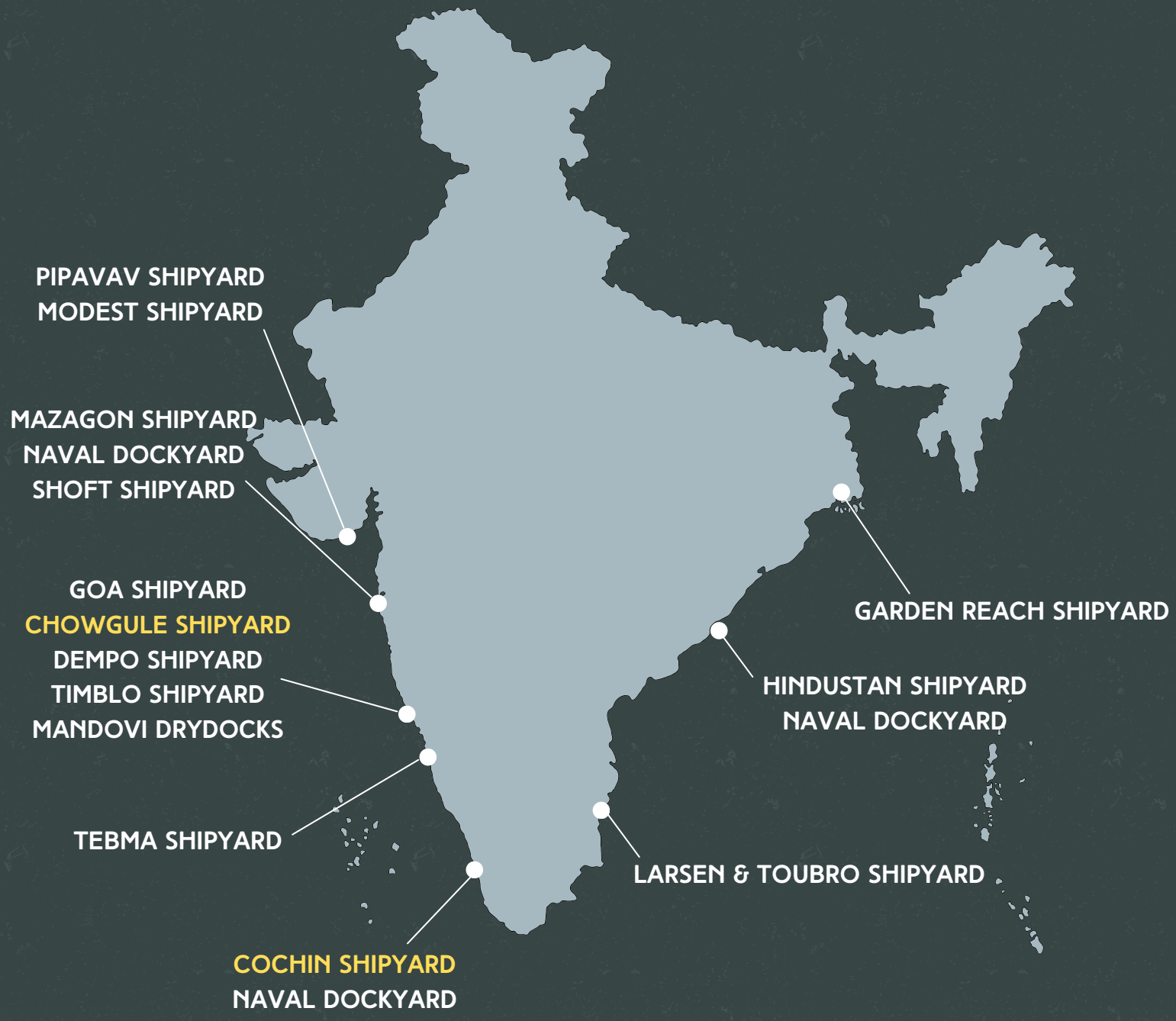
OPERATOR	ANCHOR HANDLING TUG SUPPLY	GENERAL CARGO SHIP	LANDING CRAFT	OFFSHORE SUPPORT VESSEL	PLATFORM SUPPLY SHIP	RO-RO CARGO SHIP	TOTAL
AtoBatC Shipping		12					12
HM Pelagic Partners RAIF VCIC							2
HS Bereederungs GmbH		8					8
Massterly						2	2
Mega Infra Projects			2				2
Nordic Shipholding	1						1
Norwegian Shipping II					1		1
Sea-Cargo						1	1
Vertom Bereederings GmbH		6					6
Wijnne & Barends Cargadoors		6					6
Total	**1**	**32**	**2**	**2**	**1**	**3**	**41**

Fig. 3: *Northern European operators vs. accumulated GT for each vessel type ordered:*

OPERATOR	ANCHOR HANDLING TUG SUPPLY	GENERAL CARGO SHIP	LANDING CRAFT	OFFSHORE SUPPORT VESSEL	PLATFORM SUPPLY SHIP	RO-RO CARGO SHIP	TOTAL
AtoBatC Shipping		50,400					50,400
HM Pelagic Partners RAIF VCIC				12,400			12,400
HS Bereederungs GmbH		44,632					44,632
Massterly						1,654	1,654
Mega Infra Projects			712				712
Nordic Shipholding	4,247						4,247
Norwegian Shipping II					2,630		2,630
Sea-Cargo						7,695	7,695
Vertom Bereederings GmbH		23,040					23,040
Wijnne & Barends Cargadoors		17,970					17,970
Total	**4,247**	**136,042**	**712**	**12,400**	**2,630**		**163,370**

KEY STAKEHOLDERS

- **Cochin Shipyard** is the largest shipyard in India and caters to both defence and commercial needs. The majority of the income comes from the Indian defence sector (78% from the top two orders, as of March 2022). However, Cochin has been able to diversify, and has secured orders to build vessels from European clients. Presently Cochin is building a small battery operated vessel as a pilot.
- **Chowgule Shipyard** in Goa is perhaps the most export-oriented private shipyard in India. From on-site visits at Chowgule in January 2023, management noted that 18 ships are presently being built for Norwegian, Finnish and Dutch clients, including six hybrid ships.



SHIP REPAIR

India's share of the global ship repair industry[9] is less than 1%. Shipyards in China, Singapore, Turkey, Bahrain, Dubai account for a major share of the global ship repair market, despite higher cost of ship repair services compared to other Asian countries. Availability of a skilled workforce (often from India) and the latest technology allows these shipyards to attract demand from other low-cost locations like India, Malaysia and Indonesia.

However, there is a strong potential for expanding the Indian ship repair industry. As stated in the Maritime Vision India 2030,[7] 7-9% of the global trade passes within 300 nautical miles of India's coastline, and India is poised to offer repair services to the Indian Navy and the US Navy's 5th and 7th fleet in the Indian Ocean & Arabian Sea. In addition, India already has excellent dry dock and ship repair facilities.

In 2020-21, a total of 376 ships were repaired in India: 235 ships by private sector shipyards and 141 ships by public sector shipyards.

The top-3 active public shipyards in terms of repairs in 2021 were:

NAME	SHIPS REPAIRED	LOCATION
Cochin Shipyard	97	Kochi, Kerala
Goa Shipyard	31	Vasco, Goa
Hindustan	6	Visakhapatnam, Andhra Pradesh

The top-5 active private shipyards in terms of repairs in 2021 were:

NAME	SHIPS REPAIRED	LOCATION
Chidambaram Shipcare	103	Chennai, Tamil Nadu
Dempo Shipbuilding	26	Panaji, Goa
Equiptrans Logistics	21	Surat, Gujarat
Sea BlueShipyard	18	Kochi, Kerala
Mandovi Dry Docks	13	Panaji, Goa

LIMITATIONS

India has a huge potential for making its mark in the global ship repair industry, but is generally uncompetitive compared to service providers in the Emirates, Singapore, Turkey and East Asia. Repair cost in India on an average is 1.4 times the average cost of repairs in Dubai or East Asian countries, primarily due to higher procurement costs, high cost of financing, and limited efficiency in working processes.[7] Also, turnaround time for repair in Indian yards is on average is 1.4 - 1.6 times that of global repair yards for the following reasons:

- Long drawn out procedures for procurement and custom clearances
- Shortage of specialised lifting /material handling equipment and shore cranes
- Non-standard operations & minimal training of manpower
- Longer lead times because of operational policies of public undertaking structure

OPPORTUNITIES

Many of the general opportunities listed in Ship Building also apply for Ship Repair, namely the effects of an ageing fleet, new regulations, lack of modern equipment that augment and enhance production methods, expected demand for energy saving devices and maritime equipment, Ballast Water Management solution providers, ship design and ship building capabilities.

- **Ageing fleet**: With 64% of the Indian fleet being older than 16 years (and 96% of the larger overseas ships being more than six years old), there is a general need for upgrades across most ship types, especially considering new requirements spawned by new global sustainability regulations.
- **Infrastructural deficiencies**: Obsolete or lacking infrastructure may pave the way for opportunities for Danish companies catering to infrastructure and auxiliary services. This is also a focal point for the Indian government, as reflected in the MaritimeVision 2030[7] document, that emphasis the following interventions:
    - Build warehouses with storage capabilities to stock inventory for at least three months, live tracking of parts & equipment and semi-automated /automated part handling capabilities
    - Setup road, rail and water logistics to enable faster and low-cost transportation of goods and people
    - Live tracking of shipments using GPS technologies allowing the team so to constantly monitor
- **Public legislation**: The vision document recommends declaring dedicated repair clusters as Free Trade Zones, and reducing Goods and Services Tax levied on spares and machinery required for repairs, to help reduce import and operations cost and thus improve the competitiveness in the international market.
- **Skilled labour**: Many of the foreign shipyards in proximity to India rely on skilled labour from the country. There is an availability of skilled labour from local maritime institutions that can help augment India's ship repair ambitions.

KEY STAKEHOLDERS

- Cochin ship repair division has grown fast in recent years, focusing on increased business volume and niche areas such as Submarine refits, Offshore fabrication, Conversions etc.
- Chowgule ship repair division has recently augmented their large ship repair capabilities by acquiring yards and upgrading machinery.

NAVY EXPANSION

The Indian Ocean and surrounding seas are increasingly becoming a focal point for Indo-Chinese geopolitical engagement. China has invested heavily in its navy and has taken active measures to advance its strategic interests in the region. India has responded with a massive modernisation and expansion of its maritime forces, centred around indigenous platforms and systems, including its first indigenous nuclear submarine commissioned in August 2016,[14] and first indigenous aircraft carrier commissioned in September 2022 .[15]

The Indian Navy plans to build a strong fleet of 200 vessels by 2027, [16] from its present size of approximately 150 ships. As of November 2022, the Indian Navy has 45 vessels of various types under construction, including destroyers, frigates, corvettes, conventional-powered and nuclear-powered submarines and various other ships.

The Navy's expansion plan has largely been restricted to the government shipyards: **Cochin Shipyard Limited** (aircraft carriers, tankers and shallow water crafts), **Goa Shipyard Limited** and **Mazagon Dock Shipbuilders Limited** (frigates and destroyers), **Hindustan Shipyard Limited** (nuclear submarines and tankers), **Garden Reach Shipbuilders and Engineers Limited** (frigates, corvettes, survey vessels, shallow water crafts and landing crafts). However, private operators like **Reliance Naval and Engineering Limited** and **Larsen & Toubro ShipBuilding** are increasingly entering the arena.

LIMITATIONS

According to a recent report written by the Director General of Naval Design and a top functionary of the Naval Design Group (**Shipbuilding – A Larger National Perspective**, 2020), the "inherently monopsonic nature of naval shipbuilding" (i.e. where one single buyer controls the market as the major purchaser) has led to "aggressive undervalued bidding for naval projects from an industry desperate for orders. This, coupled with the burden of high debt, high working capital costs, poor cash flows, poor productivity/efficiency and poor project management has resulted in poor performance of shipyards on existing naval orders, resulting in a virtual standstill, in some cases''.

Another main limitation is the nature of public procurement in India, which is often more complex, nebulous and favours indigenous suppliers, especially for defence contracts (for those not yet deterred, see this 691 page document on the **Defence Acquisition Procedure**).

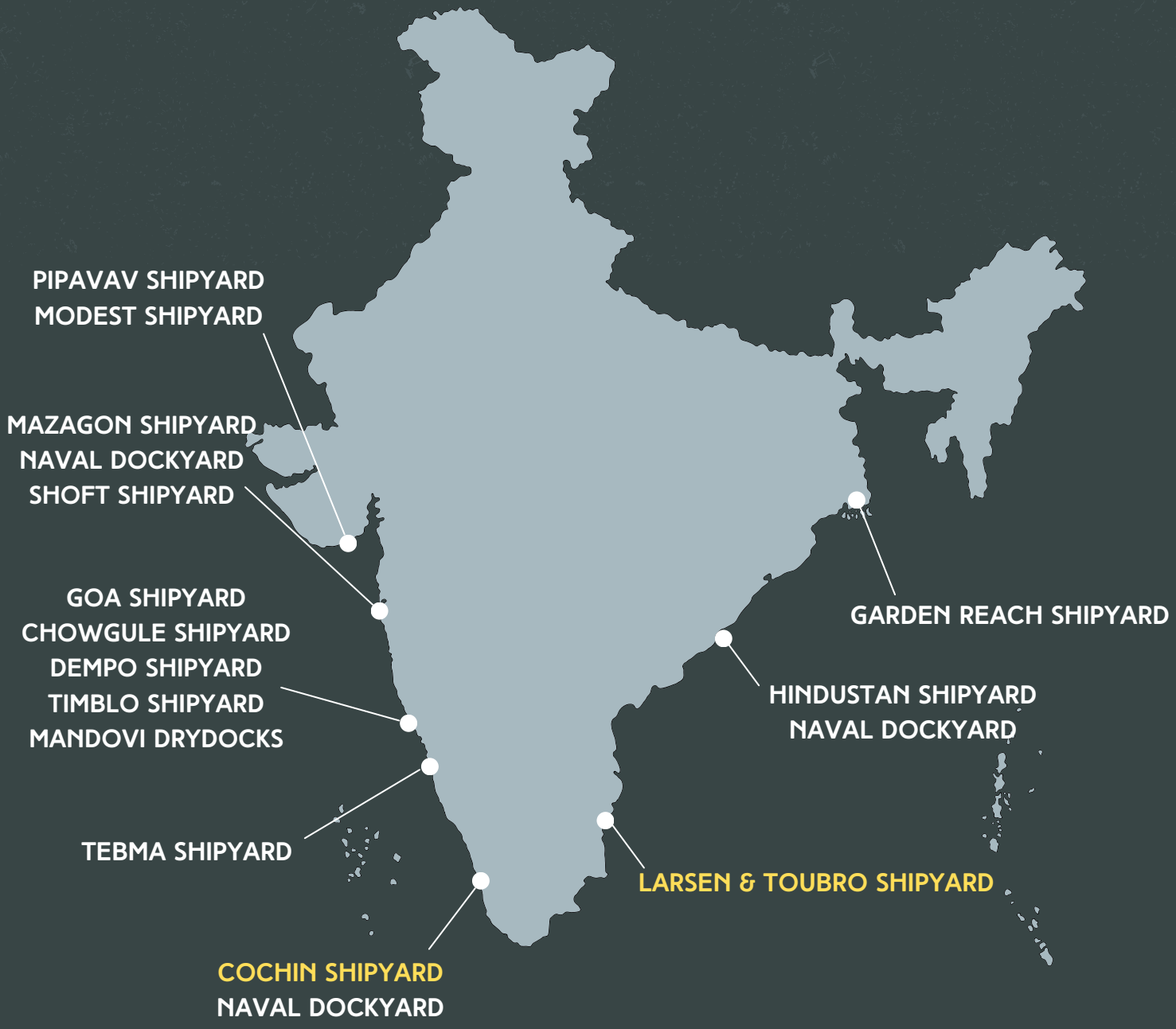
One Danish company interviewed by the project mentioned that the Navy only approves (i.e. adds to the "makers list") advanced new technology products, if multiple companies can deliver identical/similar products. As part of standard risk mitigation due to supplier over reliance, the Navy thus adopts any advanced technology when more than one supplier is able to deliver the same. Regrettably, this practice leaves out the newest and most energy efficient maritime equipment and means that many of the Indian naval ships built are less sophisticated than they could be.

OPPORTUNITIES

- Privatisation of naval shipbuilding activities: More cost-effective privately owned ship yards are increasingly being contracted to build smaller ships, e.g. patrol vessels for the coast guard etc. The main private shipyards catering to the Indian navy are: Reliance Defence and Engineering Limited and Larsen & Toubro Mumbai. Eg. L&T Defence Shipbuilding operations has built 50 navy vessels in 10 years from the Kattupalli shipyard near Chennai, Tamil Nadu. As private stakeholders are usually easier to engage with for smaller foreign companies, this may be the access point for Danish maritime companies.
- Privatisation of naval ship repair activities: In 2022, a US Navy ship for the first time ever undertook repairs from an Indian shipyard, the privately held Larsen & Toubro shipyard at Kattupalli.[17] According to some observers, this marks the beginning of a new chapter for deeper engagements and testifies to the capabilities of Indian shipyards in the global ship repairing market.
- Increased export of Indian Naval solutions: Since 2016, Indian defence exports, including Naval technology, have grown by 800% to DKK 13 billion.[18] Engaging as sub-suppliers to this growing industry might provide opportunities for Danish companies.
- Growing naval innovation ecosystem: Cochin Shipyard has, together with Indian startups, recently built vessels capable of undertaking autonomous missions. This may indicate opportunities also for Danish maritime startups to explore engagement on challenges indicated by shipyards through their SME/startup programmes.[24]

KEY STAKEHOLDERS

- **Cochin Shipyard** is perhaps the most important naval shipyard and thus by default a key stakeholder to engage within this subsector.
- **Reliance Defence and Engineering Limited** is the first private sector company in India to obtain the licence and contract to build warships.
- **Larsen & Toubro Shipyard** has increasingly made its mark in the naval domain and might be relatively more open for Indo-Danish collaboration due to its historic connections with Denmark.



THE CRUISE INDUSTRY

India offers opportunities within both blue water cruise tourism and river and lake tourism. Presently the Indian blue water cruise industry accommodates 468,000 passengers annually (2020), most of which[7] are handled by the foreign operators. 95% of these passengers pass through three major ports: Mumbai (Maharashtra), Mormugao (Goa) and Cochin (Kerala), with Mumbai alone catering to half the passengers in 2019-20.

Domestic Indian cruise industry is largely focused on river cruises, especially on the Ganga and Brahmaputra in Northern India, with 13,000 passengers (2019) across 100 cruise ships. According to the Maritime India Vision 2030,[7] the Indian government is intent on growing the entire Indian cruise industry: India must be promoted as a global destination for cruise tourism with dedicated interventions across three key areas: Oceanic and Coastal Cruise, Island and Infrastructure Development, and River and Inland Cruise. According to the Maritime Vision-document, the Indian cruise market has the potential to increase 10-fold,[5] primarily driven by the following factors:

- Increasing income and growing GDP
- Infrastructure development for meeting domestic and international demand
- Easing immigration and customs policies
- Multiple itineraries and port options to encourage domestic tourism
- Strategic cruise tourism initiatives launched by the government, e.g. the world's longest river cruise - Ganga Vilas project launched by Prime Minister Modi.[19]

Fig. 1: Passenger and Vessel statistics for India's main cruise terminals

	2018-2019		2019-2020	
Port	**Passengers**	**Vessels**	**Passengers**	**Vessels**
Chennai Port	3,685	5	612	2
Cochin Port	62,753	49	67,907	44
NewMangalore Port	29,372	26	24,080	21
Mormugao Port (Goa) *	80,510	102	152,875	163
Mumbai Port *	86,757	106	222,105	221
Total	**263,077**	**288**	**467,579**	**451**

LIMITATIONS

According to an analysis performed by Tata Consulting in 2017, a number of factors were preventing the Indian cruise industry in reaching its full potential:

- Indian port costs and limitations, including harbour dues, were "extremely high compared with other parts of the world", and should be reduced by 50% to be competitive.
- Indian port facilities, including dockage, pilotage and facilities for mass disembarkation, were considered substandard compared to Europe, China and Singapore.
- Indian turnaround costs were markedly higher than similar ports in the Mediterranean, e.g. Mumbai EUR 79,000 vs. Venice/Piraeus average EUR 42,000.
- Indian transit costs were markedly higher than similar ports in the Mediterranean, EUR 50,000 vs. 15,000.
- Indian tax levels were markedly higher, e.g. domestic and international Cruise fare and Onboard changes were 20% in India vs. more or less 0% in USA and Australia. In addition, ships have to pay duty on the consumption of alcohol, bonded stores and bunkers throughout India's territorial waters, out to 200 nautical miles.
- Numerous counts of other legislation were perceived as de-incentivising for the cruise industry, including red tape and a lack of good declaration process in general.

OPPORTUNITIES

The Maritime India Vision states a number of very specific interventions designed to develop and expand the Indian cruise industry.

- **Upgrade and modernisation of existing ports**: The six existing cruise ports (Mumbai, Mormugao, New Mangalore, Cochin, Vishakapatnam, and Chennai) are all planned for a major upgrade. The flagship of these upgrades is the establishment of the New International Cruise terminal in Mumbai, planned for commission in July 2024.[20] With a price tag of nearly DKK 500 million, the terminal will be able to berth two cruise ships at a time, and have the capacity to handle 200 ships and one million passengers per year.

- **New cruise ports to be established**: In order to cater for a growing cruise industry in India, another six cruise terminals will be built in Kolkata, Porbandar, Ganpatipule, Diu, Somnath, and Konark.[21] These ports will cater to passengers joining the four new themes-based coastal destination circuits proposed by the government to increase domestic cruise tourism along the Indian coastline: Gujarat: Pilgrimage tours, West Coast: Cultural and scenic tours, South Coast: Ayurvedic wellness tours, East Coast: Heritage tourism. If successful, these initiatives will increase the demand for smaller cruise ships in India.
- **Easing legislation**: In order to accommodate the cruise industry, the Indian government has announced the rationalisation of port fees, the removal of ousting charges, granting priority berthing to cruise ships and providing e-visa facilities.
- **Cordelia cruises expanding**: The largest India-focused cruise company is planning to invest more than USD 1 billion by 2025 for acquiring at least three cruise ships as it aims to target the domestic market.[22]

KEY STAKEHOLDERS

- **Cordelia Cruises:** Owned by Waterways Leisure Tourism, Cordelia is India's largest cruise operator, covering destinations on the west coast, including Kochi, Goa and the Lakshadweep Islands, and now expanding to the East coast.
- **Jalesh Cruises:** India's first multi-destination cruise line, now part of Cordelia.
- **Angriya Cruises:** India's first domestic cruise liner, with voyages on the Mumbai-Goa sea route and along the Konkan Coast.
- **Nefertiti Cruises:** Sailing mainly on the West coast, from Kochi to Kozhikode in Kerala.
- **Antara Luxury River Cruises:** Launched in January 2023, the world's longest luxury river cruise, MV Ganga Vilas, is 62 metres long, 12 metres wide, and accommodates 36 tourists and 40 crew members.
- **New government Task Force** headed by the Secretary of Tourism and Secretary of Shipping, including a high level Advisory Committee comprising national and international experts to help the Task Force in creating an enabling ecosystem for development of cruise tourism in the country.[23]

THE NORWEGIAN APPROACH

In January 2015, the Norwegian government launched The Green Shipping Programme (GSP), a public-private partnership that initially consisted of 16 private companies and organisations, and two government ministries. In the spring of 2023, the programme included more than 108 private companies and organisations as well as 12 public observers.

The aim of the GSP was to create the world's most environmentally friendly shipping. The GSP set out to develop feasible solutions that could ensure efficient and sustainable shipping, cost-effective emission reductions, economic growth, sustainable logistics solutions, increased competition, and new jobs.

The underlying ambition was to establish Norway as a leading showroom and incubator for environmental maritime technologies and green transport services, and a platform for Norwegian maritime exports.

The GSP was financed partly by public allocations from the Norwegian government and partly by the members themselves. By spring 2022, the program had initiated over 45 green pilot projects, of which 17 had been realised or were in process.

The GSP followed a long-term five-phase strategy that initially focussed on nurturing domestic innovation and cross-institutional collaboration, and only in phase 5 shifted focus to internationalisation, wisely reflecting the need for a solid national foundation before venturing abroad.

1. 2015-16: Assess the potential for battery and gas-powered maritime transport in Norway. Target - Identify emissions and the potential for emission reductions, as well as the effect on industry and exports.
2. 2016-17: Evaluate business cases in the industry. Target - Define the way forward and analyse the business and economic consequences of measures, and raise concrete challenges and opportunities for the Norwegian government.
3. 2018-19: Remove barriers to green solutions. Target - Answer the most important analytical questions related to the green transition, through studies of barriers, opportunities, and policy instruments, focusing on cargo ships, speedboats, ferries, fishing vessels, services for the aquaculture industry and for oil companies, as well as moving cargo from road to sea and ports for an efficient green transition.

4. 2019-20: Develop and scale green solutions in Norway. Target - Increase the scope of the programme by piloting more green logistics solutions, technologies, fuels, and financial solutions, and provide evidence-based input to the government's planning work. Focus should be on cargo ships and coastal shipping, public procurement and moving cargo from road to sea.
5. 2012-22: Develop and scale green solutions in Norway and internationally. Target - Continued focus on phase four areas, but also including offshore wind, autonomous ferries, services for the aquaculture industry and for oil companies, and green public and private procurement. Additionally this phase would seek to develop international, green markets, e.g. through the IMO's GreenVoyage-2050.
6. 2023-24: Piloting for scaling and green growth. Target - Emphasise zero-emission fuel through increased involvement of cargo owners, financial institutions, energy players and authorities.

The main vehicle for scaling Norwegian solutions internationally is the IMO's GreenVoyage-2050 programme launched in May 2019, with an initial funding of DKK 42 million from the Norwegian Ministry of Climate and Environment. This funding covers activities until the end of 2023 in 12 pilot countries: Azerbaijan, Belize, China, Cook Islands, Ecuador, Georgia, India, Kenya, Malaysia, Solomon Islands, South Africa, Sri Lanka. The main Indian partner is the Directorate General of Shipping.

The overall goal of the programme is to support the effective implementation of the Initial IMO GHG Strategy and provide support to developing countries in their efforts to reduce GHG emissions from ships. The specific activities are structured into four general components that are initiated sequentially:

- Developing global tools to support implementation of the Initial IMO GHG Strategy
- Capacity building, policy and national action plan development
- Strategic partnership development
- Technology cooperation, innovation and pilot demonstrations.

Perhaps reflecting the methodology of the Green Shipping Programme, the initial components of the Green Voyage programme focus on creating a solid foundation for innovation and implementation, including the establishment of domestic partnerships and policy frameworks, funding models, capacity building and action plans. Only then can the partnering countries collaborate towards identifying, developing and implementing sustainable pilot projects.

Today Indo-Norwegian maritime collaboration is marked by regular exchanges of high level visits and collaborations, including the Norway-India Marine Pollution Initiative (2019), the Task Force on Blue Economy for Sustainable Development (2019), the India-Norway Ocean Dialogue (2019) and the Maritime Knowledge Cluster (2021). Norwegian companies are building ships in India and port infrastructure, and transferring new technologies in the process. Norwegian and Indian government officials meet regularly in the Joint Working Group Maritime, and there is a strong cooperation between India's Directorate General of Shipping and several Norwegian institutions.

LESSONS LEARNT

The key learnings from the Indo-Danish Maritime Bridge could be summarised as follows:

- India's Maritime sector is small by global standards but expanding rapidly. The growth is fueled by structural and economic necessity and geopolitical changes in terms of security and supply chain diversification.
- Recent global sustainability regulations are forcing Indian shipowners to either build new ships or retire their existing fleet, and therefore they are keen to understand the technology landscape for sustainable technologies and new energy saving solutions onboard ships.
- Now is therefore a good time for foreign stakeholders to engage with the Indian maritime ecosystem. The sector is still nascent and relatively inconspicuous compared to the traditional maritime heavy weights (China, South Korea and Japan), yet likely heading for rapid growth in the near future.
- Norwegian, Swedish and Dutch Maritime companies are successfully accessing India. The cross-institutional Norwegian approach to India can serve as inspiration for a Danish maritime engagement strategy.
- Danish maritime stakeholders should explore working on a Nordic collaborative model where they can liaise with shipowners from other Nordic countries who are building their ships in India to leverage on Danish solutions thereby integrating themselves further in the Indian market.
- The best entry points for Danish maritime companies are select private Indian shipyards with international focus and customers. However, new engagement models should be explored, that include a more diverse set of maritime stakeholders in both India and Denmark.

Moving forward, there is an urgent need to rethink Indo-Danish maritime collaboration to enable the full potential of opportunities in India:

- **Ensure mutual benefits** for both Danish, Indian and Asian stakeholders. The traditional one-way export model will not yield optimal results. Instead focus on multiple interventions that cover trade, talent and sustainability.
- **Form synergies** with other Danish companies and boost the combined value proposition when approaching Indian stakeholders.
- **Include multiple stakeholders** from the entire maritime ecosystem - academia, private and public organisations - to replicate the success of the triple helix model widely practised in Denmark.
- **Focus on a broad range of thematic areas** across the maritime sector value chain to ensure multiple touchpoints for an ecosystemic approach.

SOURCES

1. Joint Statement for India-Denmark Green Strategic Partnership.(2020).

2. Denmark and India to establish a Centre of Excellence on Green Shipping. (2022, May 4). SAFETY4SEA.

3. India's exports up 6% to $447 billion in FY23, imports climb 16.5% to $714 billion. (n.d.). The Economic Times.

4. Shipbuilding and Ship repair teams, Cochin Shipyard Interview. (2023)

5. Cruise Tourism in India has potential to grow 10 fold says Shipping Minister Sarbananda Sonowal. (2022, May 14). Press Information Bureau.

6. Government intends to increase the share of Inland Water Transport (IWT) to 5% as per Maritime India Vision (MIV)-2030. (2023, March 17). Press Information Bureau.

7. MIV 2030 Report. (2021). Sagarmala.

8. Maritime clusters & CEZ to bolster India's maritime sector growth under Sagarmala. (2021). Sagarmala

9. Statistics of India's Ship Building And Ship Repairing Industry 2021-2022 | Ministry of Ports,Shipping and Waterways. (2021).

10. How ABG Shipyard sunk into ocean of debts and got booked in biggest fraud case. (2022, February 14). India Today.

11. Chowgule and Co set to buy the Mangalore yard of bankrupt Bharati Defence and Infrastructure for Rs 75 crore. (2022, September 27). - ETInfra.com.

12. Cochin Shipyard delivers two autonomous electric barges to Norway-based firm. (2022, June 26). English. Mathrubhumi.

13. Cochin Shipyard hands over first electric boat to Kochi Metro Rail. (2021. December 31). ANI News.

14. INS Arihant is now operational: All about India's nuclear deterrent in the sea. (2018, November 5). The Indian Express.

15. The Glorious History of India's Aircraft Carriers. (2022, September 06.). Press Information Bureau.

16. Indian Navy aiming at 200-ship fleet by 2027. (2018, July 14). The Economic Times.

17. US Navy Ship Mathew Perry completes repair work at L&T's shipyard near Chennai | Chennai News - Times of India. (2023, March 28). The Times of India.

18. Aatmanirbharta on the rise: Defence exports reach an all-time high of approx. Rs 16,000 crore in Financial Year 2022-23; Over 10-times increase since 2016-17; India exporting to over 85 countries. (2023, April 01). Press Information Bureau.
19. Prime Minister Modi flags off MV Ganga Vilas: What to expect from the world's longest river cruise. (2023, January 13). Firstpost.
20. Mumbai International Cruise Terminal to be commissioned by July 2024. (2022, March 31). Press Information Bureau.
21. India to get six new mega ports under Ministry of Shipping's Sagarmala project-India News , Firstpost. (2016, November 1). Firstpost.
22. Cordelia Cruises aims to pump in $1 bn by 2025 to boost India operations. (2022, June 1). The Hindu.
23. Govt sets up committee to boost cruise tourism. (2023, May 15). The Pioneer.
24. Startup engagement program of Cochin Shipyard (n.d.). Cochin Shipyard website.
25. Government subsidy program (2023, May 23). Maritime Executive.