

Gujarat Port Development Role in GSDP

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Abstract:

Examining the economic elements of port development in Gujarat, India, is the aim of this study. Gujarat has become an important player in the maritime trade, and the state's economy has benefited significantly from its extensive port network. The study employs a total cargo handle by major and non-major port of Gujarat in share of India and state growth that influence and are influenced by port development. The research also evaluates the role of export and import of major and non-major port with GSDP. In this paper correlation between major port Kandla and non-major port of Gujarat state with GSDP has also been tested through hypothesis.

Part – I Overview

Introduction:

In our nation's history, ports have also been significant. Nine Indian states are connected to a total of 13 major ports and another 200 minor ports. Gujarat is the maritime gateway point to the Middle East, Africa, and Europe, boasting the longest coastline in India at 1600 km. Gujarat growth engine of India. Gujarat enjoys robust connectivity to major international trade routes, including those leading to the USA, Canada, Europe, Australia, China, Japan, Korea, the Gulf, and various African nations via sea. Furthermore, its well-developed road network seamlessly connects to major Indian cities and key ports like Kandla and Pipavav. Gujarat share of 8.36% of India's overall GDP. With a port share of over 20% of India's total exports, Gujarat is the export leader. Port and Sea route have been playing important roles for cultural, social and economic development in India. (Gujarat Budget 2022-23: Socio Economic Review - English, n.d.)

History of Port Development in Gujarat:

Gujarat's maritime history dates back centuries, with a rich legacy of port development. One of the earliest references is to the ancient port of Lothal, an integral part of the Indus Valley Civilization around 2400 BCE. However, the modern era of port development in Gujarat gained momentum during the colonial period (Khadkikar et al., 2004).

➤ **Colonial Era:**

The British East India Company recognized Gujarat's strategic coastal location and established ports like Surat and Bharuch in the 17th century for trade and commerce. The export of textiles, spices, and other items to Europe and other countries was greatly aided by these ports.

Post-Independence Period:

The development of the maritime infrastructure received increased attention following India's independence in 1947. Through port expansion, the government sought to improve economic activity and trade. The construction of Asia's first specialized port for handling dry cargo,

Kandla Port, in 1950 marked a significant turning point in the 1950s and 1960s. In Gujarat's port history, this was a major turning point (*Lothal: A Harappan Port Town / Harappa*, n.d.)

➤ **1970s to 1990s:**

During this period, there was a surge in port development activities. Ports like Mundra and Sikka were established, catering to different types of cargo. The Gujarat Maritime Board (GMB) was formed in 1982 to oversee and regulate maritime activities in the state, further contributing to organized and sustainable port development.

➤ **Late 20th Century to Present:**

The state experienced a change toward private involvement in port development in the late 1990s and early 2000s. Adani Ports' Mundra Port grew to be the biggest commercial port in India and a major contributor to Gujarat's economic expansion. Significant growth and development were also observed at other ports, including Dahej and Pipavav (now APM Terminals Pipavav).

➤ **Recent Developments:**

The government kept supporting the construction of new ports and the renovation of old ones. Gujarat's nautical capabilities have been further enhanced by the building of ports such as Hazira, Okha, and Mithivirdi. The Indian government's "Sagarmala" plan is to modernize port infrastructure and improve port connections, which will greatly benefit Gujarat's maritime sector.

Literature Review:

The current study has been assessed using the following table, aligning with the research objectives and drawing insights from previous studies related to port development in Gujarat. The analysis indicates that the present research introduces a distinctive perspective and divergence in terms of relationships and isolation compared to earlier research in this context.

No.	Author	Title of the Research	Research Gap
1.	Chudasama, K. (2020)	“Port Development: Relationship Between Port Traffic of Gujarat and Its Hinterland”	Econometric Analysis of Relationship between GSDP of hinterland state and cargo traffic at Gujarat ports. ‘Increase cargo traffic at its ports, with a 0.39 – 0.55% increase per 1% increase in GSDP’.

2.	Ranade,P. (2002)	“Impact of Infrastructure Development on the Ports of India's Western Coast”	Comparative statistical analysis of Development of infrastructure at near the western coast ports has positively impacted traffic handled by these ports, with increased value and volume of traffic, especially in liquid bulk cargo. Outcome of the research Changes in import and export volume, traffic composition at ports.
3.	Patel, K., & Juremalani, J. (2018)	“Development of Satellite Sea Ports - A New Initiative under Sagarmala Project”	Policy analysis and reconditions of The Sagarmala Project aims to modernize and connect Indian sea ports, enhancing economic growth and coastal community development through “port modernization, connectivity enhancement, port-linked industrialization, and coastal community development”.
4.	Sagufta Parveen, (2014)	“Surat: As a Major Port-Town of Gujarat and its Trade History”	With robust shipbuilding and trade, Surat was a major port in Western India in the 17th century. However, the demise of the Mughal Empire, the growth of Bombay, and the decreased market for its textiles caused Surat to decline in the 18th century.
5.	Nil (Guler, 2002)	“Economic Evaluation of Port Investment”	Lower transportation costs are one of the direct advantages of port deepening projects. Further types of benefits need to be taken consideration in public port projects.
6.	Jing. Li, Jing. Lu and Nan. Xiang, (Li et al., 2008)	“The impact of port development on regional economy”	Port development's effects on the local economy, positive as well as negative. Total economic production, industrial structure, and other factors are included in the evaluation index system.
7.	(Goldar & Paul, 2018)	“Impact of Port Infrastructure on Economic Development with Special Reference to Major Ports in India”	Based on the study, India's GDP is greatly boosted by the infrastructure of its major ports, which increases throughput and operational income, promoting economic

			expansion and creating a significant number of job opportunities domestically.
8.	(Pradhan et al., 2022)	“Sagarmala & India’s maritime big push approach: seaports as India’s geo-economic gateways & neighbourhood maritime lessons”	This paper encourages of the 'Sagarmala' project to modernize ports, which is expected to be significantly enhance economic growth and substantially impact India's GDP through port-led industrialization, the study highlights the significance of seaports for India's commerce and geo economic gateways.
9.	(Munim & Schramm, 2018)	“The Impacts of Port Infrastructure and Logistics Performance on Economic Growth”	The contribution of port development to India's GDP is not particularly discussed in this paper. Nonetheless, it highlights how enhanced port infrastructure and logistics performance, especially in developing nations like India, greatly boost economic growth.

Problems of the Research:

Gujarat Ports have been at the forefront of advancing the port sector in India, excelling in policy formulation, strategic planning, and effective implementation. An important turning point was the implementation of the BOOT (Build, Own, Operate, and Transfer) strategy for the port sector in 1997, which resulted in the nation's first private sector port development. Mundra, Dahej, and Hazira quickly became important ports with the BOOT Policy. The cumulative investment in these ports, along with subsequent investments, exceeded INR 35,000 crores by 2016 (Port Information - Gujarat Maritime Cluster, n.d.). Gujarat stands as the foremost state in India with a well-established maritime sector, achieved through substantial expansions in maritime capabilities. The cargo volume handled by Gujarat ports has consistently increased over time, paralleled by the continuous augmentation of capacities across various ports in the state. This research paper examines the effects of port expansion on Gujarat economy.

Objectives of the Research:

- To analyse the economic impact of port development in Gujarat.
- Evaluate the economic contribution of ‘major and non-major port’ in Gujarat.
- To examine the share of import-export through port in the GDP of Gujarat state.

Hypothesis of the Research:

1. **Ho:** “There's no significant linear correlation between the import of major port of Kandla and GSDP.”
2. **Ho:** “There's no significant linear correlation between export of major port of Kandla and GSDP.”
3. **Ho:** “There's no significant linear correlation between import of non-major port and GSDP.”
4. **Ho:** “There's no significant linear correlation between export of non-major port and GSDP.”

Significance of the Research:

The state of Gujarat has a total of 49 ports. In which there are one Major port of Kandla and 48 Non-Major Ports.(GMB Ports, n.d.) Sagarmala project was implemented in the year 2016. The objectives of the program were to utilize India's vast coastline and industrial waterway to promote industrial development. The project is based on the four's main pillars of “Port Modernization, Port Connectivity, Port led Development and Coastal Community Development” which is expected to be completed vision 2025. Based on the statistics of socio-economic review 2021-22, Gujarat state has a port share of 40.41% in GSDP. The based on this review the study has considered the situation before and after the implementation of Sagarmala Project. This program is context to help explain Gujarat's port development impact on Gujarat economic development.

Methodology:

Secondary data is the base of the study. Secondary data is collected from Gujarat State government report of Socio-Economic Review of Gujarat (2022-23), Statistical Outline Gujarat State (2023), academic publication, and industry reports. The research employs quantitative methods to analyse economic indicators such as GDP growth, Export and Import. Additionally, qualitative analysis is conducted to understand the qualitative aspects of port development, including policy impacts and stakeholder perspectives. In the present research the correlation between GSDP and import and export major and non-major port has been examined through hypothesis. Statistical data has been analyzed using SPSS software and Excel.

Part – II Gujarat Major and Non-Major Port Role in GSDP

Data Collection:

Established in 1982, the Gujarat Maritime Board (GMB) supervises 48 ports, such as Bedi, Bhavnagar, Dahej, and Porbandar. Initially accounting for 3% of the national port traffic in

1982-83, Gujarat's non-major ports have witnessed significant growth, handling 416 million tonnes of cargo in 2022-23. This constitutes 30% of the total Indian port traffic and a substantial 65% share of all Non-Major Port (NMP) traffic in the country. As of 2023, the current capacity of Gujarat's non-major ports stands at 593.01 million tonnes (Rana, 2023).

1. Cargo Handle by Major and Non-Major Ports in Gujarat Comparison with India									
	Gujarat			India			% Share of State		
Year	Major	Non-Major	Total	Major	Non-Major	Total	Major	Non-Major	Total
2021	117.57	387.57	505.14	672.68	577.3	1249.99	17.48	67.13	40.41
2020	122.61	411.79	534.4	704.92	615.05	1319.97	17.39	66.95	40.49
2018	110	371	481	679	529	1209	16.2	70.08	39.8
2017	105	345	450	647	485	1132	16.23	71.13	39.75

Source: Socio-Economic Review of Gujarat (2022-23)

Gujarat's ports are crucial role in India's maritime trade, and compared to major ports, non-major ports handle significantly greater volumes of cargo. The state's share in total cargo handling has remained around 40%, with non-major ports contributing over 65%. While total cargo handling has increased over time, major ports' contribution has remained relatively stable. The data highlights Gujarat's strong reliance on non-major ports for maritime trade expansion.

2. Cargo handle by Port in Gujarat and GSDP

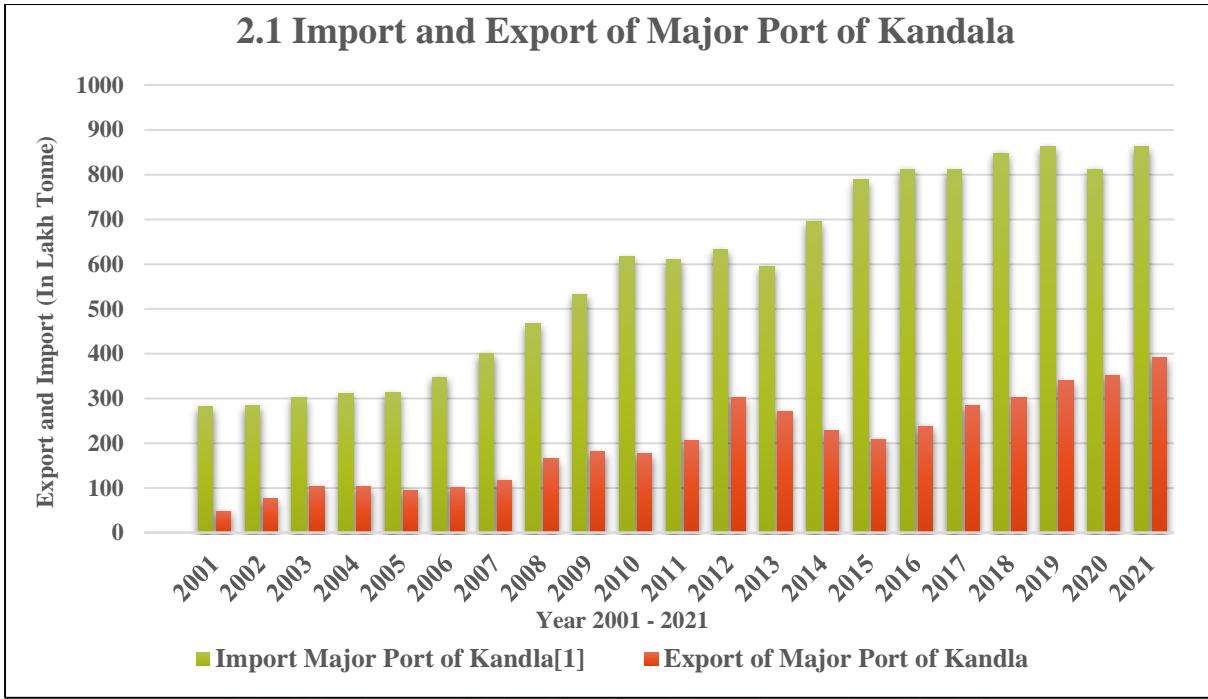
Year	Import Major Port of Kandla*	Export of Major Port of Kandla	Import of Non-Major Port	Export of Non-major Port	GSDP of Gujarat (In Crore)
2001	281.03	47.87	467.87	263.93	123573
2002	284.57	77.04	530.83	294.63	141534
2003	302.37	103.74	534.56	306.68	168080
2004	310.8	103.08	555.56	337.92	203373
2005	313.87	95.45	611.04	360.24	244736
2006	347.8	101.76	703.99	376.76	283693
2007	399.8	117.36	874.28	450.14	329285

2008	466.86	165.09	974.93	501.05	367912
2009	531.58	180.25	1079.92	448.22	431262
2010	616.51	176.07	1442.95	612.45	521519
2011	609.96	206.39	1535.81	773.26	615606
2012	631.93	302.18	2020.14	858.03	724495
2013	594.92	270.77	2167.5	931.96	807623
2014	695.56	227.59	2386.98	973.95	921773
2015	788.73	209.02	2388.47	1009.32	1029010
2016	812.22	238.51	2450.74	1006.65	1167156
2017	811.41	284.06	2607.66	1100.03	1329095
2018	847.69	301.25	2813.75	1178.22	1492156
2019	862.93	339.4	2937.76	1180.16	1617143
2020	812.33	352.46	2735.09	1140.63	1636781
2021	862.68	391.77	2789.62	1264.29	1957583

Source: Statistical Outline Gujarat State (2023)

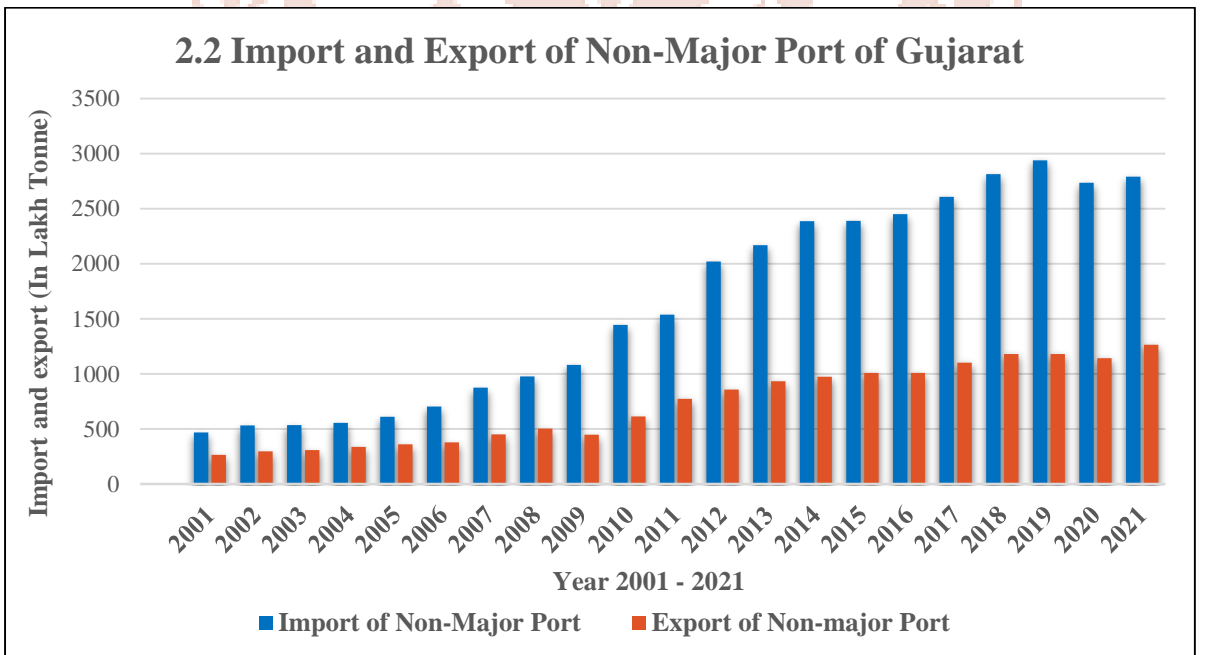
The data shows a steady increase in cargo handling at Gujarat's ports alongside the state's rising Gross State Domestic Product (GSDP). Non-major ports dominate imports and exports, significantly surpassing Kandla Port's volumes. Cargo handling increased significantly between 2001 and 2021, while imports from non-major ports nearly doubled during that time. From ₹1.23 lakh crore in 2001 to ₹19.57 lakh crore in 2021, the GSDP likewise increased significantly. The correlation indicates that Gujarat's port activities and economic growth are closely related, highlighting the vital role that maritime trade plays in the state's development.

2.1 Import and Export of Major Port of Kandala



The graph shows Kandla Port's import and export trends between 2001 and 2021. From 281.03 million tonnes in 2001 to 862.68 million tonnes in 2021, imports have grown steadily. From 47.87 million tonnes in 2001 to 391.77 million tons in 2021, exports have also increased dramatically. Notably, following 2010, the export volumes increased quickly, indicating Kandla's growing significance in India's maritime industry. The port's expanding capacity and vital role in Gujarat's and India's commercial economy are demonstrated by the consistent increase in cargo handling.

2.2 Import and Export of Non-Major Port of Gujarat



The data, which shows a significant increase in both imports and exports, shows cargo activity at Gujarat's ports between 2001 and 2021. While exports increased from 47.87 to 391.77 million tonnes, Kandla Port's imports increased from 281.03 million tonnes in 2001 to 862.68 million tonnes in 2021. With imports rising from 467.87 million tonnes in 2001 to 2789.62 million tonnes in 2021 and exports rising from 263.93 to 1264.29 million tonnes, non-major ports handled significantly larger volumes of cargo. Gujarat's growing maritime infrastructure is demonstrated by the notable increase in non-major port trade. Non-major ports have continuously outpaced Kandla Port in handling cargo throughout the years, demonstrating their increasing importance in the state's commerce sector. Gujarat's robust economy is demonstrated by the consistent increase in import and export activity at these ports.

Data Analysis:

In this research paper, statistical data for the Gross State Domestic Product (GSDP), along with import and export activities at the major port Kandla and non-major ports, spanning the period from 2001 to 2021, is analysed using SPSS software. Descriptive statistics, including measures such as range, minimum, maximum, and mean, are employed to interpret the gathered information.

Descriptive Statistics:

3. Descriptive Statistics					
Export and Import	N	Range	Minimum	Maximum	Mean
Import Major Port of Kandla (In Lakh Tonnes)	21	581.90	281.03	862.93	580.2643
Export Major Port of Kandla (In Lakh Tonnes)	21	343.90	47.87	391.77	204.3386
Export Non-Major Port (In Lakh Tonnes)	21	1000.36	263.93	1264.29	731.8343
Import Non-Major Port (In Lakh Tonnes)	21	2469.89	467.87	2937.76	1648.0690
GSDP of Gujarat (In Crore)	21	1834010.00	123573.00	1957583.00	767304.1905

Import Major Port of Kandla:

The above table has analysed the import major port of Kandla from 2001 to 2021. The data ranges from 281.03 to 862.93 lakh tonnes. It can be seen here that the minimum value of import is 281.03 lakh tonnes, which is from the year 2001. The maximum value is 862.93 which is

from the year 2019. In the above table the value of mean is 580.2643 which shows that major port Kandla has imported 580.2643 lakh tonnes in the last 21 years.

Export Major Port of Kandla:

The above table has analysed the export major port of Kandla from 2001 to 2021. The data ranges from 47.87 to 391.77 lakh tonnes. It can be seen here that the minimum value of export is 47.87 lakh tonnes, which is from the year 2001. The maximum value is 391.77 which is from the year 2021. In the above table the value of mean is 204.3386 which shows that major port Kandla has exported 204.3386 lakh tonnes in the last 21 years.

Import Non-Major Port:

The above table has analysed the import no-major port from 2001 to 2021 The data for imports through the non-major port ranges from 467.87 to 2937.76 lakh tonnes. It can be seen here that the minimum value of import is 467.87 lakh tonnes, which is from the year 2001. The maximum value is 2937.76 which is from the year 2019. In the above table the value of mean is 1648.0690 which shows that no-major port has imported 1648.0690 lakh tonnes in the last 21 years.

Export Non-Major Port:

The above table has analysed the export no-major port from 2001 to 2021. The data ranges from 263.93 to 1264.29 lakh tonnes. It can be seen here that the minimum value of export is 263.93 lakh tonnes, which is from the year 2001. The maximum value is 1264.29 which is from the year 2021. In the above table the value of mean is 731.8343 which shows that no-major port has exported 731.8343 lakh tonnes in the last 21 years.

GSDP of Gujarat:

The above table has analysed the GSDP from 2001 to 2021. The Gross State Domestic Product (GSDP) data ranges from 123573.00 crore to 1957583.00 crore. It can be seen here that the minimum value of GSDP is 123573.00, which is from the year 2001. The maximum value is 1957583.00 crore which is from the year 2021. In the above table the value of mean is 767304.1905 crore which shows that GSDP 767304.1905 crore in the last 21 years.

Correlation Analysis and Result of Hypothesis Testing:

4. Correlation		GSDP of Gujarat (In Crore)
Import Major Port of Kandla (In Lakh Tonnes)	Pearson Correlation	.938**
	Sig. (2-tailed)	.000
	N	21
Export Major Port of Kandla	Pearson Correlation	.936**

(In Lakh Tonnes)	Sig. (2-tailed)	.000
	N	21
Import of Non-Major Port (In Lakh Tonnes)	Pearson Correlation	.950**
	Sig. (2-tailed)	.000
	N	21
Export of Non-Major Port (In Lakh Tonnes)	Pearson Correlation	.960**
	Sig. (2-tailed)	.000
	N	21

** . Correlation is significant at the 0.01 level (2-tailed).

Correlation between GSDP of Gujarat and Import Non-Major Port:

Pearson Correlation: .950**

Significance (2-tailed): .000

Interpretation: There is a very strong positive correlation of .950** between the Gross State Domestic Product (GSDP) of Gujarat and the amount of goods imported through the Non-Major Port of Kandla. This suggests that as the GSDP of Gujarat increases, there tends to be an increase in the amount of goods imported through the Non-Major Port of Kandla.

Ho: “There’s no significant linear correlation between import of non-major port and GSDP.”

In the above table the value of significance is 0.00 which is less than 0.05. So H₀ is rejected. That is there is a correlation between two variables.

Correlation between GSDP of Gujarat and Export Non-Major:

Pearson Correlation: .960

Significance (2-tailed): .000

Interpretation: There is a very strong positive correlation of .960 between the Gross State Domestic Product (GSDP) of Gujarat and the amount of goods exported through the Non-Major Port. This suggests that as the GSDP of Gujarat increases, there tends to be an increase in the amount of goods exported through the Non-Major Port.

Ho: “There’s no significant linear correlation between the export of non-major port and GSDP.”

In the above table the value of significance is 0.00 which is less than 0.05. So H₀ is rejected. That is there is a correlation between two variables.

Correlation between GSDP of Gujarat and Export Major Port of Kandla:

Pearson Correlation: .936

Significance (2-tailed): .000

Interpretation: There is a very strong positive correlation of .936** between the Gross State Domestic Product (GSDP) of Gujarat and the amount of goods exported through the Major

Port of Kandla. This suggests that as the GSDP of Gujarat increases, there tends to be an increase in the amount of goods exported through the Major Port of Kandla.

Ho: “There’s no significant linear correlation between the export of major port of Kandla and GSDP.”

In the above table the value of significance is 0.00 which is less than 0.05. So H₀ is rejected.

That is there is a correlation between two variables.

Correlation between GSDP of Gujarat and Import Major Port of Kandla:

Pearson Correlation: .938

Significance (2-tailed): .000

Interpretation: There is a very strong positive correlation of .938** between the Gross State Domestic Product (GSDP) of Gujarat and the amount of goods imported through the Major Port of Kandla. This suggests that as the GSDP of Gujarat increases, there tends to be an increase in the amount of goods imported through the Major Port of Kandla.

Ho: “There’s no significant linear correlation between the import of major port of Kandla and GSDP.”

In the above table the value of significance is 0.00 which is less than 0.05. So H₀ is rejected.

That is there is a correlation between two variables.

Conclusion:

Gujarat stands as a maritime hub, contributing significantly to India's trade and economic activities. The state's economic environment has been significantly shaped by continuing port development projects. A master plan for the National Master Plans, extending until 2047 is to be prepared with an aim to streamline operations, minimize risks, and ensure competitiveness in the dynamic global trade scenario. Hence it can be said that ‘port development has a positive effect on the economic development of Gujarat’.

In conclusion, the economic aspects of port development in Gujarat showcase a compelling narrative of growth, progress, and strategic significance. The state's proactive approach in fostering a conducive environment for port infrastructure has not only stimulated local economies but has also positioned Gujarat as a crucial player in the global trade landscape. The research underscores the pivotal role played by Gujarat's ports in facilitating trade, enhancing connectivity, and attracting investments. The economic benefits derived from efficient port operations are evident in the increased employment opportunities, heightened industrial activity, and a boost to the overall Gross Domestic Product (GDP) of the region.

Furthermore, the state's focus on incorporating sustainable practices and technology into port development shows a forward-thinking attitude. This improves Gujarat's competitiveness in the global commercial arena and is also in line with international standards, which bodes well for the environment. But it's important to remember that there are obstacles

like legal barriers, infrastructure bottlenecks, and the requirement for constant adaption to new worldwide trends. In order to maintain and even accelerate the good economic trajectory observed following port expansion, it will be essential to address these difficulties. In the long run, other areas hoping to capitalize on the economic potential of maritime trade can learn a lot from Gujarat's port development success story. Ongoing research, policy improvement, and strategic investments will be essential to guaranteeing Gujarat's port sector's resilience and steady economic growth in the ever-changing global economy as the state develops into a maritime hub.

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