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AI AND THE RENOVATION IN CONTRIBUTION OF INDIA IN GLOBAL TRADE WITH REFERENCE TO BLUE ECONOMY

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Abstract
India has a unique maritime position. Its 7517 km long coastline is home to nine coastal states and 1382 islands. The country has 12 major ports and 187 non-major ports, handling about 1400 million tons of cargo every year, as 95% of India's trade by volume transits by sea. It is enriched with abundant natural marine resources in the form of crude oil, natural gas, fisheries etc. A large part of the population depends on marine resources directly and indirectly. The optimum utilization of these resources enhances the rapidity of economic growth and employment generation. This paper analyses the impact and of Artificial Intelligence (AI) on India's marine trade and its contribution in global marine trade. A comparative study has been made between India's marine trade growth rates for the period of 2015 to 2025. The projections of marine economy growth with AI contribution also analysed. For this study Secondary data is collected and analysed.
Keywords: Marine Trade, Marine Trade Growth Rates.

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Introduction:
In early 21 century the blue economy word is created. Blue economy by **Oxford Dictionaries** meaning is an economic system or sector that seeks to conserve marine and freshwater environments while using them in a sustainable way to develop economic growth and produce resources such as energy and food:
The coastal line in India spread with 7,516 km including the island coast and providing employment to nearly 28-30 million livelihoods. It is one of the world's top three fish-producing countries (about 8% of global production). Blue economy is defined as the usage of natural resources of sea for economic growth and development. It includes the connectivity of maritime activities of all ocean and coastal resources for economic growth and sustainability.
Blue economy encompasses living natural resources as well as non-living renewable energy resources. It covers a wide range of economic activities related to fisheries and aquaculture, boats, boat builders, port workers, tourism guides, cold chains and value chain infrastructure, natural gas, crude oil, wind energy tidal and wave renewable energy, ports, shipping and logistics for marine trade, coastal tourism, marine technology and many.
India has a unique maritime position. Its 7517 km long coastline is home to nine coastal states and 1382 islands. The country has 12 major ports and 187 non-major ports, handling about 1400 million tons of cargo every year, as 95% of India's trade by volume transits by sea. It is enriched with abundant natural marine resources in the form of crude oil, natural gas, fisheries etc. A large part of the population depends on marine resources directly and indirectly. The fishing industry

recorded fish production of 175.45 lakh tonnes in FY 2022-23 by providing more than 2.8 crore fishers and fish farmers and the exports of seafood recorded 60,523.89 crore in FY 2023-24.

Significance of Blue Economy in India:

As India has rich coastal line, the growth of blue economy plays a crucial role in Indian economic growth and development. Even today the blue economy shares around 4% of GDP with sectors like fisheries, seafood exports, ports and coastal industries. Blue economy contributes to Indian trade volume is around 95%.

Blue economy shelters more than 30 million people directly and indirectly through marine industries. Food security improved by large production of fish which is a main staple food of many populations.

Blue economy study focused on understanding and improving the 'blue carbon' concept protects the climate and maintains the sustainability.

The three sides of our country are secured with naturally created coastal line, hence a proper vigilance in this area enhances the security of the country. However, the optimum exploitation of sea resources is the important objective of the government.

The contribution of blue economy in world trade is remarkable as same with India. Hence the study of prospectus of blue economy in world trade as well as in India is essential. Now, the trade scenario is changed due to the introduction of AI. The additional value added to the trade due to AI with respect to blue economy is analysed.

The secondary data regarding world trade, the proportion of blue economy and the areas influenced by AI in world trade and India's contribution in world trade with respect to blue economy is analysed for the period of 2014-15 to 2024-2025.

World Trade for the Period of 2014-15 to 2024-25:

World trade growth period can be divided as pre pandemic and post-pandemic periods. The growth rates of merchandise trade remained between the lowest range of 0.1% to highest range of 4.7% for the period of 2015-16 to 2019-20. However, the pandemic year has shown a negative growth rate of -5.0%. After the lockdown the trade rebounded to 9.4%. The growth rates fluctuated between 2.9% to 3.3% for the period of 2022-23 to 2025-26 and it also dropped to -1.2% in 2023-24.

The world trade volume growth was moderate for pre-pandemic period. After the pandemic the growth rates undergone extreme fluctuations like 9.4% to -1.2%. Russia-Ukraine war, high inflation, high energy prices, geopolitical tensions, protectionism are some of the reasons for the fluctuations in world trade growth. The impact of world trade growth rates has reflected on maritime growth rates too. It is observed that the maritime growth rates in pre-pandemic period fluctuating between consistently increasing except in 2019-20. From 2020-21 to 2024-25 maritime trade growth rates are highly volatile. For the period 2020-21 to 2024-25 it dropped to 0.5% and raised to 3.2%. However, the variations are noticed with minimum marginal differences. The details are revealed in the following table.

World Merchandise Trade Volume (Annual Percentage Change):

Financial Year	Volume of growth rate(%)	Maritime growth rate (%)
2015-16	2.7	1.3%
2016-17	1.3	2.6%
2017-18	4.7	2.7%

2018-19	**3.0**	**2.8%**
2019-20	**0.1**	**0.5%**
2020-21	**-5.0**	**-4%**
2021-22	**9.4**	**3.2%**
2022-23	**3.0**	**2.4%**
2023-24	**-1.2**	**2.2%**
2024-25	**2.9**	**0.5%**
2025-26	**3.3 (expected)**	**3% (expected)**

Source: UN Trade and Development (UNCTAD)

India's Trade for the Period 2015-16 to 2024-25:

India's international trade contribution transformed from traditional labour-intensive commodity driven exports to high value manufacturing and services led growth. The major role played by IT services, Global Capability Centres (GCCs), and business consulting, Electronics goods exports, mobile manufacturing, Pharmaceuticals and many. Hence, India's share in global merchandise exports rose from 0.6% in the early 1990s to 1.8% in 2024.

India's overall trade trends are displayed in the following table. It reflects the exports for the period of 2015-16 started with 416.60 (US$ billion) and rose to 820 (US$ billion) in 2024-25. It is nearly doubled in number. On the other hand, imports also doubled during the period of 2015-16 to 2024-25.

India's Overall Trade in International Trade:

Financial Year	Exports (USD billion)	Growth (%)	Imports (USD billion)	Growth (%)
2015-16	**416.60**	**-11.07**	**465.64**	**-12.08**
2016-17	**440.05**	**5.63**	**480.21**	**3.13**
2017-18	**498.62**	**13.31**	**583.11**	**21.43**
2018-19	**538.08**	**7.91**	**640.14**	**9.78**
2019-20	**526.55**	**-2.14**	**602.98**	**-5.80**
2020-21	**497.90**	**-5.44**	**511.96**	**-15.09**
2021-22	**676.53**	**35.88**	**760.06**	**48.46**
2022-23	**776.40**	**14.76**	**898.01**	**18.15**
2023-24	**778.21**	**0.23**	**853.77**	**-4.93**
2024-25	**820**		**915.19**	**6.85**

Source: Annual Report Commerce.gov.in

India's merchandise trade in exports increased from 262.29 (US$ billion) in 2015-16 to 437.07 (US$ billion) in 20224-25. The growth in imports also reflected the incremental trend for the period of 2015-16 to 2024-25.

India's Merchandise Trade:

Financial Year	Exports (USD billion)	Growth (%)	Imports (USD billion)	Growth (%)
2015-16	**262.29**	**-15.48**	**448.03**	**- 0.48**
2016-17	**275.85**	**5.17**	**384.36**	**0.88**
2017-18	**303.53**	**10.03**	**465.58**	**21.13**

2018-19	**330.08**	**8.75**	**514.08**	**10.42**
2019-20	**313.36**	**-5.06**	**474.71**	**-7.66**
2020-21	**291.81**	**-6.88**	**394.44**	**-16.91**
2021-22	**422.00**	**44.62**	**613.05**	**55.43**
2022-23	**451.07**	**6.89**	**715.97**	**16.79**
2023-24	**437.10**	**-3.10**	**675.45**	**-5.66**
2024-25	**437.07**		**678.21**	

Source: Annual Report Commerce.gov.in

India's Maritime Trade for the Period of 2014-15 to 2024-25:

India's maritime trade has many dimensions like fisheries, seafood exports, ports and coastal industries which are components of blue economy. The optimum utilization of these areas escalates the growth rates of blue economy. Maritime trade growth is measured with the parameters like cargo traffic growth, operational efficiency, capacity efficiency, coastal and inland water ways, financial performance and private public participation. In the following table the performance of India during 2014-15 to 2024-25 demonstrated the remarkable growth in all the above-mentioned areas.

Maritime Trade for the Period of 2014-15 to 2024-25:

Sr. No.	Details	2014-15	2024-25
1.	Cargo Traffic growth	871.52 MTPA	1600 MTPA
2.	Operational efficiency	93 hours	48 hours
3.	Capacity expansion	1400 MMTPA	2762 MMTPA
4.	Coastal cargo	86.3MT	165.4MT
5.	Inland waterways cargo	18MMT	146MMT
6.	Net annual surplus of major ports	1026 crore	9352 crore
7.	Private Public participation cargo handling share	26%	60%

Even though the growth of maritime trade is remarkable, but there is lot of scope to expand the trade by exploring unexplored areas of Indian coastal area. To bridge the gap between traditional industrial ocean operation and escalating sustainable blue economy the AI could be the one of the best solutions.

The improvements in growth rates of blue economy as a consequence of AI is summarised as

- The conflict between expansion of ocean economic activities and ecological sustenance can be solved by AI. Biodiversity and global climate economic activity with ecological sustenance could be measured with accuracy by AI and accordingly ocean economic activity expansion and ecological sustenance are managed as compliments to each other rather than substitution.
- On the blue economy already millions depended for their livelihood, hence, by transforming the current practices which benefit both future of ocean and millions of livelihoods depended on it by using AI.
- It is capable of bridging the gap between traditional industrial operations and growing sustainable blue economy.
- Traditional platforms for offshore oil and gas infrastructure are renewed with AI sophisticated algorithms and digital technology which improves these platforms with more accuracy.

- The existing infrastructure coordinated with AI could accelerate the energy transition and create new revenue from old infrastructure.
- The efficient use of AI to decarbonize the coastal line by identifying efficient fuel routes, cutting emissions and operational costs, highest efficiency of engines, next generation of vessels optimised for alternative fuels and energy saving devices with more accuracy.
- Ports are planned with AI techniques to regulate vessel traffic, automate cargo handling, optimise energy consumptions, reducing greenhouse gas emissions, improving operational efficiency etc., and hence the trade becomes more sustainable and stronger.
- AI encourage learning and reduce risks by translating technical reports, maintenance logs and operational data and ensure past investments into human capital.
- AI data collection and analysis of technologies could be used to preserve and renewal of marine world by monitoring marine ecosystems, logistic operations and water pollution. so that oceans could be healthier and stronger for future generations.
- AI could process the valuable volumes of data with speed and provide insights to help in decision making for example, coastal planning and sustainable use of ocean resources.
- Ocean transport could be optimised by AI and autonomous systems by regulating ship operations, reducing emissions like ocean noise, waster steams, CO2. It will improve the operations' transparency and efficiency.
- Ocean source food should be more environmentally and socially sustainable by accuracy of fishery stock assessments, sustainable fisheries management, data for seafood industry sectors. AI tools can identify size and species of each fish, recording of fish catch so that efficiently manage the seafood.

Conclusion:

The analysis about the AI intervention in the ocean economy concludes that it play a considerable role in promoting the growth of the blue economy by enabling data-driven for more accuracy in decision making, utilization of ocean resources with sustainability. However, AI decision could not be the end as it is also not above the mistakes. Machine learning models may be on the basis of assumptions which sometimes may be false. Thus, the Predictions of AI will not be final. Even the countries using AI will be more benefitted comparing with the countries not using AI but depends on local knowledge, local manpower and low technology. it may also affect the employment opportunities for the labour enhance regional disparities. During the collection, analysis and use of data AI may overlap the jurisdiction, which finally lead to violation of privacy and security limitations. It may provide short term gains rather than long term benefits.

Although the negative side of the AI is noticed, it could be used for the sustainable and growth of blue economy with proper policy framework, government regulations and social, economic and environmental viability.

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