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THE IMPACT OF INDIA'S ECONOMY ON THE DEVELOPMENT OF SEAPORTS

Summary. India's diversified economy includes traditional and modern agriculture, crafts, modern industries and a variety of services. In 2017, almost half (48.93%) of India's GDP was generated by the service sector, whereas the industrial sector accounted for 26.16% and agriculture 15.45%. Despite a short-term economic downturn caused by a demonetisation and implementation of compulsory tax on goods and services, the continued favourable economic growth, including sustainable growth of the gross domestic product, revenue per capita, private consumption and public investment, as well as the improvement of other economic indicators, for example, car sales indicate that India's macroeconomic conditions are generally stable. Structural reforms introduced by the government contribute to enhanced productivity among domestic businesses and attract more foreign direct investment. Due to its geographical location, India has been using sea transport to promote its international trade. However, with too few deep-sea ports and limited cargo handling capacity, its seaports can handle only some of the largest intercontinental ships. This article discusses India's economic situation, with particular regard to the GDP growth in 2000-2017 and foreign trade. The analysis covers growth in cargo handling in main ports in India in 2000-2018. It discusses the port development project of Sagarmala introduced by the Government of India in 2015. The project is expected to solve problems

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associated with the performance of Indian ports and strengthen the Indian maritime sector to meet the ever-growing demand for goods transported by sea.

Keywords: India, main ports, economy, cargo handling, Sagarmala

1. INTRODUCTION

India belongs to the fastest growing economies and is currently the seventh largest economy in the world. After the completion of reforms liberalising the economy in 1991, India became one of the newly industrialised countries. The economic growth has been accelerated by the deregulation of industry, privatisation of state enterprises and the relaxation of foreign trade and investment controls. The overall development of the country is still undermined by corruption, poorly developed infrastructure, restrictive and burdensome regulatory environment, as well as inefficient budget and finance management².

The transport sector in India is large and diverse but it has been lagging behind growing demands. Main directions for the development of the sector set by the government are intended to support the further economic growth of the country and eradicate poverty. Due to its geographical location, India uses sea transport to promote its international trade; it accounts for approximately 95% of trade in goods in terms of volume and 70% in terms of value³. However, infrastructure in India's seaports cannot compete with technologically advanced seaports of China or Singapore designed to handle the largest container vessels in the world. Guided by its economic calculations and geostrategic location, the government of India has decided to introduce port development programs, create transport corridors and modernise its logistics. The implementation of the far-reaching large scale investment is designed to convert India into a global production hub and boost its economy.

2. INDIA'S ECONOMY

For the past several years, India witnessed an accelerated growth regarding its gross domestic product of approximately 7% a year. As regards GDP per capita, according to the International Monetary Fund, India was ranked 119 out of 185 countries around the world in 2018, with its revenue per capita of approximately 2,000 USD (for comparison, China was ranked 73)⁴.

The diversified economy of India consists of traditional and modern agriculture, crafts, modern industries and a variety of services. In 2017, almost half of India's GDP (48.93%) was generated by the service sector, whereas the industrial sector accounted for 26.16% and agriculture 15.45%. Leading service industries include telecommunications, IT and software. The developing IT industry is gradually becoming a very important part of India's economy since, in the fiscal year of 2016/2017, it accounted for around 8% of the GDP, which was a slight decrease in relation to previous years when the sector delivered approximately 10% of GDP. Nevertheless, the IT industry has been steadily growing in terms of income and

² 2019 Index of Economic Freedom; <https://www.heritage.org/index/country/india>

³ India Brand Equity Foundation; <https://www.ibef.org/industry/ports-india-shipping.aspx>

⁴ World Economic Outlook Database, April 2019; International Monetary Fund; <https://www.imf.org/external/pubs/ft/weo/2019/01/weodata/weorept.aspx?sy=2018>

employment. IT includes software development, consulting, software management, online services and business process management (BPM)⁵.

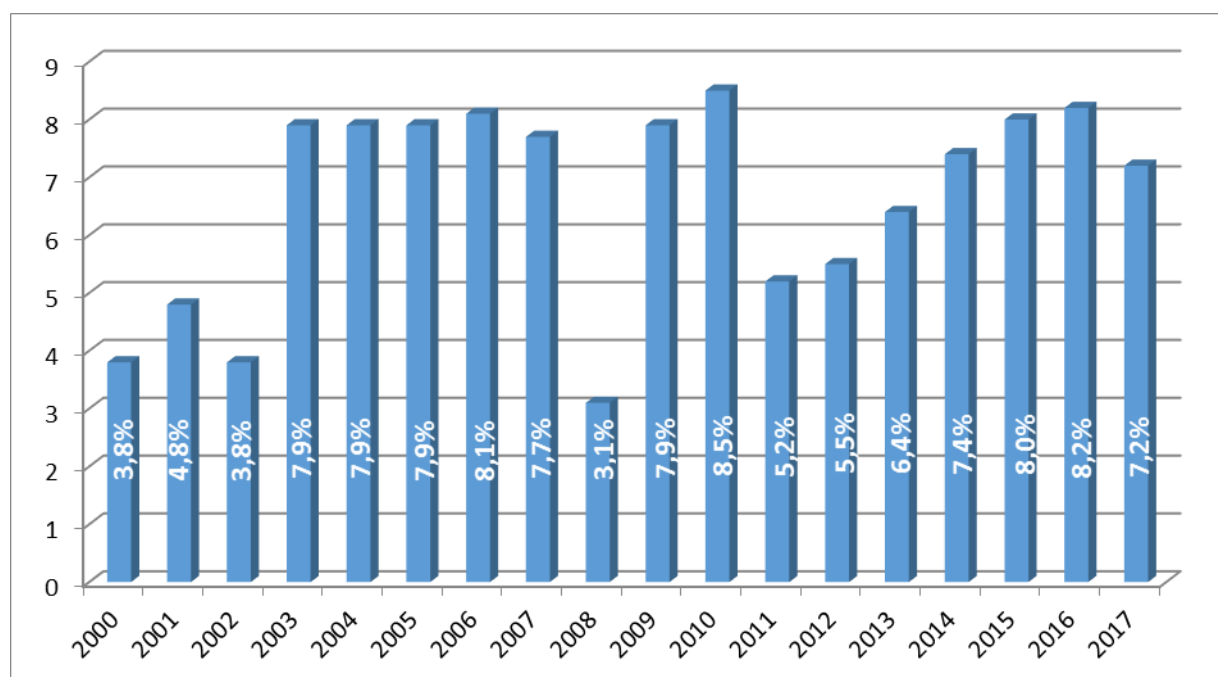


Fig. 1. India's GDP growth in 2000-2017

Source: <https://data.worldbank.org/indicator/ny.gdp.mktp.kd.zg?locations=in>

India's economy is largely based on domestic trade and to a limited extent on export. Therefore, it remains less susceptible to external factors compared to other markets which rely on foreign trade, particularly considering the current trade conflict with the United States. India's major trading partners include China, the United States, United Arab Emirates and Saudi Arabia, Indonesia, South Korea, United Kingdom, Switzerland, and Germany.

In 2018, India exported goods worth 323.1 billion USD, which accounts for 19.1% of its total GDP and growth by 8.4% compared to 2017. In terms of transaction value, almost half of Indian goods (49.3%) were delivered to other Asian countries, 19.3% to Europe, 18% to North America, 8.3% to Africa, 2.9% to Latin America and the Caribbean (excluding Mexico) and 1.3% to Australia and Oceania⁶.

The 2018 India's import was worth 507.6 billion USD. The majority of goods (60.3%) were brought from Asian countries. Goods purchased by India from their European trading partners accounted for 15.8% of import, from Africa 8.2% and from North America the remaining 8.1%. A less important contribution to the overall imports was made by goods imported from Latin America and the Caribbean, excluding Mexico (4.2%), and from Australia and Oceania (2.9%).

Product groups in Table 2 account for 80% of the total value of imports.

India has used its large, educated and English speaking community to export its IT and business services and promote the employment of its software programmers in foreign

⁵ Statista; <https://www.statista.com/statistics/271329/distribution-of-gross-domestic-product-gdp-across-economic-sectors-in-india/>

⁶ <http://www.worldstopexports.com/indias-top-10-exports/>

companies⁷. However, the country still has one of the highest levels of poverty, the largest income disparities and poorly developed public healthcare.

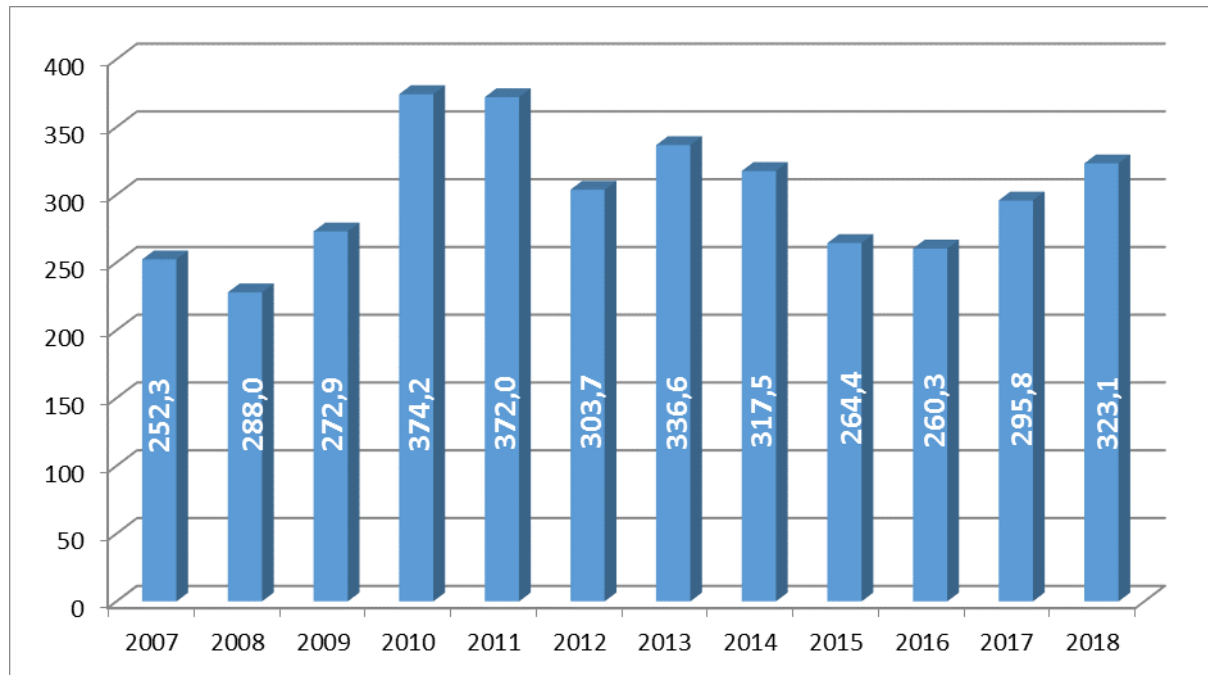


Fig. 2. Value of India's exports in 2007-2018, in billion USD

Source: own material based on <http://www.intracen.org/itc/market-info-tools/statistics-export-country-product/>

Tab. 1

Individual product groups in the total exports of India in 2018

Product Group	Value, billion USD	% of total exports
Mineral fuels, including oil	48,3	14,9
Gems, precious metals	40,1	12,4
Machines, including computers	20,4	6,3
Vehicles	18,2	5,6
Organic chemicals	17,7	5,5
Pharmaceuticals	14,3	4,4
Electrical machines, equipment	11,8	3,6
Iron, steel	10,0	3,1
Cotton	8,1	2,5
Clothing, accessories (excl. knitting)	8,1	2,5

Source: <http://www.worldstopexports.com/indias-top-10-exports/>

⁷ 2019 Index of Economic Freedom; <https://www.heritage.org/index/country/india>

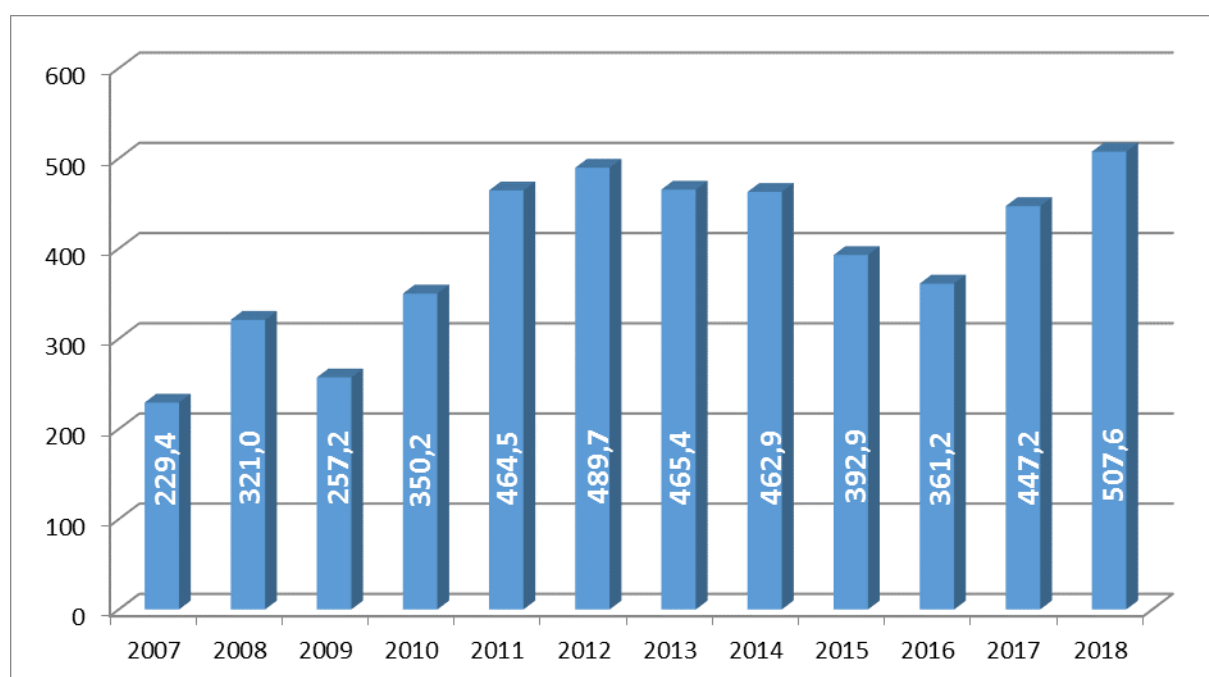


Fig. 3. Value of India's exports in 2007-2018, in billion USD

Source: based on <http://www.intracen.org/itc/market-info-tools/statistics-export-country-product/>

Tab. 2

Individual product groups in total imports of India in 2018

Product Group	Value, billion USD	% of total imports
Mineral fuels, including oil	168,6	33,2
Gems, precious metals	65,0	12,8
Electrical machines, equipment	52,4	10,3
Machines, including computers	43,2	8,5
Organic chemicals	22,6	4,4
Plastics and products	15,2	3,0
Iron, steel	12,0	2,4
Animal fats/vegetable oils, wax	10,2	2,0
Optical, technical and medical devices	9,5	1,9
Inorganic chemicals	7,3	1,4

Source: <http://www.worldstopexports.com/indias-top-10-exports/>

India is the second after China in the world in terms of its population. In 2017, the population was nearly 1.4 billion people⁸. To meet their demand for employment in the working-age population, each year more than 10 million jobs should be created.

⁸ The World Bank; <https://data.worldbank.org/country/india>

The structure of the Indian labour market distinguishes between employment in informal and formal sectors. The informal sector employs almost 81% of all the employed in India, whereas the formal only 6.5% and 0.8% in the household sector⁹. The informal sector includes companies operating on their own account. These include all unlicensed, single person or unregistered businesses, such as shops, crafts, physical work, rural trade, agriculture, etc. The organised sector includes people employed by the government, state enterprises and enterprises of the private sector. These include businesses that are registered and subject to tax on goods and services, such as banks, private schools, hospitals, listed companies, corporations, factories, shopping centres, hotels, etc.

For several years, India did not publish its employment figures (last official data are of 2012 - then unemployment rate was 2.7%). However, independent experts estimate that in the last period, the unemployment rate has been growing at the highest rate in the past 45 years and it is now 8.5% (in 2018 alone, India lost 11 million jobs), and the rapid economic growth generates much fewer jobs than in the past¹⁰.

Despite a short-term economic downturn caused by demonetisation and implementation of compulsory tax on goods and services, the continued favourable economic growth, including sustainable growth of the gross domestic product, revenue per capita, private consumption and public investment, as well as the improvement of other economic indicators, for example, car sales, indicate that India's macroeconomic conditions are generally stable. Structural reforms introduced by the government contribute to enhanced productivity among domestic businesses and attract more foreign direct investment.

In 2014, the Indian government implemented the „Make in India” program, which is intended to transform India into a global production hub, contributing to the creation of new jobs and the rise of the professional qualifications of the population. The initiative has been gradually gaining momentum and would benefit various sectors, including the maritime economy.

3. SEAPORTS IN INDIA

The Indian peninsula has one of the largest coastlines in the world, extending a distance of more than 7500 km, with approximately 200 seaports of India, including 12 major ones. The main ports handle more than 75% of the total freight traffic¹¹. On the east coast, India has the following main ports: Calcutta (Kolkata Dock System and Haldia Dock Complex), Paradip Vishakhapatnam, Ennore, Chennai, Chidambaranar (formerly Tuticorin), whereas on the west coast: Kochi, New Mangalore, Marmagoa, Mumbai, Jawaharlal Nehru (JNPT) and Kandla. The main ports are answerable to the Ministry of Shipping except for the port of Ennore, which is a public company acting under the business name of Kamarajar Port Limited registered as a company (68% of shares owned by the state and 32% by Chennai Port Trust), and the company pays dividends to the state¹². Smaller ports are answerable to governments of relevant states and perform the role of auxiliary ports for the above mentioned main ports.

⁹ The WIRE: Nearly 81% of the Employed in India Are in the Informal Sector: ILO, May 2018; <https://the.wire.in/labour/nearly-81-of-the-employed-in-india-are-in-the-informal-sector-ilo>

¹⁰ CNN Business; <https://edition.cnn.com/2019/04/05/economy/narendra-modi-economy-election-india/index.html>

¹¹ <https://www.ibef.org>

¹² India: Government to Build Mega Container Terminal at Chennai. DredgingToday.com. Retrieved October 2011.



Fig. 4. Main and auxiliary seaports of India
Source: <https://www.mapsofindia.com/maps/sea-ports/>

2000-2018 cargo handling in major ports of India is shown in Table 3.

Tab. 3

2000-2018 cargo handling in ports of India, in thousand tons

Port	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
Calcutta	31001	46207	46423	47545	43248	39928	41385	46292	50289	50951	57886
Paradip	13636	55801	57011	56030	54254	56552	68003	71011	776386	88955	102013
Vishakhapatnam	39510	50147	65501	68041	67420	59040	58503	58004	57033	61020	63537
Ennroe*	-	9479	10703	11009	14956	17885	27337	30251	32206	30020	30446
Chennai	37443	43806	61057	61460	55707	53404	51105	52541	50058	50214	51881
Chidambaranar	9993	15811	23787	25727	28105	28260	28642	32414	36849	38463	36583

Kochi	12 797	14 095	17 429	17 873	20 091	19 845	20 887	21 595	22 098	25 007	29 138
New Mangalore	17 600	33 891	35 528	31 550	32 941	37 036	39 365	36 566	35 582	39 945	42 055
Marmagoa	18 226	30 659	48 847	50 022	39 001	17 693	11 739	14 711	20 776	33 181	26 897
Mumbai	30 384	35 187	54 541	54 586	56 186	58 038	59 184	61 660	61 110	63 049	62 828
JNPT	14 976	32 808	60 763	64 309	65 727	64 490	62 333	63 802	64 027	62 151	66 004
Kandla	46 303	41 551	79 500	81 880	82 501	93 619	87 004	92 497	100 051	105 442	110 099
Total	271 869	383 745	561 090	570 032	560 137	545 790	555 487	581 344	606 465	648 398	679 367

*Lawful operations started in December 2002

Source: own material based on <http://www.ipa.nic.in/index1.cshtml?lsid=155>

The busiest ports handling the international container traffic include Calcutta, Chidambaranar, Chennai, Cochin, Vishakhapatnam and Jawaharlal Nehru (Table 4).

Tab. 4

2000-2017 container handling in the largest ports of India, in thousand TEU

Port	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017
Calcutta and Haldia	175	287	502	526	552	600	563	630	663	772
Chidambaranar (Tuticorin)	137	307	440	468	477	476	508	560	612	642
Chennai	322	617	1216	1524	1558	1540	1468	1552	1565	1495
Cochin	130	185	290	290	336	335	347	366	419	491
Vishakhapatnam	20	45	98	145	234	247	262	248	293	367
JNPT	889	2371	4062	4270	4321	4259	4162	4467	4492	4500
Total	1673	3812	6608	7223	7478	7457	7310	7813	8044	8267

Source: own material based on <http://www.ipa.nic.in/index1.cshtml?lsid=155>

The analysis of 2000-2018 cargo handling changes in major ports of India indicates a steady increase. A visible slowdown in 2012-2014 resulted from the reduction in trade after the world economic crisis, as well as the insufficient capacity of infrastructure in Indian ports and weak operating results due to the limited possibility of further shipments¹³. Apart from insufficient capacity, the development of Indian ports can be seen as a key factor in the protection of the Indian trade against fluctuations in the global economy. However, too few deep-sea ports and limited cargo handling capacity constrains its seaports handling of only some of the largest intercontinental ships. As a result, much Indian cargo must be reloaded in more developed Asian ports (Colombo, Sri Lanka), which increases time and cost of

¹³ Berry A.: *Ports in India Need Overhaul*. The Economic Times 2018; <https://economictimes.indiatimes.com/industry/transportation/shipping/-/transport/ports-in-india-need-overhaul-agam-berry-quantified-commerce/articleshow/63886226.cms>

operation¹⁴. For example, one-quarter of containers which in 2016 were handled by the main state ports of India had to be transshipped elsewhere¹⁵. To resolve these issues and to strengthen the Indian maritime sector in the context of the ever-growing demand for goods transported by sea, in 2015, the government of India adopted a port development project known as Sagarmala¹⁶. Its goal is to deliver a comprehensive solution to problems faced by the Indian ports.

4. THE SAGARMALA STRATEGY FOR DEVELOPMENT OF SEA PORTS

The Sagarmala Strategy has been developed as part of a broader program of “Make in India” as its key component. The coordination of the program at the national level is the responsibility of the Ministry of Shipping, which take care of the transformation of infrastructure into a modern system. The process comprises the modernisation of ports and their integration with special economic zones, smart port cities, industrial parks, warehouses, logistics parks and transport corridors. According to the plan, the implementation of the project should attract foreign direct investment and the implementation of individual projects under the Sagarmala Strategy (mainly private or PPP schemes) and their consistency is the responsibility of respective ports, state governments/maritime councils, and central administration.

The concept of “port-driven development” is the heart of the Sagarmala vision. The concept focuses on intensive development of logistics supported by efficient and modern port infrastructure and a functioning supply chain supported by qualified personnel.

As regards the above assumptions (upgrade of existing ports and development of new ones, improvement of connections to ports, industrialisation of ports and development of coastal communities), the program identifies 415 projects, the implementation of which is staged in 2015-2025 with the expected cost of 123 billion US dollars¹⁷.

The Government of India believes that the implementation of the Sagarmala Strategy will reduce the costs of logistics, which is crucial for domestic production. Today, in India, the logistics cost consumes about 19% of GDP (1/3 higher than in China), to compete on the global market, India needs to reduce it to 4-6%¹⁸.

According to the National Plan, the Sagarmala Strategy provides for¹⁹:

- Modernisation of existing and development of new ports - through 189 projects, including 116 to improve the operational capacity of the existing ports and the construction of six mega-ports: Vizhinjam International Seaport (status Kerala), Colachel Seaport (Tamil Nadu) Vadhavan Port (Maharashtra), Tadadi Port (Karnataka), Machilipatnam Port (Andhra Pradesh) and Sagar Island Port (West Bengal). The country designated a total of

¹⁴ Poonawalla S., Sinha R.: Will Vizhinjam port fulfill India's maritime dream? Rediff Business, December 2015; <https://www.rediff.com/business/column/will-vizhinjam-port-fulfill-indias-maritime-dream/20151214.htm>

¹⁵ The Financial Times: India's new private ports challenge impact state giants; <https://www.ft.com/content/b6892980-2e68-11e7-9555-23ef563ecf9a>

¹⁶ Government of India, Ministry of Finance (2018). *Sagarmala: Background*; <http://sagarmala.gov.in/about-sagarmala/background>

¹⁷ <http://www.makeinindia.com/article/-/v/developing-ports-sagarmala-project>

¹⁸ Mishra D: Sagarmala—Transformation of the Maritime Infrastructure and Make in India, April 2018; <https://medium.com/@devsenamishra/sagarmala-transformation-of-the-maritime-infrastructure-and-make-in-india-4ba48ec0c80b>

¹⁹ Developing Ports: Sagarmala Project; <http://www.makeinindia.com/article/-/v/developing-ports-sagarmala-project>

- 21 billion USD for the above objectives. The implementation of the Vizhinjam port project is underway and projects in other ports are in the designing phase;
- Improvements in communication with ports - 170 projects with the expected cost of 35 billion US dollars to modernise road and railway infrastructure and building multimodal hubs on 111 inland waterways in 24 states; a number of inland waterways will gain national status, which means that they will be included in the development program. This group of activities includes such governmental projects as Jal Margin Vikas (four terminal ports on River Ganga). India contracted a loan from the World Bank in the amount of 375 million US dollars for the project²⁰, Dedicated Freight Corridors (construction of rail corridors that can handle longer and heavier freight trains from/to ports in Delhi, Mumbai, Chennai and Kolkata and diagonal corridors north-south Delhi-Chennai and east-west Calcutta-Mumbai) Whether Bharatmala (construction and upgrading of 34 800 national roads, including 2000 km of roads along coastlines and in major ports);
 - Industrialisation associated with ports - 33 projects of the expected cost of 65 billion USD. The initiative provides for the development of economic regions (CEZ) in 14 coastal zones with industrial clusters. The objective is to save time and reduce costs of cargo handling in national and international traffic. It is estimated that in coastal zones, direct and indirect employment may reach 6 million people. Energy clusters, consisting of refineries and petrochemical industry, reduce India's dependence on import of petroleum products. By 2025, two more refineries and four petrochemical clusters located along the coast of India should be developed;
 - The development of coastal communities - the cost of 23 projects promoting the involvement of people living in coastal zones (18% of India's population) in the overall socio-economic development of the region is 648 million USD. Projects focus on education of citizens, development of refrigeration chain, fisheries, aquaculture, local tourism and leisure facilities.

At the same time, it is expected that the implementation of the Sagarmala strategy will contribute to the annual reduction of CO₂ emission from transport by 12.5 MT.

In March 2018, in the different phases of development and implementation were 492 projects worth 62 billion USD²¹. Out of the total 116 investment projects improving the operational efficiency of major ports, 91 projects have been completed, 8 are in progress, and 9 projects abandoned²².

Noteworthy is the building of the new container port of Vizhinjam, Kerali State, launched in 2019 at the coast of Arabian Sea under the PPP scheme. It is going to be the first in India deep-sea mega-terminal (up to 18 m draft) capable of handling the largest container vessels of up to 24 thousand TEU. In addition to the port of Dhamra, which does not yet have an adequate infrastructure to handle container ships, no other Indian container port has such operating depth²³.

²⁰ GKTODAY, GK-Current Affairs_General Studies; <https://currentaffairs.gktoday.in/tags/jal-marg-vikas-project>

²¹ India Briefing; <https://www.india-briefing.com/news/sagarmala-developing-india-ports-aid-economic-growth12980-12980.html/>

²² <http://sagarmala.gov.in/project/port-modernization-new-port-development>

²³ <https://seanews.co.uk/features/container-shipping-indian-ports-set-to-outpace-previous-records/>



Fig. 5. Masterplan for Vizhinjam Seaport
Source: <https://www.downtoearth.org.in/tag/vizhinjam>

The building of the Vizhinjam seaport, including the breakwater, quays, terminal and the port building, is divided into three stages. Stage one, requiring dredging at sea, includes the construction of an embankment of 66 ha and a breakwater of 3180 m in length. The project also includes a railway line of 10.9 km and a 9 km tunnel (second longest railway tunnel in India) to connect the port and the main railway line²⁴. The port is expected to be put into service at the end of 2020. According to the agreement, the port will be operated by Adani Vizhinjam Port (AVPL), a private concessionaire, for 40 years with the possibility to extend the contract for further 20 years, whereas the state government will receive part of the revenue after 15 years.

5. SUMMARY

In India, the establishment of new ports and modernisation of existing ones, development of coastal zones, improved transportation between ports by expanding road, rail and inland waterways networks and the development of multimodal logistics parks will boost economic development in coastal areas and stimulate the development of the whole country, creating new jobs.

An efficient system of connections to ports in India is very important because centres attracting goods for shipment are mainly located inland rather than in coastal regions. A long distance to the destination point of the shipment increases the logistics cost and time for cargo

²⁴ <https://www.thenewsminute.com/article/kerala-s-vizhinjam-port-commissioning-deadline-extended-october-2020-96738>

to be delivered. Connectivity between ports of India with their hinterland is based primarily on road and rail transport, whereas coastal and inland waterway shipping plays a very limited role. Hence, the creation of a well-connected logistics system in the country together with the introduction of new technologies and increasing handling capacity of ports is of paramount importance for the development of the national economy. This is one of the major factors boosting competitiveness, promoting traffic flow in the ports of both at the present and expected increased levels resulting from the development of international trade in goods.

For the main ports of India to be globally competitive, the Member State must ensure an attractive investment climate for global investors. In the framework of projects related to the construction and development of ports, the government of India has permitted direct foreign investments up to 100% of their value. In the period from April 2000 to December 2018, the port sector in India attracted aggregated direct foreign investment of 1.64 billion USD. Moreover, companies investing may enjoy 10-year tax exemption and apply for financial aid of 50% of investment value. Additionally, the 10-year tax exemption was extended to companies dealing with development, maintenance and operation of sea and inland ports, as well as inland waterways²⁵.

Indian government plans to improve the efficiency of all 12 major port have been finalised. Projects concentrating on the development of cargo handling capacity will be gradually implemented in the next 20 years. At the end of March 2018, in different phases of their development and implementation were 492 projects worth 62 billion USD²⁶.

References

1. 2019 Index of Economic Freedom. Available at: <https://www.heritage.org/index/country/india>.
2. Berry A. 2018. *Ports in India Need Overhaul*. The Economic Times. Available at: <https://economictimes.indiatimes.com/industry/transportation/shipping/-/transport/ports-in-india-need-overhaul-agam-berry-quantified-commerce/articleshow/63886226.cms>.
3. CNN Business. Available at: <https://edition.cnn.com/2019/04/05/economy/narendra-modi-economy-election-india/index.html>.
4. Developing Ports: Sagarmala Project. Available at: <http://www.makeinindia.com/article/-/v/developing-ports-sagarmala-project>.
5. DownToEarth. Available at: <https://www.downtoearth.org.in/tag/vizhinjam>.
6. Financial Times: India's new private ports challenge ageing state giants. Available at: <https://www.ft.com/content/b6892980-2e68-11e7-9555-23ef563ecf9a>.
7. GKTODAY, GK-Current Affairs_General Studies. Available at: <https://currentaffairs.gktoday.in/tags/jal-marg-vikas-project>.
8. Government of India, Ministry of Finance. 2018. *Sagarmala: Background*. Available at: <http://sagarmala.gov.in/about-sagarmala/background>.
9. IBEF. Available at: <https://www.ibef.org/industry/indian-ports-analysis-presentation>.
10. India Brand Equity Foundation. Available at: <https://www.ibef.org/industry/ports-india-shipment.aspx>.
11. India Briefing. Available at: <https://www.india-briefing.com/news/sagarmala-developing-india-ports-aid-economic-growth12980-12980.html/>.

²⁵ <https://www.ibef.org/industry/indian-ports-analysis-presentation>

²⁶ India Briefing; <https://www.india-briefing.com/news/sagarmala-developing-india-ports-aid-economic-growth12980-12980.html/>

12. *India: Government to Build Mega Container Terminal at Chennai*. *DredgingToday.com*. October 2011.
13. Indian Ports Association. Available at: <https://www.ipa.nic.in/index1.cshtml?lsid=155>.
14. International Trade Centre. Available at: <https://www.intracen.org/itc/market-info-tools/statistics-export-country-product/>.
15. Make in India. Available at: <https://www.makeinindia.com/article/-/v/developing-ports-sagarmala-project>.
16. Maps of India. Available at: <https://www.mapsofindia.com/maps/sea-ports/>.
17. Mindur L. (Ed.). 2014. *Technologie transportowe*. [In Polish: *Transport technologies*]. Radom: ITE-PIB.
18. Mindur M. 2009. *Transport Europa-Azja*. [In Polish: *Europe-Asia transport*]. Radom: ITE-PIB.
19. Mindur M. 2010. *Transport w erze globalizacji*. [In Polish: *Transport in the age of globalization*]. Radom: ITE-PIB.
20. Mishra D. *Sagarmala – Transformation of the Maritime Infrastructure and Make in India*. April 2018. Available at: <https://medium.com/@devsenamishra/sagarmala-transformation-of-the-maritime-infrastructure-and-make-in-india-4ba48ec0c80b>
21. The World Bank. Available at: <https://data.worldbank.org/indicator/ny.gdp.mktp.kd.zg?locations=in>.
22. Sagarmala. Available at: <http://sagarmala.gov.in/project/port-modernization-new-port-development>.
23. Seanews. Available at: <https://seanews.co.uk/features/container-shipping-indian-ports-set-to-outpace-previous-records/>.
24. Mindur M. (Ed.). 2017. *Logistyka. Nauka-Badania-Rozwój* [In Polish: *Logistics. Science-Research-Development*]. Radom: ITE-PIB.
25. Obed Ndikom, Nwokedi Theophilus C., Sodiq Olusegun Buhari. 2017. “An appraisal of demurrage policies and charges of maritime operators in nigerian seaport terminals: the shipping industry and economic implications”. *Naše More* 64(3): 90-99.
26. Ojadi Francis, Jackie Walters 2015. “Critical factors that impact on the efficiency of the Lagos seaports”. *Journal of Transport and Supply Chain Management* 9(a180): 1:13. ISSN: 2310-8789.
27. Poonawalla S., R. Sinha. *Will Vizhinjam port fulfill India's maritime dream?* Rediff Business. December 2015. Available at: <https://www.rediff.com/business/column/will-vizhinjam-port-fulfill-indias-maritime-dream/20151214.htm>.
28. Statista. Available at: <https://www.statista.com/statistics/271329/distribution-of-gross-domestic-product-gdp-across-economic-sectors-in-india/>.
29. The News Minute. Available at: <https://www.thenewsminute.com/article/kerala-s-vizhinjam-port-commissioning-deadline-extended-october-2020-96738>.
30. The WIRE: Nearly 81% of the Employed in India Are in the Informal Sector: ILO, maj 2018. Available at: <https://thewire.in/labour/nearly-81-of-the-employed-in-india-are-in-the-informal-sector-ilo>.
31. The World Bank. Available at: <https://data.worldbank.org/country/india>.
32. World Economic Outlook Database. April 2019. International Monetary Fund. Available at: <https://www.imf.org/external/pubs/ft/weo/2019/01/weodata/weorept.aspx?sy=2018>.
33. World's Top Exports. Available at: <https://www.worldstopexports.com/indias-top-10-exports/>.

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