



## Pakistan's Maritime Potential for The Blue Economy and Its Strategic Impact on Sustainable Socio-Economic Development

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### ABSTRACT

Pakistan is a littoral state blessed with a 1050 km long coastline of the Arabian Sea that lies in the South of Pakistan and possesses an Exclusive Economic Zone (EEZ) of 350 nautical miles in the Arabian Sea. Geo strategic location of Pakistan offers a global political and economic pivotal role, and the Gwadar seaport provides the economic phenyl as a transit economy. Pakistan has been blessed with multiple strategic sea-borne resources that include aquaculture, chemical and salt, coastal tourism, fisheries, hydel power generation, marine biomedicine, marine food processing chain, oceanic security, offshore oil and gas, renewable energy, seafood, and wind energy that offers multiple investment opportunities for Pakistan's sustainable economic development but that has not been explored so far for its optimum commercial use. The sea zones of Pakistan also provide economic dividends to Pakistan and China under the flagship of China Pakistan Economic Corridor (CPEC) and further facilitate inwards to the nation and outwards for regional land-locked countries and the rest of the world. The research concludes with the supporting arguments that the prosperity of Pakistan's sustainable economic development lies in the exploration of Pakistan's blue economy.

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### 1. Introduction.

Pakistan's Maritime Potential for the Blue Economy and its Impact on Sustainable Socio-Economic Development has been dynamic in the genesis of Pakistan's coastal geography that further stretches and enhances strategically towards the global economy through the Arabian Sea, Persian Gulf, Indian Ocean, and Red Sea. Maritime potentials for Pakistan's blue economy are the national capability to exploit its oceanic potentials for the exploration of maritime trades, marines, minerals, and energy for a sustainable economy. Pakistan's geography possesses a vital position for Afghanistan, Central Asian States (CARS), China, the Far East, the Middle East, and the African Continent. Since Pakistan remained in wars, cold war, and a political crisis for the last 77 years of her inception, thus Pakistan's geogra-

phy including the coastal area has been used by the global economic, military, and political powers for their political and military interests in the South Asian region, therefore her vital geographic dynamics and coastal area's potentials has not been exclusively used for the people of Pakistan. Pakistan's geography is a land of the archipelago, bays, biome, coastal areas, creeks, folk cultures and traditions, heights, islands, lagoons, marines, pampas, plateaus, rivers, savanna, steppes, strata, world's largest irrigation network, and the world largest temperate glaciers but these geographic dynamics have neither been exploited at national level nor global level that resulted weak economy and poverty in the country. Pakistan's geostrategic significance should have been signified by the political leadership even at the preliminary stages of Pakistan rather than at the later stage. However, Pakistan's geography provides opportunities for the promotion of economic development in the country but was ignored in the past. Pakistan a resource-efficient country was turned into a resource-deficient nation in the world because of a lack of futuristic strategy and vision, immature political behaviour, corruption, nepotism, and sectarianism. It should have

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been used for the economic development and prosperity of the people of Pakistan. One can always make the best use of ocean potential as a dynamic approach for the promotion of Pakistan's vital economy, nationalism, and patriotism at national, regional, and global levels. For viable development and prosperous that certainly needs to focus on contemporary artificial intelligence (AI), blockchain technology, and skilled education for the exploration of multi-economic fields and sectors to enrich the national economy. Pakistan's Maritime Potential for the Blue Economy and its Impact on Sustainable Socio-Economic Development has produced a wide range of effects in different national organs of the state particularly among the organs of the coastal provinces in the country. The aspects which are being focused on in this study with respect to Pakistan's maritime potential towards national integration which should have been done in most of the fields related to coastal development, prosperity, peace, and stability in Pakistan, will be the significant aspects.

The main aim of this research is to analyse Pakistan's strategic significance of coastal areas and sea zones for its maritime blue economy for sustainable socio-economic development and its multifaceted impact with a historical perspective, by defining, exploring, and combating technological, and security challenges and opportunities. The research has explored some of the key factors that are responsible for the weak exploration of oceanic potentials that have impeded the growth of Pakistan's maritime blue economy. This study is mostly empirical and based on archival and library collections. The material has been collected after thorough historical scrutiny and research analysis. Though procedural information has been gathered from the published books, various articles published in the journals, newspapers, from the different university libraries of Islamabad and different seminars. The most common theoretical framework of Alfred Thayer Mahan's theory of Sea Power has been analysed in achieving sea power, oceanic potentials, and national economic stability by utilizing the maritime potentials for the blue economy. This theoretical framework provides sufficient information regarding the subject-related study that provides insight strategic significance of Pakistan's existential maritime blue economy for her sustainable socio-economic development. In this research, qualitative methods have been used, including semi-structured observational techniques and document analysis.

## 2. Literature Review.

Alfred Thayer Mahan in his book titled, "US control of the seas, paved the way for United States emergence as the world's dominant economic, military, and political power" published in 1892 for achieving socio-economic stability and oceanic security for dominance.

Banase, Karl, and Charles R. McClain have mentioned in their book titled, "Winter Bloom of Phytoplankton in the Arabian Sea as Observed the Coastal Zone Color Scanner" published in 1986 about the marine's potentials, ecological progress, and strategic significance of the Arabian Sea for maritime blue economy.

Gunter Paul writes in his book titled, "The Blue Economy: 10 Years, 100 Innovations and 100 Million Jobs" published in 2014, that how the coastal areas and seas play a vital role in the development of a nation's blue economy, and military powers.

The above-mentioned theoretical framework has been applied in this research work that enabled to develop a coherent approach systematically.

## 3. Genesis of Pakistan's Maritime Blue Economy.

Oceanic history has been extraordinarily rich and dynamic in developing humanity since the last 4,000 years ago and has been providing a significantly cheaper economy for cargo, commerce trade, and transportation than the other air and ground routes. Oceans and seas also provide energy, marine, minerals, oil and gas and sea foods with economical transportation. There are more than five thousand major seaports and more than ninety thousand commercial and war naval ships in the world. The littoral states which have less than 150 km distance of their coastal areas from the sea have almost two-thirds of the world's population which means more than 90% of the world trade is based on maritime sea born trade, which is almost fifteen times cheaper than the rail, forty times cheaper than the road and one hundred and forty-five time cheaper than the air. However, the battles have also been fought for global geopolitics and naval military domination in the oceans and seas to protect the maritime trading routes, sea lanes, ocean economy, and coastal areas for their national interests.<sup>2</sup>

Conceptually, the blue economy includes all industrial sectors which are related to the ocean, seas and coastal areas either based on maritime potentials i.e., energy generation, fisheries, and shipping environment or on land-based that include coastal tourism, oceanic industries, seaports, dockyards, shipyards, seashore hostelling, aquaculture, algae production, biomedicines industries, chemical industries, coastal economy, communication and transport industries, fisheries, marines engineering industries, minerals industries, oil and gas industries, power generation industries, salt manufacturing industries, Sea foods industries, seawater utilization industries, sea tourism industries, sea sports, sea water for the irrigation of specific plants and mangroves on wet land to maintain the ecosystem, scientific research, shipbuilding industries and ship transportation. The world's water bodies and oceans constitute more than 90% of the biosphere and are well-being for the global ecosystem. The seabed also provides 35% of the global supply for hydrocarbons, oil and gas, mining, renewable blue energy, seabed minerals and thermal energy etc. Oceans' resources can be utilized for a sustainable blue economy and for job creation to improve the livelihood of the people with certain strategies to improve climate change, ecosystem, environment, and global warming with certain regional and global legitimization.<sup>3</sup>

<sup>2</sup> Carey, 1858; Zipf, 1946; Wilson, 1970; Erlander & Stewart, 1990; Maris et al. 2019.

<sup>3</sup> Henderson, Hazel (June 22, 2010). "Book Review: The Blue Economy — Seeking Alpha." seekingalpha.com.

Seaports are primarily the conduit between sea and land for the exploration of marines, minerals, energy, seafood, oil and gas, transportation of goods for export and import for carrying passengers and to facilitate maritime trades. Dockyards and shipyards provide harbouring services, refilling of ships, repair, and maintenance, and constructing and dismantling of ships for economic purposes and naval-military use. Pakistan's coastal areas and Exclusive Economic Zone have a lot of strategic potential. Bin Qasim Seaport, Karachi Seaport, and Gwadar Seaports are strategic seaports for international trade significance whereas Ormara, Pasni and Jiwani ports are for local fisheries and are under the control of the Maritime Secretary of Pakistan.<sup>4</sup> Seaports can be further classified as Container Ports, Feeder Ports, Hub Ports, Passenger Terminals, Petrochemical Terminals, and Transshipment Ports for the maritime blue economy. The difference between the blue economy and the green economy is that the blue economy is related to the seaborne economy and the green economy is related to the land-based economy and both domains need to be addressed for environmentally friendly.

Presently, Pakistan's maritime revenue only contributes \$195 million which is 0.5% to 0.7% of the country's GDP which is less than even Bangladesh, and Sri Lanka whose maritime revenue is \$ 5.5 to \$6.5 Billion. Pakistan is the home of marines, and sea foods including more than 532 numerous fish species, 240 freshwater fishes and 300 marine fishes.<sup>5</sup>

### 3.1. Defining the Blue Economy.

Blue economy is an economic term defined as the economic opportunity related to the activity of ocean and seaborne resources for trade related to the exploitation of marine potentials like aqua culture, bio-prospecting, blue carbon, fisheries, maritime transport, minerals, offshore renewable energy, tourism, and seabed extractive activities for mining, its preservation, regeneration for the marine environment, and marine ecosystem for sustainable blue economy as the economic opportunity for sustainable economic development without disrupting the ecological and marine environment.<sup>6</sup>

*The Commonwealth Nations* defines that the blue economy as the emerging concept of exploitation of sea-based resources.

*The European Commission* defines that the blue economy is the activity of all economic activities that are related to the coast, ocean, and sea as an emerging sector for sustainable economic development.

*The United Nations* defines the blue economy as a range of economic sectors that are related to the policy to use the oceanic economy for sustainable development without creating any environmental hazards for the ecosystem in collaboration with other nations and partnership in achieving UN Sustainable Economic Development Goals for Life below Water.

<sup>4</sup> Mathias, Hartpence (15 July 2011). "The Economic Dimension of Sino-Pakistan Relations: An Overview." pp. 581–589.

<sup>5</sup> Quest, Bastien Y.; Vic, Clement; Heywood, Karen J.; Pointkovski, Sergey A. 2018-4142-4151.

<sup>6</sup> "What is the Blue Economy?" THE WORLD BANK. June 6, 2017.

*The World Bank* defines the blue economy as the oceanic resources to be exploited for economic growth, job opportunities and for improved livelihoods while preserving the health of the ocean ecosystem.

## 4. Strategic Significance of Arabian Sea, Coastal Areas, And Sea Zones of Pakistan.

Pakistan is a littoral state that lies in the south of Pakistan's coordinates and has a total length of 1050 km along the Arabian Sea out of which 800 km lies with the Balochistan province of Pakistan and 250 km lies with the Sindh province of Pakistan. Pakistan possesses an Exclusive Economic Zone (EEZ) of 350 nautical miles i.e., 290000 sq. km<sup>2</sup> including 200 nautical miles of continental shelf in the Arabian Sea which was also approved by the United Nations Commission on the Limits of the Continental Shelf (UNCLCS) in 2015. The Arabian Sea covers about 3,862,000 sq. km<sup>2</sup> in the west by the Horn of Africa, Gulf of Aden, Arabian Peninsula connecting the Strait of Babul-el Mandeb, Red Sea and in the north by Pakistan and Iran, connecting the Gulf of Oman and the Persian Gulf via Strait of Hormuz. The countries that border the Arabian Sea are Pakistan, Iran, Oman, Yemen, Somalia, and India.<sup>7</sup> Pakistan's strategic islands along the Arabian coast are Astola, Malan and Zalzal islands which lie on the Makran coast of Balochistan province and, Baba, Bhit, Buddo, Bundal, Churna, Clifton Oyster Rocks, Dhari, Khiprianwala, Monora, Shams Pir, and Pimo islands lie along the Sindh coast. Sir Creek is the extended arms of the Arabian Sea jutting inwards inland of district Thatta of Sindh province of Pakistan.<sup>8</sup>

The Indus River and Dusht Rivers are the principal waterways draining into the Arabian Sea. The Arabian Sea has a maximum depth of 4,654 meters.<sup>9</sup> The continental shelf of the Arabian Sea occurs narrowly along the coast of Pakistan and the Arabian Peninsula, however, scattered coral reef is also found along the coast of Balochistan and Sindh provinces.<sup>10</sup> Coastal areas of Pakistan have bays, dockyards, seaports, lagoons, and shipyards and contain a fishery as well. Bin Qasim Seaport, Karachi Seaport, and Gwadar seaports are strategic seaports for international trade significance whereas Ormara, Pasni and Jiwani ports are for local fisheries. Pakistan's seafood comprises Boney Fishes, Cartilaginous Fishes and Jawless Fishes that includes, Abalones, Basa, Catfish, Cephalopods, Ceviche, Cioppino, Clam Chowder, Cocktail, Crabs Cakes, Crustaceans, Crayfish, Echinoderms, Freshwater Fish, Fish Fry, Jellyfish, Lampreys, Limpets, Lobsters, Molluscs, Mussels, Oysters Rays, Rockefeller, Paella, Pangasius, Periwinkles, Prawns, Primitive Sharks, Roe, Salmon, Saltwater Fish, Sawfish, Scallops, Shells,

<sup>7</sup> Lüke, Claudia; Speth, Daan R.; Kox, Martine A. R.; Villanueva, Laura; Jetten, Mike S. M. (2016-03-08). "Metagenomic analysis of nitrogen and methane cycling in the Arabian Sea oxygen minimum zone."

<sup>8</sup> Pham, J. Peter. "Putting Somali piracy in context." *Journal of Contemporary African Studies* 28.3 (2010): 324-340.

<sup>9</sup> Banse, Karl, and Charles R. McClain 1886- 200-210.

<sup>10</sup> Lüke, Claudia; Speth, Daan R.; Kox, Martine A. R.; Villanueva, Laura; Jetten, Mike S. M. (2016-03-08). "Metagenomic analysis of nitrogen and methane cycling in the Arabian Sea oxygen minimum zone."

Shellfish, Shrimps, Skates, Snails, Sturgeons, Tuna and, Whelks can meet the financial growth and financial stability in the country are the strategic importance in nature.<sup>11</sup>

Pakistan, the most strategic littoral state in the region provides the shortest possible sea services and sea routes to China, Afghanistan, and Central Asian States (CARS) and visa-vie to the Middle East countries. Pakistan's ninety per cent of trade is based on the maritime sea route through Bin Qasim seaport, Gwadar seaport, and Karachi seaport.<sup>12</sup> The continental shelf of the Arabian Sea occurs narrowly along the coast of Pakistan and the Arabian Peninsula, however, scattered coral reef is also found along the coast of Balochistan and Sindh of Pakistan. China-Pakistan Economic Corridor (CPEC), the Gwadar deep seaport also provides the Gulf oil-rich states and China with an easy, secure, and shortest possible economic sea route for their flourishing economy in the world. The year 2020 was also celebrated by Pakistan as "The Year of Blue Economy" as a flagship project of CPEC between Pakistan and China through Gwadar seaport that provides the shortest possible economic phenyl to Afghanistan, Central Asian Republics (CARS), China, oil-rich Gulf States, and visa-vi to the rest of the global littoral states.

The climatology, geology, hydrology, and morphology of the Arabian Sea and the coastal zone of Pakistan contribute a lot to the marines' lives. Below the basins, authigenic minerals, oil and gas, poly-metallic sulphides, and red clay including metallic and non-metallic minerals are deposited in abundance in the sea zones along the Makran coast and Sindh coast. Salinity remains less than 30 parts per thousand (PPT) to 35 parts per thousand over the surface of the entire Arabian Sea. Monsoon climate occurs in the Arabian Sea from June to August with a maximum air temperature of 28 °C to 45 °C and a minimum air temperature of 10 °C to 25 °C occurs from December to February that facilitates the entire hydrology of the Arabian Sea and coastal zones of Pakistan to have warm water and friendly for trade shipping, fishing and for the exploration of minerals round the year. This friendly environment of the Arabian Sea further facilitates and enhances Pakistan's geo-economic, geo-military, geo-political and geo-strategic significance as a littoral state in the region as well as in the globe.<sup>13</sup>

The above-mentioned dynamics further enhance Pakistan's strategic significance not only in the region but also in the globe. Chinese President MR. Xi Jinping has expressed his deep concern over the China-Pakistan Economic Corridor (CPEC) which is the worth \$64 billion Pakistan-China flagship project almost 25% of Pakistan's annual GDP, I feel as if I am going to visit the home of my brother and claimed that the friendship between Pakistan and China is higher than the mountains, deeper than the oceans, and sweeter than honey. China always claims repeatedly announced on many oceans that Pakistan and China are two iron brothers and have an all-weather friendship. Pak-

istan's coastal areas further facilitate both the brother countries economically.<sup>14</sup>

In the past, the exploitation of Pakistan's coastal areas and offshore sea zone recourses remained restricted merely to local fisheries and local-level tourism resorts that relied only on the Karachi coast which is a vulnerable target to any external conventional and nonconventional threat. Neither Pakistan being a littoral state effectively explored her maritime potentials for her blue economy nor exploited and commercialized her oceanic resources for optimum use therefore this neglected sector has hampered the national seaborne maritime growth for trade and shipping which was necessary for sustainable development of the country. Pakistan's further naval development, the construction of new seaports, ship harbour areas, dockyards, shipyards, yetis, and bays, extension in sea zones and exclusive economic zones as an economic and military strategy can exclusively secure Pakistan's vital geo-economic, geo-military, geo-political and geo-strategic interests in the Arabian Sea, in the region and the globe as well.<sup>15</sup> Unfortunately, the Indian industrial waste deposit has drastically affected the Arabian Sea's Abyssal plain and marines.

## 5. Pakistan's Maritime Blue Economy, Challenges and Opportunities.

The term maritime refers to the aquatic, abyssal, coastal economy, commerce, deep-sea economy, green economy, marines' minerals, naval matters, ocean economy, sea-borne trade, sea navigation, and shipping whereas marine refers to its adjective meaning pertaining to the sea or ocean life and blue economy refers to the economics of using, protecting, and redeveloping the marine environment. The strategy for coastal resources is frequently used in relation to the maritime blue economy for sustainable economic development. This may cover several economic fields from more traditional ones like fisheries, aquaculture, coastal, marine, maritime transportation, maritime tourism, or other traditional uses to more contemporary ones like bioprospecting, coastal renewable energy, ecosystem, and seabed mining services offered by the ocean.<sup>16</sup>

The term blue economy was first used during the United Nations Conference held in 2012 on Sustainable Development and Growth, which was held in Rio-de-Janeiro (the River of January) a famous metropolitan seaside city, a city famous for architecture, Balneario, bossa-nova, carnivals, Christ the Redeemer, natural setting and samba of Brazil that lies in South America and also lies in the Tropic of Capricorn. The conference was focused on leveraging the oceanic potentials for a maritime blue economy with sustainable economic growth and reducing the ecological, geological, and environmental risks.<sup>17</sup>

<sup>11</sup> Ali Khan TM, Kabir A, Sarker MA (2002) Sea Level variations and geomorphological changes in the coastal belt of Pakistan. *Marine Geodesy* 25: 156-172.

<sup>12</sup> Salman, A., & Abbasi, J. 2019.

<sup>13</sup> Pratik, Kad; Parekh, Anant; Karmakar, Ananya; Chowdary, Jasti S.; Gnanaseelan, C. April 1, 2019-320-330.

<sup>14</sup> Shah, Saeed (20 April 2015). "China's Xi Jinping Launches Investment Deal in Pakistan." *The Wall Street Journal*.

<sup>15</sup> Ahmad, Muhammad. (2017). Snooping into the Belt & Road Initiative: a Comparative Study of Gwadar with Chabahar Port. *Journal of Punjab University Historical Society*. Vol. 30 Issue: 2, pp.68-79.

<sup>16</sup> Morrissey et al, 2010.

<sup>17</sup> Alex Robinson; Gardenia Robinson 2014-27-29.

The concept of Pakistan's maritime blue economy is based on a sea-based economy for the sustainable economic development of Pakistan's oceanic economy. Pakistan's maritime potentials for her blue economy are a proportion of her capital economy that only relies on the conventional oceanic potentials within her 350 NM sea zones of the Arabian Sea which is merely dependent on conventional maritime transport. Gwadar Seaport, Karachi Port Trust (KPT) and Port Qasim Authority (PQA) must be substantially improved for world-level sea transportation. Pakistan's Sea Zones (SZ) lie in the proximity of world sea lanes i.e., the Strait of Hormuz, Strait of Malaca and Suez Canal which are the world's busiest maritime transport shipping lanes and channels that provide a doorstep facility to Pakistan to link her maritime blue economy with the rest of the world. Pakistan should utilize its maritime blue economy for its optimum use and as per the reports, Pakistan's maritime blue economy is merely \$ 180 billion whereas this sector can produce even more than \$ 100 billion annually.<sup>18</sup>

China-Pakistan Economic (CPEC) is a multi-billion mega-economic project and is considered a milestone in the development of Pakistan's maritime blue economy, originating from the Chinese province of Kashgar through Pakistan via Gwadar Seaport. In this regard, Pakistan and China have taken a concrete step to protect this mega project which is a lifeline for Pakistan's economy to protect and secure against any emerging challenges on the come-what-may policy. Since United States (US) has opposed China's Belt and Road Initiative (BRI) and CPEC on and off by using cunning India to sabotage this mega project and have introduced a new Indo-Pacific Policy (IPP) to contain BRI and CPEC. To avoid any confrontation, both parties require a sensible approach to be adopted regarding maritime policy in the Indo-Pacific Region (IPR) for the overall interests of the region and globe.<sup>19</sup>

The existing oceanic and coastal potentials include aquaculture, bio-prospecting, boat building, coastal tourism, deep sea bed mining, resource extraction, ship build oceans marines biotechnology, maritime tourism, minerals, oceanic renewable energy, oil and gas, offshore renewable energy, seabed extractive, seafood, sea sports, trade shipping and much other ocean-related equipment, ocean instrumentation and to provide the global ship servicing industries that further enhanced the scope of Pakistan's maritime blue economy. But unfortunately, so far Pakistan's maritime blue economy is only contributing \$185 million which is 0.5% to 0.7% of the country's GDP which is regarded as an underutilization of her maritime potential for her blue economy. Today, 80% of the global economy is merchandized through oceans and seas. Since Pakistan is also a littoral state and is the home of more than 550 fish species including 240 freshwater fishes and 297 marine fishes therefore CPEC must be utilized for its peaceful optimum economic use

and must not be delayed under any circumstances or any internal and external political pressure. Gwadar Seaport has a vital strategic position in the region particularly for Pakistan's sustainable economic development and for BRI. Pakistan's maritime potential has a vast market for African countries, Central Asian States, Middle Eastern countries, and South Asian countries via China Pakistan Economic Corridor.

### 5.1. Traditional Security Challenges.

Recently, India has made a bilateral agreement with the United States (US) which is called Logistic Exchange Memorandum of Agreement (LEMOA) imposes an implicit threat to Pakistan in the Indian Ocean region. Therefore, Pakistan has no choice except to develop its naval power to counterbalance the Indian hegemonic hostile posture in the Indian Ocean. In this regard, China has also helped Pakistan and handed over powerful and highly advanced type-54 A/P Frigate which will be the backbone of Pakistan's naval fleet and four powerful naval vessels will also be handed over to Pakistan by China in 2025. It will significantly enhance Pakistan's naval power potential and will emerge as a strong strategic navy with maritime diplomacy in the region. Pakistan has deployed her naval ship in the Gulf of Aden and the Gulf of Oman in collaboration with the littoral states i.e., Oman and Somalia and the Red Sea, with the joint collaboration of Saudi Arabia and Gulf States as part of naval maritime diplomacy.<sup>20</sup>

Maritime affairs are becoming strategically important in the arena of globalisation during the 21<sup>st</sup> century, particularly after the Cold War and 9/11 period. Pakistan's littoral position stands significant in the Arabian Sea and the Indian Ocean region because 37 independent states including 36 littoral states and 11 hinterland states lie in the region of the Arabian Sea and in the Indian Ocean where presently the world ship industries are handling almost 80% of the world trade worth \$4.5 trillion annually and involving more than 4,050 seaports worldwide. This region also includes more than 2.8 billion population making up 45% of the world's population as well and facilitates more than 80% of global commerce traffic lanes. The Strait of Bab-el-Mandeb, the Strait of Hurmuz and the Malaca Strait are the principal commerce shipping lanes and navigational choke points that facilitate the free and secure shipping passage for smooth economic activity. South Asia, West Asia, and the Indian Ocean Region (IOR) are also globally projected for abundance energy reservoirs for short-term, medium-term, and long-term use in the region having surplus energy potentials in the Arabian Sea, Indian Ocean Region, Persian Gulf and Gulf States. The region is already projected for global maritime based on the blue economy in the world economic arena.<sup>21</sup>

Pakistan's maritime blue economy will strengthen seaborne industries to meet domestic needs as well as global export needs.

<sup>18</sup> Fazl-e-Haider, Syed (5 March 2015). "A Strategic Seaport – Is Pakistan Key to China's Energy Supremacy?" Foreign Affairs.

<sup>19</sup> Chang, & Khan, (2019) "China-Pakistan economic corridor and maritime security collaboration: A gro Gregory and Stuart, Paul and Robert (February 28, 2013). The Global Economy and its Economic Systems. South-Western College Pub. p. 25-31.

<sup>20</sup> Salman, A., & Abbasi, J. (2019). Towards blue growth: A Sustainable Ocean-led Development Paradigm (SODP) for Pakistan. Maritime Study Forum, Islamabad.

<sup>21</sup> Nazir, K., Yongtong, M., Kalhoro, Memon, K. H., Mohsin, M., & Kartika, S. (2015) "A preliminary study on fisheries economy of Pakistan: plan of actions for fisheries management in Pakistan". Canadian Journal of Basic and Applied Sciences, 3(01). pp.7-17.

In the contemporary global geo-political cartelism shift from west to east in the Indian Ocean, Pakistan should formulate her maritime strategy to protect and promote her blue economy, modernise her naval bases to protect her oceanic vital potentials having strategic significance, focus on maritime economy, must activate the diplomatic channel to explore new seafood market and must choose the strategic choke points in the sea lanes to defend her maritime economy with swiftly changing naval dimensions and naval doctrine. However, Pakistan's navy is a dedicated, very professional force and is aware of its duties to protect the national vital interest in the Sea lanes of Pakistan. Pakistan Navy has already conducted several joint naval operations with European naval forces, Gulf States naval forces, Turkish naval forces, and US naval forces in 2004, 2017, 2019 and 2022.<sup>22</sup>

Maritime Doctrine of Pakistan (MDP) however has been preserved and documented in 2019 and underscored to protect her strategic dimensions and vital interests of maritime blue economy in her sea zones in the Arabian Sea as well as in the Indian Ocean. It will protect and safeguard the freedom of action for free and secure shipping transportation in the Indian Oceans that has been streamlined for sustainable Pakistan's economic development. Pakistan is constantly building and modernising her naval capabilities with advanced technologies for the better interests of the region and globe, the Regional Maritime Security Patrol (RMSP) has also been established to patrol and to check and to protect against any maritime challenges, hostilities and threats against any drug trafficking, human trafficking, piracy, terrorism or against any sea offensive. Pakistan has recently upgraded its submarines and naval ships with advanced and sophisticated technologies and developed new submarines with sensor capabilities that will play a successive and vital role in the balance of power against any Indian hegemonic design and naval threat in the Indian Oceans.<sup>23</sup>

This is the right time for Pakistan to leap into the development of coastal areas, oil refineries, naval build-up, seaports, transshipment industries and shipbreaking industries to cash these opportunities for poverty elevation and to generate economic opportunities for the people of Pakistan. No matter what happens the maritime blue economy's risk and challenges it imposes, should be dealt with Quid-Pro- Quo- Plus.<sup>24</sup>

### 5.2. Non-Traditional Security Challenges.

Pakistan's blue economy can face a range of non-traditional security challenges that span various domains. These challenges include issues related to academic cooperation, blue growth opportunities, capacity building, and the competency to effectively respond to any emerging challenges. Crew mismanagement, criminal activities, design and manufacturing concerns,

disaster risk, and the overall efficiency of maritime operations are also critical areas of concern. Furthermore, aspects such as energy supply, finished goods trade, fuel supply chains, geopolitical motives, compliance with international laws, inter-state disputes, piracy threats, adherence to regional laws, safety and logistics, and trade and connectivity in maritime transportation contribute to the complex security landscape of Pakistan's blue economy.<sup>25</sup>

### 5.3. Technological Challenges.

Pakistan's blue economy encounters a spectrum of technological challenges that demand innovative solutions and strategic foresight. These challenges encompass various domains such as advanced robotics systems, artificial intelligence applications, communication networks, and the integration of cloud computing and blockchain technologies for internet connectivity and security. The persistent threat of cyberattacks, data collection complexities, hacking vulnerabilities, and the imperative to embrace new digitalizing trends further underscore the intricate technological landscape. Additionally, the necessity for an integrated supply chain system for all modes of transportation, efficient management of interconnected systems, mitigation of navigational hazards, and bolstering research and development capacities are critical imperatives. Addressing these challenges requires a concentrated focus on science and technological advancements, the adaptation of smart manufacturing and delivery systems, acceleration in operational speeds, and the seamless transformation of cyber-physical systems (CPS) to ensure the resilience of Pakistan's blue economy in the digital age.<sup>26</sup>

### 5.4. Environmental Challenges.

Environmental challenges are the global challenges being faced by the shipping industries and maritime blue economy because the shipping industries, oil ships and cargoes operate in an open environment in the oceans which are subjected to oceanic behaviour due the extreme environmental conditions. Extreme strong and lethal winds, hurricanes, oceanic upwelling, tornados, tsunamis, high-rise oceanic tides, and heavy rains are the major environmental challenges faced by the shipping industries. Moreover, the shipping industries' acoustic pollution, air pollution, carbon dioxide pollution, chemical spills, dry bulk cargo releases, environmental damage, garbage, increased concentrations of nitrogen and phosphorous along with the coastal areas, marine species invasion, noise pollution, oil pollution, port congestion, releases of blast water containing aquatic invasive species, traditional use of antifoulants, underwater noise, vessel discharges, water blast and water pollution that creates the negative impact for greenhouse emissions which are the major environmental challenges and hazards for clean oceanic environments, for smooth shipping in the sea lanes and can be

<sup>22</sup> Rashid, A. (2017). Water as blue economy for sustainable growth in Pakistan. Journal of Basic & Applied Sciences, pp. 249-257. NIMSA Policy Paper.

<sup>23</sup> Zaidi, S. Akbar. 1999. Issues in Pakistan's Economy. Karachi: Oxford University Press.

<sup>24</sup> Ahmad, Muhammad. (2017). Snooping into the Belt & Road Initiative: a Comparative Study of Gwadar with Chabahar Port. Journal of Punjab University Historical Society. Vol. 30 Issue: 2, pp.68-79.

<sup>25</sup> Asaf Humayun, and N. Zafar, "Pakistan's 'Blue Economy': Potential and Prospects," Policy Perspectives 11, no. 1 (2014): 57–76.

<sup>26</sup> Chang, & Khan, (2019) "China–Pakistan economic corridor and maritime security collaboration", Agro Gregory and Stuart, Paul, and Robert (February 28, 2013). The Global Economy and its Economic Systems. South-Western College Pub. p. 24-30.

very lethal and toxic for marine life, local fisheries, dockyards and shipping industries.<sup>27</sup>

### 5.5. Global, Regional Piracy and Terrorist Threat Challenges.

Piracy, robbery, stealing, terrorist threats, thievery, trespassing, human trafficking, kidnapping, hijacking, attacking cargoes, destroying vessels, illegal fishing, smuggling, illegal cargo transportation, drug trafficking, holding cargoes and vessels for ransom money, Illegal immigration, and illegal maritime trades the global issues that pose significant threats to the maritime movements and will also remain potential threats and challenges to Pakistan's maritime blue economy as well.<sup>28</sup>

Millions of oil barrels cargoes and passenger ships move in the world's oceans around the clock and around the year and their routes are mostly defined and restricted through the choke points in the oceans. The sea routes lie mostly in the near vicinity of developing and third-world countries and are exposed to local piracy, hijacking, and theft cases. Several piracy, hijacking and theft cases have already happened in the near past, but no concrete measures have been taken to combat these challenges at an international level. Since Pakistan in the context of CPEC is also exploring and developing her maritime-based blue economy in her sea zones in the Arabian Sea that ultimately will fan out through the world oceans, therefore, Pakistan must develop her strategic navy to protect her maritime blue economy in collaboration with China and the Middle East against any maritime challenges.

## 6. Strategic Impact of The Blue Economy on Pakistan's Sustainable Socio-Economic Development.

Blue economy recognises the oceanic potential for economic development with multi-innovations and strategic economic growth. Pakistan sea zones are full of oceanic potentials that embrace economic opportunities, the blue economy can create certain job opportunities, and economic growth to meet food necessities, minimise the impact of climate change in the region as well as in the globe, meet the devastating impact of hunger and poverty, can overcome the state capital vulnerabilities, can be socially equitable, can mitigate the sustainable fisheries and renewable energy for sustainable economic development in the country.<sup>29</sup>

Pakistan Navy has significantly transformed into a formidable tactical and strategic position in collaboration with China and other regional and global friendly countries to contain any external hegemonic design or external threat imposed by Pakistan's adversary in the Indian Ocean. The contemporary global

geopolitical design is also summarized as the era of interdependence and to work jointly for the better interests of the nations, region, and globe.<sup>30</sup> The more you have stakeholders, the less you have risks and threats for your integral security. Keeping in view, therefore over a while, Pakistan Navy has conducted multiple naval exercises with the friendly countries' naval forces for the protection of maritime security in the region in collaboration with the US-led operation "Enduring Freedom and AMAN", with Multi-National Combined Task Forces-150" to work against any piracy, terror network, and criminal gangs to protect and secure the shipping transportation sea lanes in the Arabian Sea and the Indian Ocean.<sup>31</sup> In this regard, Pakistan Navy has successfully completed ten command tenures of Command Task Force-150 which has a significant regional and global impact as Pakistan is a peace-loving country that not only believes in national and regional security but also believes in global security and is committed to promote peace and stability in collaboration with other nations of the world. Pakistan has also conducted a regional naval exercise in collaboration with regional friends and regional stakeholders. Pakistan Naval Ship SAIF which is capable of conducting all types of maritime security operations against any threats in the sea, has been tasked to patrol jointly with the naval force of the Kingdom of Saudi Arabia for maritime security in the Gulf of Aden and Red Sea to secure the strategic naval choke point and to safeguard the sea shipping lanes.<sup>32</sup>

In Pakistan, multiple models have been experienced to develop the maritime-based blue economy, but no significant and optimum results have been achieved now the authorities that are at the helm, have realized the strategic importance of Pakistan's maritime blue economy and have demonstrated resilience and strong will to improve and have started working on the subject lines. Poor infrastructure has been significantly improved and restructured along the coastal areas of Pakistan. Seaports, dockyards, and shipyards have been renovated with the latest technique of ship harbouring and ship development in the sea lanes with the developing concept of Pakistan's blue economy that will ultimately facilitate the public and private investors to invest in the same industries with a win-win strategy. It will have a positive impact on the growth of the blue economy for the sustainable economic development of Pakistan. It will also increase the significant national capital income and gross domestic production (GDP) as well in the country.

The positive impact on Pakistan's blue economy remains significant for economic growth out of marine aquaculture production and fisheries for sustainable economic growth and development. However, it has been established that Pakistan's maritime potential for her blue economy can play a significant role in the creation of new job opportunities, poverty uplift-

<sup>27</sup> Yu, H., Liang, D., Tan, Q. & Li, J. (2018). Marine Waste and Microplastic Pollution and its International Process. *World Environ.* 54- 10.

<sup>28</sup> Burnett, John (2002). *Dangerous Waters: Modern Piracy and Terror on the High Seas.* Plume. p. 338.

<sup>29</sup> Andersen, Walter K. *Emerging Security Issues in the Indian Ocean: An American Perspective in Selig N. Harrison Superpower Rivalry in the Indian Ocean: Indian and American Perspective*, New York: Oxford University Press, 1989.

<sup>30</sup> Ahmad, Muhammad. (2017). Snooping into the Belt & Road Initiative: a Comparative Study of Gwadar with Chabahar Port. *Journal of Punjab University Historical Society.* Vol. 30 Issue: 2, pp.67-78.

<sup>31</sup> Muhammad Azam Khan, "Maritime Doctrine of Pakistan: Preserving Freedom of Seas," Pakistan Navy, Government of Pakistan, December 2018.

<sup>32</sup> Khan Ashan ur Rahman. *Evolving Geopolitics of Indian Ocean: In Depth Analysis*, Oriental Review, Open Research and Discussion Journal, 6 August 2013.

ing, higher wages, access to a new multi-culture, better benefits, cheap travel opportunities, career flexibility, exploration of new market and new talent, the spread of innovation and advanced technologies, low-cost production and labour, to meet the higher standard of civic life, socio-economic development, working in close harmony with trans-nations and for sustainable economic development in the country. If proper management is not established for the optimum utilization of oceanic resources in Pakistan, then certainly it will impede the economic growth of Pakistan and will have an adverse effect on the capital income of the nation and will increase the economic uncertainty and unemployment in the country with low-cost GDP.<sup>33</sup>

## Conclusions.

Pakistan's maritime blue economy can be further developed and enhanced up to \$10 to \$ 15 Billion annually with the use of artificial intelligence (AI), blockchain technologies, zero defects and zero effects, but unfortunately, this sector has been neglected, ignored and neither considerable effort has been made at provincials nor central political level that resulted in the sea blindness and weak economy. This ignorance and weak phenomenon have not only conjugated Pakistan's maritime potential for her blue economy but also remained a major hurdle for Pakistan's maritime growth for blue economy that impacted a great loss. About 65% of world oil trade and 85% of Indian oil trade are shipped across Pakistan's sea zones from the Middle East and the Persian Gulf on a daily basis. Pakistan's littoral neighbours like China, India, and South Asian Association Regional Cooperation (SAARC) member countries like Bangladesh, Sri Lanka and Maldives have the optimum utilization of their ocean's potential for their maritime economy.<sup>34</sup>

The contemporary global phenomenon is based on interdependence and working jointly. In the recent past, however, the Indian Ocean Region has been focused on multi-maritime challenges which are diverse in their manifests because of global oceanic geopolitics in the region, a power struggle among the stakeholders to contain China's emerging economy, China's Belt and Road Initiative (BRI) and China Pakistan Economic Corridor (CPEC). Moreover, the emerging modern-day piracy, Indian uranium smuggling by Indian Non-State Actors (INSA), maritime terrorism, and maritime smuggling impose significant challenges and threats to safe shipping transportation in the Indian Ocean. Pakistan's economic destiny is also determined with the success of CPEC and peaceful ship trading in the Arabian Sea and the Indian Ocean as well are the major credentials for Pakistan's navy. Therefore, Pakistan's strong maritime naval conventional and strategic force is essential in this perspective to combat the oceanic hazards and global maritime

challenges for security purposes are mandatory.<sup>35</sup>

However, in the backdrop of globalization, Indian geopolitics in the Indo-Pacific and her joint naval exercises with Australia, Japan, the U.S., and Israel have significantly increased strategic threats in the region. Pakistan is a peace-loving country, sincere and determined to contribute her share of peace and stability in the region and globally based on uncompromised economic, diplomatic, political, and national vital interests. Pakistan will maintain the absolute equilibrium and will not compromise at any cost of her sea zone boundaries, ideologies, geographic security, and sovereignty. Pakistan can foresee the immediate naval threat from the Indian naval force in collaboration with the Israeli naval force in the Arabian Sea, Indian Ocean, and the Red Sea. Pakistan must formulate its oceanic security threshold. Since Pakistan Navy has actively participated in the Multinational Naval Exercises in the Arabian Sea to determine regional and global peace and to combat such types of challenges against any traditional and nontraditional security challenges posed in the Arabian Sea, Indian Ocean, and the Red Sea.<sup>36</sup>

Pakistan has been blessed with numerous geographic potentials and several natural resources including the coastal geographic potentials that lie in the Arabian Sea qualify Pakistan as a littoral state. Oceanic maritime potentials are valuable resources which are in abundance and strategic in nature and good for economic security and naval military strategy. So far, Pakistan's blue economy has merely been restricted to coastal fisheries rather than the exploitation of offshore maritime blue economy. Pakistan as a littoral state has neither been able to exploit the maritime blue economy at an optimum level effectively nor for sustainable development in the country which has hampered the significant growth of Pakistan's maritime blue economy.<sup>37</sup>

Pakistan's biggest economic drivers are the exports to inwards Afghanistan, Central Asian States (CARS) and outwards Africa, Europe, the Middle East, the United States and West Asia. Pakistan, despite having many marine reservoirs of fisheries, and minerals for the blue economy, could not establish a significant development in this sector. Pakistan's National Security Policy (PNSP) 2022 articulates as economic centric policy with consumption, export, and investment with short-term, midterm and long-term strategies and has also documented that the economic security of Pakistan takes a vital and strategic position for sustainable development and national security by taking certain measures to reduce the imports and induce the exports to balance trade deficit by promoting inland and offshore economy.<sup>38</sup>

Pakistan must address her challenges like weak accountabil-

<sup>35</sup> Haddad, Tareq (6 January 2017). "Pakistan builds state-of-the-art warships to defend new trade routes with China." *International Business Times* (UK).

<sup>36</sup> Chen, S., Bruyne, C. D., Bollempalli, M. (2020). *Blue Economy: Community Case Studies Addressing the Poverty-Environment Nexus in Ocean and Coastal Management*. Sustainability, 1-18.

<sup>37</sup> Asaf Humayun, and N. Zafar, "Pakistan's 'Blue Economy': Potential and Prospects," *Policy Perspectives* 11, no. 1 (2014): 55–74.

<sup>38</sup> "New security policy," *Dawn*, December 29, 2021. Accessible at <https://www.dawn.com/news>.

<sup>33</sup> Alharthi, M. and Hanif, I. (2020), "Impact of blue economy factors on economic growth in the SAARC countries", *Maritime Business Review*, Vol. 5 No. 3, pp. 252-268.

<sup>34</sup> Mathias, Hartpence (15 July 2011). "The Economic Dimension of Sino-Pakistan Relations: An Overview." pp. 581–589.

ity, bad governance, bureaucratic hurdles, corruption, delayed justice, growing population, huge foreign debt, illiteracy, inefficiencies, nepotism, outdated technologies, marine pollution, climate change, weak political behaviour, security challenges, trade litigation barriers, and weak industrial research. National coherence and national harmony among the sub-political units of the country must be inculcated at all tiers. Bribes in public institutions must be addressed vigorously. The state must reduce top-notch perks and privileges and adopt austerity measures at all levels in public and private sectors with honesty and dedication. External security challenges must be addressed; acquisition of the latest coastal development technologies i.e., Blockchain technology, offshore exploration of marines and minerals, technologies, wind power and hydel power generation technologies must be acquired. Steps to be taken regarding the exploration of new markets in the region and at the global level for an exaggerated strategic maritime economy. A conducive economic environment for the blue economy to be created for local and foreign investors. Reduce the trade tariff, to make a favourable global and regional economy for inward and outward investors for sustainable economic development.<sup>39</sup>

To protect and safeguard nationalism, the local people must be trained in this sector and inducted for the overall national interest. Unnecessary institutional trade barriers and litigation barriers are to be removed with immediate effect. Trade cartelism must be secured and facilitated politically and diplomatically for a favourable blue economy. Pakistan's sea-based strate-

gic economic interests must be safeguarded and well-protected for the national interest. Government to increase the capacity building in existing dockyards, seaports, shipyards and ship harbouring areas, technical and administrative problems must be addressed, and any unforeseen port congestion in regards to ship harbouring areas must be removed so that there should not be any unnecessary delay and ship must not wait for cargoes unloading and de embossing for a longer period otherwise the delay may cause the demurrage charges and shortages of food supply, medicine supply and other related goods supply. Certain concrete efforts must be made to develop, improve, and increase the coastal areas tourism.<sup>40</sup>

Moreover, the domestic, regional, and global supply chains must not be delayed or disrupted at any cost and must be made secure. Measures are to be taken by the authorities in collaboration with global stakeholders to protect the maritime economy from any kind of piracy and environmental and oceanic hazards. A maritime blue economy regulatory authority is to be made to monitor and regulate government policies for the significant growth of the blue economy. Digital technologies, AI, blockchain technologies, business models, and maritime operations will certainly reduce the cost effect and increase efficiency. The future of the global economy is determined by the blue economy, so does Pakistan's future economic prospects lie in the maritime blue economy. Media should play a vital role in regional and global awareness by launching the mainstream campaign for Pakistan's seaborne potential and the exploration of Pakistan's sustainable maritime blue economy.<sup>41</sup>

<sup>39</sup><http://siteresources.worldbank.org/PAKISTANEXTIN/Resources/Pakistan-DevelopmentForum-2004/PakCFAA2004>.

<sup>40</sup> <http://www.yara.com/news-and-media/press/press-kits/yara-birkeland-press-kit/>. Yara (2020).

<sup>41</sup> Shah, Saeed (20 April 2015). "China's Xi Jinping Launches Investment Deal in Pakistan." *The Wall Street Journal*.