

HISTORY OF TRANSPORTATION OVER THE AGES IN METROPOLITAN CITY OF KOCHI

A project submitted in partial fulfilment of the requirements for the award of a B.A Degree
in History, St. Teresa's College (Autonomous) affiliated to Mahatma Gandhi
University, Kottayam.



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Angel Mary. P. V - AB20HIS017

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DEPARTMENT OF HISTORY

ST. TERESA'S COLLEGE (AUTONOMOUS)

ERNAKULAM

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CERTIFICATE

This is to verify that the project work entitled “**History of Transportation over the ages in metropolitan city of Kochi**” being submitted by HRITHI JOSEPH, ANGEL MARY P.V, ALGA P.P, DARSHANA PRASAD, SEETHU T.B in partial fulfillment of the requirements for the award of a B.A degree in History of St Teresas college (Autonomous), affiliated to Mahatma Gandhi University is a bonafide record of the work done by them under the supervision and guidance. No part of this work has been submitted elsewhere for the award of the degree.

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DECLARATION

We hereby declare that this project work entitled a study on ‘History of transportation over the ages in the metropolitan city of Kochi’ is an original work done by us under the supervision guidance of Dr Stancy S, Associate Professor, Department of History, St. Teresa’s College (Autonomous). No part of this work has been submitted elsewhere for the award of any degree.

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ACKNOWLEDGMENT

I wish to acknowledge all those who helped us to complete this project. I thank God almighty for guiding us in the right path and making all things possible. I take this opportunity to express our profound gratitude and deep regard to our guide Dr Stancy S, Assistant Professor, Dept. of History, St Teresa's College Ernakulam for her exemplary guidance, monitoring and constant encouragement throughout the course of the project. She has taken the pain to go through the project and make necessary corrections as and when needed.

I express my gratitude to our Head of the Department Smt. Vinitha T. Tharakan for her constant support and guidance. I also thank our class teacher Dr. Vinitha T Tharakan for her support and valuable suggestions. I also thank the staff of Kerala History Association, Ernakulam for permitting us to use their Library. I use this occasion to thank all our respondents for the valuable time they spent with us. I thank the staff of the Library of St.Teresa's college for their cooperation. Lastly, I extend my heartfelt thanks to our family and friends for their constant encouragement throughout the process of creating this project.

PLACE : ERNAKULAM

DATE :

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CHAPTER - 1

INTRODUCTION

The Kochi agglomeration was defined in 1998, with corporation of Cochin, municipalities of North Paravur, Aluva, Angamaly, Kalamassery and 11 adjoining villages. Kochi is a major port city on the Malabar coast of India bordering the Arabian sea.¹ It is the most densely populated city in Kerala. The current population of Kochi in 2023 is 3,406,000 making it the largest and the most populous metropolitan area in Kerala.²

The current metropolitan limit of Kochi include the main land Ernakulam, Fort Kochi, the suburbs of Edappally, Kalamassery, Aluva and Kakanad to the northeast, Tripunithura to the southeast and a group of Islands closely scattered in the Vembanad lake (Willingdon, Vypin) . Kochi is tagged as the ‘queen of Arabian sea’, the city is also the commercial capital of the state, thus becoming a popular commercial and trading hub. At present, Kochi is on the move, with the addition of wider highways, bridges, Flyovers, boat services, airports and the latest milestone in the growth story of Kochi is the metro. However these developments in transportation stimulates the easier mobilization of the people in Kochi.³ The project is divided into five chapters. First chapter gives the introduction to the project topic, explaining the basic terms, describing the objectives, and methodology used for this project. Second chapter gives a historical background of transportation and its developments over the ages in Kochi. The topic is classified under respective headings such as roads, highways, bridges, boat services and airport in Kochi. The Third chapter deals with a detailed analysis of the development of means of transportation in Kochi based on the data collected from respondents. The Fourth and final chapters exhibit the findings and conclusions drawn from this project.

¹ https://en.m.wikipedia.org/wiki/Kochi_metropolitan_area#:~:text=The%20Kochi%20metropolitan%20area%20or,populous%20metropolitan%20area%20in%20Kerala.

²

<https://www.macrotrends.net/cities/21305/cochin/population#:~:text=The%20current%20metro%20area%20population,a%203.6%25%20increase%20from%202020.>

³ https://en.m.wikipedia.org/wiki/Kochi_metropolitan_area#:~:text=The%20area%20constituted%20on%20the,North%20Paravur%20Perumbavoor%20and%20Angamali.

REVIEW OF LITERATURE

The idea of Kochi is changing over time. Today's Kochi is entirely different from the Kochi hundred years ago. In this dissertation, the term "Kochi" refers to the urban part of the town. Transportation plays significant role in the lives of the people in Kochi. Oxford dictionary defines transportation as a system for carrying people or goods from one place to another using vehicle, roads etc. There are different means of transportation that people make use of. It includes air, water, roads, railways etc.

Another term is "metropolitan city". The Census Commission of India defines metropolitan city as those Indian cities having a population of more than four million.⁴The current metropolitan limit of Kochi include the main land Ernakulam, Fort Kochi, the suburbs of Edappally, Kalamassery, Aluva and Kakanad to the northeast, Tripunithura to the southeast and a group of Islands closely scattered in the Vembanad lake (Willingdon, Vypin)⁶.

Books, memorials, newspaper articles, oral history collected from natives, common knowledge etc were helpful in tracking the historical background and development of transportation in Kochi.

OBJECTIVES

- To study the development of transportation infrastructure of Kochi with special focus on Road, Water and Air transport.
- To understand the evolution of Roads, Bridges, Airways and water Transportation in the city of Kochi.
- To analyse how far these developments have influenced the daily life of the people in Kochi.
- To study about the changes that took place in each of the sectors; Roadways, Waterways and Airways on the basis of its own innovations.

⁴ Census Commission of India report

⁶

https://en.m.wikipedia.org/wiki/Kochi_metropolitan_area#:~:text=The%20area%20constituted%20on%20the,North%20Paravur%2C%20Perumbavoor%20and%20Angamali.

METHODOLOGIES

Various research methodologies have been undertaken for this project. This project contains data obtained from objective sources like surveys, oral history, gazetteers etc. Hence this is a quantitative research. Primary data used for this research includes the following; Survey with a sample size of 3 respondents belonging to various age groups from various places in Kochi. Questions were framed in various forms such as MCQ's, short answer type and descriptive type. Survey was conducted using a mix of methods including survey in person, survey through the online medium (with the help of Google forms). Official records such as gazetteers were accessed. Subjects of the survey comprised of mostly residents of Kochi who depend on the city's transportation services.

Focus was given to old residents of the city who could give information regarding the origin and development of the transportation infrastructure in Kochi. Secondary data used in this project includes; books available in various local libraries, newspapers records various newspaper article links etc. Many of the books used in this project were availed from online databases. Content from early research papers were also utilized. Websites of prominent newspapers of the city proved to be helpful. The documents from the regional archives were also referred.

CHAPTER-2

HISTORICAL BACKGROUND

WATER TRANSPORT

The district of Ernakulam is abundant in natural beauty, with backwaters, big rivers, and streams. All of the canals aid in efficient transportation. They were also put to good use for industrial and commercial development facilities. The Periyar River flooded its banks into Kochi in the fourteenth century. The only means of transportation in Kerala's rivers were the boats. To get to the town on the backwaters, people used to spend hours travelling by rowboat and boat that was bound with mats.

BACKWATER TRANSPORTATION

⁵ Boats of different sizes and cargo boats were always available at Kochi backwaters. Ferries were used to link the smaller island regions. Boats were constructed in a variety of forms and sizes. The two-headed floating sloops were seagoing vessels used for fisheries. The small public boat, the bait boat, the Valavaravanchi, the tent boat used by the wealthy, and the grandiose style of whaleboat used by the nobility were all common sights in the backwaters. The vessels were referred to as kettuvallams. Kevuvalams travelling to Duradikkali were also present. These were employed for both passenger and cargo transportation. Ample passenger vessels drawn by 6 to 16 poles were also available. Between four and five kilometers per hour were travelled with it's support. Just 10 or 12 hours were sufficient for the same. By the 19th century, steam boats had taken over the Ernakulam-Kochi ferry routes.

Company ships called Pathemaris transported both people and merchandise. These Pathemaris provided connectivity to places like Kochi Port, Alappuzha, Kollam, etc. They had roofs with nagam coating. They used to work by tying a mat to a tree and passing a stick through the streams.

With time, the watercraft evolved into steamboats. They moved via Kochi's backwaters. The steamboat's first trip was from Ernakulam to Cochin. These boats were powered by water and firewood. These boats were crawling even though they were automated. As crude oil became more prevalent, use of engines became obsolete. The field of water transportation underwent several modifications because of this.

⁵ ERNAKULAM District Directory -1984

Boat building and associated developments in Kochi have been made possible by immigrants. The majority of them were of Portuguese, Dutch and Jewish descent. It was made possible by the Cochin harbor. Even today, the city is populated by boat-building specialists. They are related to the Portuguese biologically. Motorboat transportation services were launched in Ernakulam under the leadership of prominent industrialist S. Koder and his business.

The district saw a rise in activity in the realm of mechanical water transport in the 1940s. Two vessels were servicing through Cheripilly jetty near paravur. The Ernakulam district directory editor, PA Abdul Rahman Kutti and his siblings carried out this. When the bridge was finished, the ferry came to a halt. Along with this, the Ernakulam Cheripilli ferry service was terminated. Alappuzha, Kollam, Kottayam, Changanassery, etc. could be reached directly from Ernakulam. From 1925 to 1940, this occurred. Prior to the 1961 opening of the Arur bridge, passengers going from Ernakulam to the southern districts had to spend the entire night on a boat to get there.

The Kerala backwaters are a labyrinthine system made up of more than 900 kilometers (560 mi) of waterways that are connected by interconnected canals, rivers, and inlets and run parallel to Kerala state's Malabar Coast, which is the Arabian Sea coast.

/ The second-largest metropolis along India's western coastline, after Mumbai, is Kochi, the capital of the south Indian state of Kerala. Kochi is less susceptible to storm surges or cyclones than towns on the country's eastern coast because of its position on the lower west coast of the Indian peninsula. The city is located within a sophisticated estuarine system that includes Lake Vembanad and the numerous rivers that run into it, including the Periyar and Muvattupuzha rivers. 51 Over 1,100km of waterways are accessible in Kochi, making it a city rich in waterways. The Inland Waterways Authority of India (IWAI) rules require a minimum depth of 2 meters for motor boat operations, so only 40 km of these are thought to be motor boat navigable. Water transportation in Kochi is run by the State Water Transport Department (SWTD).

In Kochi, roads designed for wheeled traffic are a relatively recent development. Backwaters and rivers in the Taluks of Kanaynnur-Cochin, Cranganur, and portions of Mukundapuram and Trichur are admirably served, and these played a significant role in the early development of the nation by providing a quick and affordable way to transport the produce of the interior to the ports of Coghin, Cranganur, and Chetva.

The main canal is the one that extends from the State of Trichur's southern border, a distance of nearly 60 miles, while numerous branches, with an aggregate length of more than 60 miles,

stretch out to the interior, primarily in the direction of the east. Only during the rainy season can vessels travel the Ponnani and Karuvannur rivers, whereas the Alwaye and Chalakudi rivers are navigable for nearly 60 and 30 miles annually, respectively. For nearly three centuries, Kochi was able to dominate commerce with the Portuguese and the Dutch along the Malabar coast because of these water communications.

BOATS

⁶Sankara Variyar and Sankunni Menon's regimes saw a significant improvement in the waterways in Kochi. Tripunittura was easily accessible from Ernakulam thanks to the construction of the canal from Tevara to Kundannur, and boat traffic between South Cochin and Edattirutti was made feasible owing to the deepening of the Edattirutti canal and the construction of the Aranattukara canal. A boat was present during Sankunni Menon's tenure all year. The Chirkkal canal and a channel were built in the Trichur lake, greatly reducing the distance from the waterway to Trichur. In order to keep the waterways in good shape and to ensure that their utility was unaffected, he had also kept a steam dredger at work in the back waters. Since his time, not much has been done to improve the waterways and in recent years, particularly after the advent of the railway, they have received a great deal of neglect. Boats frequently become trapped in shallow areas during low tide as a result of this. The significance and utility of the backwaters have been greatly diminished by the railway, but they are still very much a viable communication option.

FERRIES

For the convenience of travelers who must traverse backwaters and rivers, the Darbar maintains close to 100 ferries. They are farmed out to contractors, who are required to use boats of the specified type and charge costs at set rates. Steam launches are used for the ferry between Ernakulam and Mattancheri, but regular open canoes are used to transport passengers over. However, these conveyances are only available at the ferries connecting metalled roads. Cattle are transported in changadams or railed platforms. By mutual consent, the District Board of Malabar and the Darbar each handle a portion of the frontier ferries that run between Cochin

⁶ The Cochin State Manual – C Achyutha Menon

and Malabar. The Darbar pays the latter a majority of the ferries' receipts, and the former pays the latter a majority of the ferries' receipts. Cochin and Travancore's earnings are divided equally between the two States, but moieties are not traded. An average of Rs 20,000 is received annually from boats.

DECLINE OF PRIVATE SERVICES

⁷ The introduction of motor transportation brought rivalry to the industry. There was a very low fee for the ferry services. This made many private services unable to compete with vehicle transportation. The Kerala government and commercial sectors came together to create the Water Transport Corporation in this setting. This company was also quickly liquidated because of losses. The government created the State Water Transport department despite suffering losses because it was impossible to fully stop the water transportation industry. The term Travancore-Cochin Transport was changed from Travancore State Transport in 1948. As a result, vehicles for transportation began traveling to Kochi. All of the government-owned boat transportation companies in Kochi's backwaters are operating at a significant loss.

PRIVATE SECTOR

The Irrigation Wing of the State Public Works Department oversees private watercraft services. This department approves them, chooses the path, and makes other decisions. In addition to this, there are private boat services that link a few areas that are under the control of the Cochin Port trust. Port Trust assumes the responsibility of granting these and other licenses. The Public Works and Canal Assistant Engineer Near Ernakulam Boat Jetty is in charge of overseeing the complete work of the district's irrigation department. The present boss is Mrs. K.J. Baby. Underneath her are four waterway sub-offices.

Kondoor – Paravur

Kondoor – Kottapuram

Njarakkal- Eloor Karthedam

Chathanaadu – Ernakulam

Arukutti – Ernakulam

⁷ Ernakulam District Directory -1984

Chettibaagham – Ernakulam

Mulavukad – Ernakulam

Private watercraft services are available throughout these regions. Karthatam-Ernakulam and Kundur-Kottapuram paths are currently not in operation. One boat will be accessible between the points of Kannur and Paravur, Njarakkal and Elur, Arukutty and Mundampally, and Mulavukad and Ernakulam. On the Arukutty-Ernakulam route and the Chathanad-Ernakulam route, four boats are routinely operating. The path between Ernakulam and Chettibagh has nine boats. The following jetties are used for this service: Highcourt, Ponnimangalam, Mulavukad Panchayat, Mulavukad North, Vaduthala, Chitter, Ulamapilli, Paya Chennur, Kandanad Cheranallur, and Varapuzha.

COCHIN CORPORATION

Fortkochi - Vypin and Ernakulam-Vypin are connected by Cochin Corporation's boat-jankar services. In Fortkochi, Vypin, and Ernakulam, the Jangar Jetty and Boat Jetty are under the control of the Corporation. The State Water Transport Department's boat service is utilized daily by about 4000 individuals. There is a delivery service as well. 3,000,000 is the average monthly wage.

KSRTC

In the area of water transportation, Kerala State Transport Corporation plays a significant part. There are a total of 12 boats in the ferry operation. In 1957, the initial boat was constructed. Other women include Ashwathi, Gayathri, Jalaja, Ashwini, Karthika Nirmalyam, Kaveri, Kerala Kumari, Ganga, Komalakumari, Olympia, Kairali Tarangini, and Gayathri. There were 340 journeys per day from Ernakulam to Panambukadu-Terminus, Mattanchery – Terminus, Fortkochi, Willington Island, and Vypin. This is used by almost 25000 individuals. A 1500 km region is covered by this. The company ferry is experiencing a loss, just like other ferries. The service is available between 5:30 in the morning and 11:00 at night. Thevara Perumannur is home to K.S.R.T.C's own boatyard. There are about 40 employees. Here, all of the Corporation's vessels are constructed. A total of 3,000 people work for the corporation.

Double-decker boats used to travel the Mattancherry-Eranakulam path in the beginning. These had two engines attached to them, and as Kochi's harbor expanded and the tide's strength rose, the double deckers were withdrawn. That piece of art in the current style was published by Gayatri. During India's first nationalization process after gaining independence, boat services were transferred from the commercial sector to the state government. The Mattancheri Ernakulam ferry was nationalized and maintained by the Kochi administration in the month of December 1947. Ferry services were integrated into the K S R T C as of April 1, 1965. The Edakochi Aroor ferry service was also operational during this time, prior to the building of the Edakochi Aroor bridge.

The Edakochi Aroor ferry service was the only mode of transportation along the west coast to link Kochi with the state capital and the Vadakan districts, and only rafts were used to transport vehicles. The service is no longer required there since the Arur bridge has been completed (the bridge's opening was depicted as Arur and Edakochi getting married). That increased the significance of the Mattanchery Ernakulam route. Ferry services in Kochi Bay are vital as long as Kochi Port is present. The ferry service will have those added features once the Vendurutty Bridge is no longer helpful to the general public. A proposal for KSRTC to operate boat service from Thoppumpady was made in response to the traffic congestion at Vendurutty Bridge and Palluruthy Bridge. Even now, the Ernakulam shore's jetty facilities are completely insufficient to meet both the requirements of the present and the growing demand for ferry service.

KINCO

Kerala Inland Navigation Corporation, also known as KINCO is a wholly owned subsidiary of the Kerala government that was established in 1975 for the development of water transportation. Its primary goal is to maximize the growth of public transportation and travel options via Kerala's inland waterways and canals. In addition to operating passenger vessels, F. A. C. T Delivering the raw materials needed by other factories from Kochi port to the factories is another task that the company is responsible for. 8 barges and 9 passenger boats are owned by the company. Each year, the Corporation can move 25 lakh passengers and 1.50 lakh tonnes of raw goods.

WATER METRO PROJECT

⁸After the debut of the first of the 23 battery-powered electric boats being produced by Cochin Shipyard Limited, named “Miseries,” in December 2021, Kochi became the first city in India to have a water metro project. This launch is a component of the Rs 747 billion initiative run by Kochi Water Metro Ltd. (KWML). Transport by train or by road uses more energy than transport by water does. In addition to easing entry to business districts on the mainland for metropolitan households located along the Kochi lakeshore, the project is anticipated to lessen pollution and traffic congestion in the city. The Kochi water metro project calls for the development of 15 routes, which would link 10 islands over a network of 78 km of routes, using a fleet of 78 fast, electrically-propelled hybrid ferries that would service 38 jetties. The water subway is anticipated to provide benefits to over 100,000 island residents. Through commercial real estate growth and tourism-based initiatives, it is envisioned to be a socially inclusive transportation system rather than just a transportation service. The Kochi Water Metro Project aims to boost ridership by introducing new, energy-efficient, environmentally responsible, and safe boats with minimal wake and draft characteristics frequently.

The water transportation system planned for Kochi places an emphasis on more than just ferry services as a means of getting around town; it also includes a comprehensive plan for the areas that will be connected to the city by waterways and will incorporate the waterway system into the city’s overall public transportation network.

Along with improving ferry service, the project aims to improve access to the jetties and to the islands as a whole, ensure the safety and security of all users by maintaining active, well-lit streets, encourage the use of small occupancy feeder modes to reach the jetties, and encourage property development near the jetties. The Kochi Water Metro project has a total cost of 819 crores and the majority of it is financed through Indo-German Financial Cooperation with a long-term loan agreement of 85 million euros (or 579 crore Indian rupees) with German funding agency, KfW (Kreditanstalt für Wiederaufbau). The project intends to use the inland waterways in and around Kochi, the majority of which are National Waterways (NW3), which account for 40% of the waterways, Cochin Port Trust Waters, which account for 33%, existing pathways used for irrigation, which account for 20%, and other inland waters, which account

⁸ <https://currentaffairs.adda247.com/water-metro-project/>

for 7%. The proposed Water Metro Project includes fifteen (15) routes that have been found, linking thirtyeight (38) jetties located in ten (10) island communities and two boatyards. 76.2 line kilo meters is the total length of the lines on these 15 paths. The minimum water depth in channels is (-2 to -2.50m CD). The approaches from the navigational channel to the terminal area make up the majority of the dredging because the majority of the waterways are already in use. An estimated 0.65 million cubic meters of material will be dug up overall. As part of this project, 15 routes are proposed. In the sketch below, these are emphasized. During peak hours, different paths' headways must range from 10 to 20 minutes. All along the paths, there will be night navigational aids and navigational buoys. This undertaking includes management of water weeds and floating trash.

ROADS

Waterways were a major means of transportation for people in prehistoric days. Ancient man relied solely on rivers, seas, and other bodies of water for the exchange of goods and other necessities. Through the use of water, they traveled thousands of kilometers to reach each distant location. This resulted in the spread of culture, different customs, and so on. Narrow paths were the only form of reliance in those days because there were no waterways to cross mountainous areas. Land transport developed over time alongside water transport. Better transportation methods, roads, and railroads came into existence as human civilization progressed. Road transportation is one of the main modes of transportation. The timeline of modern modes of transportation begins in the 19th century. Traders and foreign visitors used the cart roads and pathways to move through the mountainous areas at the same time. Tomojans and palanquins, two primitive modes of transportation, were used for ground travel. Due to a lack of established transportation, there was no cart activity in the area. Only horses or palanquins were used for transportation by the elite class and feudal landowners. On rough roadways, bullocks and donkeys were used to haul cargo. There were no roads in Kochi that were appropriate for wheeled transportation until the middle of the 20th century.⁹In Kochi, Diwan Shankara Variyer was a pioneer in the construction of roads. He oversaw the construction of the majority of the current primary roads, bridges, and culverts. Although they followed their judgment and made it suitable for wheeled traffic, there was still much space for improvement in terms of drainage and metalling. By the time Diwan Sankunni Menon left

⁹ A memoir of transportation in Travancore and Kochi, A Wilfred

his position, Kochi was covered in a network of roads that were in excellent shape. These flaws were greatly corrected, and several branch roads were built.¹⁰

CHITTOOR ROAD

One of the main thoroughfares in Kochi, India, is Chittoor Road. The route that links Ernakulam south and Chittoor, an island in Ernakulam north is the city's oldest arterial road. The road travels 8.2 kilometers in a north-south path parallel to the coast. (5.1 mi). Since the road terminates in front of the temple's main gate, Chittoor Temple was the inspiration for the road's name. The Chittoor Road was the oldest road in Ernakulam municipality. Prior to the advent of the Dutch in Kochi, the road is said to have been built in the middle of the 1620s. The route was built to make it easier for Kochi Maharaja to travel to the Chittoor temple on his yearly pilgrimage from the mainland. However, according to popular folklore, during the Dutch siege of Fort Kochi, a bomb shell severely injured King Veera Kerala Varma II's leg. For the royal family's protection, he was quickly transferred to Ernakulam Palace. After receiving extensive care, he was able to move, but he was unable to fully recover. A doctor from Chittoor Island visited the King at this time and offered him an oil for routine massage. The king considered giving the claims of the mysterious doctor a try even though he didn't trust them. The king was able to move easily a few months after the oil was applied. He made the decision to dispatch soldiers to Chittoor Island to find the doctor and bring him to the Palace. However, the search teams' efforts were in vain, so the king himself descended to ask for the public's assistance in finding the missing doctor. Later, it was discovered that the person who had come to relieve the king's suffering in disguise was none other than the ruler of Chittoor (Chittoorappan). The King rebuilt the sanctuary after becoming a devoted follower of the Lord. The King also made the decision to visit the sanctuary on an annual basis. However, the lack of road connectivity was the primary hindrance to getting to the island. Back then, the only way to get to this island was by ferry. King and his retinue found it challenging to walk a considerable distance once they arrived on the island because the temple was situated somewhere in the center of the sizable island. The lack of a road had an adverse effect on the

¹⁰ Cochin State Manual, C Achyutha Menon

supplies of the materials required for reconstruction. In addition, the royal family considered the need for a road to ensure their safety in the event of a Dutch assault and attack. These factors led to the creation of a stone-paved path connecting Valanjambalam with the Chittoor temple. The road's construction began in 1617 and finished in 1622. The King's carriage was intended to use the initial stone-paved road only for travel. Over Chittoor Lake, an iron bridge connecting the shore and the island, was built. The road came to a stop at a fork just before the temple's West Gate. Midway through the 18th century, as the Travancore Army strengthened Pallipuram Fort, the route once more came to light. Maharaja Rajrishi Rama Varma built a modern road in 1910 to link North Ernakulam residents with other important areas of the city. Before MG Road took over, this road served as the town's primary thoroughfare up until the 1940s.¹¹

SAHODARAN AYYAPPAN ROAD

Sahodaran Ayyappan Road, popularly known as S.A Road is one of the most important and the second main arterial road of CBD Kochi city (after the M.G Road); it is supposed to be the busiest and most congested road in the city of Kochi, which run in east-west direction and the shortest road connecting the two main iconic junctions in the city. The road is known as Kochi's "backbone road" because it links the MG Road in the west with Vyttila Junction & Hub in the east. Chittoor Road then continues as Tripunithura Road, which connects to Tripunithura. The Kochi Metro Rail connects S.A. Road and M.G. Road, two major arterial roadways in the CBD, and they both lead directly to Vytilla Hub. Tripunithura Road, formerly known as S.A. Road, was constructed by the Kochi Royal Maramattu (PWD) Department in 1863, when the seat of the Kochi Kingdom was moved to Tripunithura. The route was built to make it easier for the King to travel to Ernakulam every year to attend the Annual Durbar at the Durbar Hall. The initial route came to an end at Chittoor Road close to Valanjambalam, where it connected to the Durbar Hall Grounds. Later, when the British built in 1926, it was expanded to MG Road. When Foreshore Road opened in 1988, a linking road from MG Road was constructed. The section from Foreshore Road to Vyttila was renamed S.A. Road in 1962 because it is under the Corporation of Cochin's jurisdiction while the remainder was under Thrippunithura municipality. The only cars on the initial road were those owned by the royal family, so it only

¹¹ https://en.m.wikipedia.org/wiki/Chittoor_Road

had one lane. The road was repaved in 1936 with two lanes of traffic, which it still has today. As the city expanded, numerous businesses opened along this section, increasing traffic. Additionally, the development of the residential neighborhoods of Panampally Nagar, Giri Nagar, and Kadavanthra as well as the expansion of Vyttila Junction made the road extremely congested with heavy traffic. Since there was less land available on both sides, acquiring property became very challenging. The Corporation of Cochin made the decision to proceed with forced land acquisitions in 2000, which allowed for the reconstruction of some of the 4lane road from South Overbridge to Vyttila.¹²

MAHATHMA GANDHI ROAD

Mahatma Gandhi Road, also referred to as M. G. Road, is the major thoroughfare and the city's main commercial thoroughfare in Kochi, Kerala, India. The road's limits, which are the Venduruthy bridge, Thevara in the south, and the Madhava Pharmacy Junction, where it meets the Banerji Road in the north, are where it runs north-south. The road was subsequently given to Kochi Municipal Corporation after previously being a part of NH 47A (Old Highway). Previously, the route was known as Seventy Feet route. The route is 4.5 kilometers long overall. (2.8 mi). The current Kochi metropolis was a princely state of British India during the time of the British Raj. Chittoor route, constructed by the Kochi Rajas and linking South Railway Station to Chittoor Temple, is the city's oldest arterial route. The British district of Kochi, Fort Kochi, and the southern portion of the city are not connected by this road. Another important route connecting to the south was needed, according to the British resident Sir Robert Bristow, the Chief Engineer who designed the new port of Kochi, revealed his intentions to build a new island between the Ernakulam Mainland and Fort Kochi Island in the year 1920 and move the current port there. For the transportation of materials and future cargo needs,¹³ he saw the urgent need for a new road linking the mainland and the new port island. Consort Queen Neythar Amma Parukutty donated land for the new road's construction after the plans were completed and work began in 1923. Since the new road was seventy feet wide, it was given the moniker Seventy Feet Road when it was made public in 1925. Through a bridge, the road linked to the recently formed port island of Willingdon, and close to Kacheripady, where the Central City offices of Kochi Kingdom were situated, it merged with Chittoor road.

¹² https://en.m.wikipedia.org/wiki/S.A_Road

¹³ [https://en.m.wikipedia.org/wiki/Mahatma_Gandhi_Road_\(Kochi\)](https://en.m.wikipedia.org/wiki/Mahatma_Gandhi_Road_(Kochi))

Since that time, this route has been crucial to the development of contemporary Kochi, as evidenced by the numerous landmarks that can be found along it. It is currently one of the state's most congested roads and one of the city's most significant commercial thoroughfares. In honor of the nation's founding father, Mahatma Gandhi, the route was renamed in 1972.¹⁴

SHANMUGHAM ROAD

R. K. Shanmugham Chetty, who served as the Diwan of the Kingdom of Kochi from 1931 to 1945, is honored by the moniker Shanmugham Road, a significant thoroughfare in Kochi, India. Alongside the Kochi Backwaters, it flows. It is a crowded, heavily commercialized city street that is dotted with shops and workplaces. The route initially followed the backwaters. Apartments and shopping centers are presently located on this strip of land. The road's northern terminus is High Court Junction, and its southern terminus is the Ernakulam Guest House close to Broadway. It continues further south as Park Avenue Road.¹⁵ During the middle of 20th century, there were a lot of fisherman cottages located on banks of backwater from Thevera to High court junction. Later during the period of Diwan Sir Shanmugham shetty, the fishermen cottages were shifted to Pachalam as part of uraban reformation in Kochi. This place was used to construct a road connecting High court junction and Park avenue and it was named as Shanmugham road as an honour to the Diwan.¹⁶

BANERJI ROAD

One of the main thoroughfares in Kochi, India's Kerala province, is Banerji Road. It is located east-west between Ernakulam North in the east and the High-Court Junction (Marine Drive) in the west. In close proximity to Ernakulam North train station, it crosses North Overbridge. It bears Sir A. R. Banerji's name.¹⁷ There once was a Punja Canal where Banerji Road is now. That trench was filled which gave shape to the present form of the Banerjee Road.¹⁸

¹⁴ <https://yometro.com/travel-guide/attraction-mg-road-kochi>

¹⁵ Swapnagal vilkkunna nagaram, Ravi Kuttikkad

¹⁶ https://en.m.wikipedia.org/wiki/S.A_Road

¹⁷ https://en.m.wikipedia.org/wiki/Banerji_Road

¹⁸ Cochin smaranika

KOCHI BYPASS

The Kochi Bypass is a section of National Highway 66 (NH66) that skirts Kochi's central business district in Kerala, India. The year 1973 saw the construction of this route. From Edapally in the Ernakulam District to Aroor in the Alappuzha District, via Palarivattom, Vyttila, Kundannoor, Madavana, and Kumbalam, the highway spans 17 km. In 1973, the Kerala government started the preliminary construction. It was only partly opened for traffic in the early 1980s after a slow process. From the outset, the section between Edapally and Vyttila had four lanes. By 2010, the remainder of the carriageway had also been upgraded, with various parts having 4 lanes, 5 lanes, and 6 lanes. The plan was to avoid the vehicle traffic leaving the downtown area. However, the city has since outgrown the bypass, which has resulted in excessive traffic in the suburbs. Currently, this street is Kochi's most significant arterial Stretch and Vyttila Mobility Hub are connected by the S.A. Road and Kaniyampuzha Road.¹⁹

SEAPORT-AIRPORT ROAD

A four-lane, 30 km (19 mi) roadway connecting Kochin Seaport and Kochin International Airport is planned as part of efforts to upgrade the city of Kochi. The Cochin Special Economic Zone is traversed by this highway, which links important industrial facilities like the HMT, FA Natural rubber modified bitumen (NRMB) is used to guarantee a smooth and long-lasting road. Stage I Between Kalamassery HMT and Karingachira Church in Tripunithura, the first section CT, and Kochi Refineries as well as the different oil terminals at Irumpanam. It also improves the movement of cargo traffic from the port and the airport. On this route is where the District Office is situated. This route serves as the beginning of the IT Expressway to Infopark. The 13-km road built in the first section serves as a bypass for the NH 47 inside the boundaries of Kochi. The road includes building a ROB (Railway Over Bridge) at Irumpanam yard and another ROB at CRL Junction. It was inaugurated in May 2003.

PHASE 2: Development of the 17 km (11 mi) (11 mi) (NH 47) stretch between HMT and the Cochin International Airport and up to Kariyad. Land acquisition for this segment is ongoing,

¹⁹ https://en.m.wikipedia.org/wiki/Kochi_Bypass

and work on the stretch between HMT and NAD is moving forward. The complete section of road between NH 47 (Kochi Bypass) Bypass (Kundanoor junction) and Cochin International Airport up to Kariyadu is being developed as a four-lane highway during Phase 3. A four-lane highway with a design speed of 100 km/hr has been suggested for the project. This road is anticipated to relieve pressure on NH 47 once all sections are complete, particularly where it takes a heavy vehicle more than an hour to travel from the airport to the Kochi port.²⁰

VYTILLA-KUNDANOOR FLYOVER

The Vytilla and Kundanoor flyovers are both being built at two of Kochi's major intersections, Vytilla and Kundanoor, which experience severe traffic congestion, particularly during peak hours. The flyovers were built at two of the region's congestion locations, Vytilla and Kundanoor. The Vadavucode -Puthenkurishu panchayat, which includes Trippunithura, and the nearby industrial regions, are connected to the city center by Vytilla. It links the city to the remote island stretches of Panangad, Kumbalam, and Nettoor.²¹ Vehicles entering the city from the Alappuzha district via Aroor also have a convenient route through the Kundanoor junction. The 717-meter-long Vytilla flyover began building in 2017, while the 750-meter-long Kundanoor flyover's construction began in 2017 December and was officially opened on January 9, 2021.²²

PALARIVATTOM FLYOVER

A recently constructed facility, the Palarivattom Flyover, is located at the Pipeline Junction of Kochi's National Highway 66 Bypass. Three years after it was first commissioned, the flyover was subsequently shut down in May 2019 due to structural cracks.²³ The reconstruction of the Palarivattom Flyover will be overseen by "the Delhi Metro Rail Corporation (DMRC) Principal Advisor E Sreedharan," according to Kerala Chief Minister Pinarayi Vijayan. Uralungal Labour Contract Cooperative Society (ULCCS) Ltd handles the reconstruction job. Piece of

²⁰ https://en.m.wikipedia.org/wiki/Seaport-Airport_Road

²¹ <https://en.m.wikipedia.org/wiki/Vytilla>

²² https://m.timesofindia.com/city/kochi/vytilla-kundanoor-flyover-works-enter-finalstage/amp_articleshow/79111120.cms

²³ https://en.m.wikipedia.org/wiki/Palarivattom_Flyover_Scam

writing from The News Minute. The first part of the flyover demolition was started on September 28, 2020. Rebuilding the four-lane Palarivattom overpass took a record-breaking five months and ten days. The flyover was inaugurated on March 7, 2021, by the PWD's chief engineer for the National Highways section.²⁴

BRIDGES

Prior to the building of bridges, backwaters and rivers were the primary means of inland transportation. Rich people sail on cabin boats, which are typically between 25 and 40 feet long and 4 to 5 feet wide. Rivers not only facilitate mobility between locations but also benefit the general populace financially. Since there were no streams leading to the mountain ranges, highways were built. The construction of new roadways results from the continued development of bridges spanning rivers and backwaters. British involvement in the construction of bridges in Ernakulam was significant. The Mattancherry Bridge, which links the mainland of Kochi with the Willington Islands, was the city's first bridge. Robert, a British engineer, constructed it.²⁵

GOSHREE BRIDGE

A network of bridges known as the Goshree Bridges connects Kochi's mainland side to the islands that are situated to the north of the backwaters. It also connects the western island of Vypin to the mainland and offers the necessary road access to the islands of Bolgatty and Vallarpadam. Between High Court and Pachalam, on Marine Drive's northern terminus, the bridges begin. The Goshree Islands Development Authority (GIDA), which was established by the Kerala government, is responsible for building the bridges. The revenues from the sale of reclaimed land close to the bridge were used to pay for the building. On December 29, 2000, the foundation stone was formally set. On December 29, 2003, the first section between Ernakulam and Bolgatty was inaugurated. Between Bolgatty and Vallarpadam, there existed. These bridges allowed for the opening of the International Container Transshipment Terminal. Also, it provides direct road access to the city for the northwest suburbs and the

²⁴ <https://www.newindianexpress.com/cities/kochi/2022/aug/24/palarivattom-flyover-govt-in-a-legal-battle-to-realise-rs-28-crore-2490715.html>

²⁵ Cochin state manual, C Achyutha Menon

Vypin island, which formerly relied on ferry services. Its construction was handled by Cherian Varkey Construction. The Malabar, Cochin, and North Paravur will be connected to the mainland by the new container road NH from Mulavukad ²⁶

MATTANCHERI BRIDGE

A bridge in Kochi, Kerala, India is called the Mattancherry Bridge. It links Willingdon Island to the Cochin mainland. British harbour engineer Sir Robert Bristow constructed it in 1940. The bridge's centre span is built with a spring mechanism that allows it to be raised. It is also referred to as the London bridge of Kochi since it resembles the British bridge construction in London. The bridge is Kerala's first Build-Operate-Transfer structure. The Greater Cochin Development Authority, Gammon India, and the Keralan government collaborated to build it. The bridge was put into service on April 13, 1943, and later became a component of NH47. Currently, only four- and two-wheel drive vehicles are permitted on the bridge.

MARTHANDA VARMA BRIDGE

Marthanda Varma Bridge is a bridge in Aluva, in Kochi city in Kerala, India. The bridge lies on the NH 47 Highway and connects the banks of the Periyar river in Aluva. This bridge was opened on 14 June 1940. Bridge across the Periyar river built in memory of His Highness Marthanda Varma Maharaja of Travancore, Marthanda Varma Ilayaraja submitted to the land. But the bridge was built by Chithirathirunal Balarama Varma. There is an insignia of the Travancore kingdom on the top of this Bridge. Historically, the bridge served as a connection route between nearby kingdoms. A new bridge was built parallel to the old bridge to increase the traffic capabilities to four lanes in 2002, and opened to the public on 23 June. The new bridge was opened to the public on 23 June 2002. ²⁷

IRUMBU PALAM

It is possible that Tripunithura's slender iron bridge (irumbu palam) is not an engineering wonder. But this 125-year-old building is unquestionably a historical site. It is one of the

²⁶ https://en.m.wikipedia.org/wiki/Goshree_bridges

²⁷

https://en.m.wikipedia.org/wiki/Marthanda_Varma_Bridge#:~:text=The%20bridge%20lies%20on%20the,Ilayaraja%20submitted%20to%20the%20land

country's older iron bridges that is still in use. According to history, the first cast iron bridge in the world was constructed in Coalbrookdale, Telford, in 1779, and it is still in use today, carrying walkers and small vehicles. Westwood and Baillie & Co., a Victorian engineering and building firm with headquarters in Cubitt Town, London, built the iron bridge at Tripunithura in 1890. Robert Baillie and Joseph Westwood founded Westwood, Baillie & Co in 1856.

MANGALAPUZHA BRIDGE

One of the most significant bridges on the National Highway 47 connecting Salem, Kochi, and Kanyakumari is the Mangalapuzha Bridge, which spans the right arm of the Periyar River close to Aluva Town. Its length is 491 feet overall, with two spans measuring 162 feet each and one span measuring 166 feet on the left end. This is the longest span yet used in Kerala for bow string girders. 24 feet is the clear width of the road. 500 tonnes of steel and about 1100 tonnes of cement were utilised in the project. The approximate overall cost of the construction was Rs 16 lakhs. ²⁸

CHERANALLUR BRIDGE

A backwater creek is crossed in Cheranallur by the Vaduthala-Edappilli road, which is a section of the projected road connecting Parur and Ernakulam. This crossing is crossed by the Cheranallur bridge. The bridge includes two 40-foot central spans and two 37-foot end spans. The roadway is 22 feet wide and 169 feet long overall. The bridge's TEE beam cum slab type superstructure is supported by RCC friction piles and is made of reinforced cement concrete. The construction's whole cost was around Rs. 2.30 lakhs, or roughly Rs. 1,415 per square foot. On December 18, 1960, the bridge was made a traffic-friendly area. ²⁹

SANKARACHARYA BRIDGE

The lone unbridged crossing along the road has been eliminated thanks to the completion of this bridge over the Periyar River in the 146th mile of the major Central Route, close to the location of Adi Sankar's birth. The bridge is 1.350 feet long overall, with 13 spans of 100 feet

²⁸ Kerela district gazetteers, Ernakulam by Sreedhara Menon

²⁹ Kerela district gazetteers, Ernakulam by Sreedhara Menon

each, two cantilever spans of 25 feet each, a roadway of 22 feet, and five footbaths on either side. The bridge was inaugurated on May 16, 1963³⁰.

AIRPORT

The Wellington Island was not far from Kochi's first airport, which was near to the Naval Base. Being a small airport, it was unable to meet the demands of the growing metropolis of Cochin. In response to the multilevel developments gaining momentum within the district, the then chief minister of Kerala, K. Karunakaran, decided to build a new airport with all modern amenities in the early 1990s.³¹ The airport, known as Cochin International Airport (IATA: COK, ICAO: VOIC), serves the city of Kochi in the Indian state of Kerala. The first airport of its sort to be built in India under a public-private partnership (PPP) model, Cochin International Airport is situated near Nedumbassery, some 25 kilometres (16 mi) northeast of the city Center. Over 10,000 non-resident Indians from 32 different countries provided funding for this project. It is the fourth-largest airport in South India and the busiest airport in the state of Kerala. As of 2019, 61.8% of all air travel in Kerala is handled by the Cochin International Airport. In terms of foreign traffic, it is India's third busiest airport, and ninth busiest overall. The airport handled more than 10.2 million passengers and 71,871 aircraft movements during the fiscal year 2018–19. With a total operating area of roughly 225,000 square metres, the airport has three passenger terminals and one cargo terminal (2,421,880 sq ft). With the opening of a specialised solar plant in 2015, Cochin International Airport became the first airport in the world to run entirely on solar energy. The Airport received the prestigious Champion of the Planet title in 2018, the highest environmental honour established by the United Nations, for its business initiative. Airports Council International named the airport The Best Airport in Asia-Pacific in 2020 (5 to 15 million passengers annually). When the Kingdom of Kochi first constructed an airfield on Willingdon Island in 1936, it was done so with the intention of using it to transport officials engaged in the construction of the Cochin Port. The airfield was turned into a military airport by the Kingdom of Cochin so that the Indian Navy could use it during World War II. During the time, the British were in charge of India. The Royal Navy selected it as a vital location for their Southern India headquarters as well as an air station, landing craft facility, and seaplane base. In order to foil potential Japanese air strikes, the military

³⁰ Kerala district gazetteers, Ernakulam by Sreedhara Menon

³¹ <https://ernakulam.nic.in/cochin-international-airport/#:~:text=The%20first%20airport%20in%20Kochi,close%20to%20the%20Wellington%20Island>

installation housed Naval fighter jets. Just two days prior to the start of World War Two, a tiny naval force established operations. The Indian Navy ran the airport when India attained dominion status and the Kingdom of Cochin merged with India, while it still allowed commercial aircraft to use the facility. The interests of expatriates working in the Middle East necessitated the development of international linkages to Kochi during the Gulf economic boom of the 1980s. It was chosen by the Royal Navy as a vital location for their airport.

EXPANSION

Phase 1

The airport's initial floor space was 18,580 m² (200,000 sq ft). CIAL planned its expansion in four stages over a 20-year period; the third phase was finished in 2009. Only 100 people at a time were expected to be handled by the original airport terminal. The need to renovate the terminal arose in 2001 due to an increase in international passenger traffic. Due to the completion of a separate domestic terminal, which moved all domestic operations there, the floor area for the international operations of the original building increased in 2002.

Phase 2

Due to an increase in the number of airlines using the airport, CIAL made the decision to build an exclusive domestic terminal. An airline centre complex measuring 81,000 sq ft was built on the western side of the terminal to house the administrative offices of the airline. The second phase also included an expansion of the freight terminal.

Phase 3

The third phase's construction began in 2007 with a goal of accommodating 5 million passenger movements yearly. The third phase required expanding the airside area to accommodate extra gates, waiting spaces, and shopping facilities, as well as putting the finishing touches on a central block that connected the domestic and international terminals. The international arrivals and departures blocks' airside areas were combined, and glass walls were put in place to let in more natural light. In 2008, the runway's surface was resurfaced. There are now 24 parking spaces instead of 15, three of which are reserved for cargo carriers. A second aircraft taxi-way to the MRO Facility and the expansion of the cargo town were also completed in the third phase.

Phase 4

The domestic terminal renovation, which has remained unfinished in the previous three phases, was initially intended for the fourth phase of the development. Nevertheless, after the New

UDF government assumed control of the state's administration in May 2011, the expansion plans were altered. According to the updated plans, a brand-new, cutting-edge international terminal is being built while the international terminal will undergo a significant makeover before being completely turned into a domestic terminal. According to the revised plans made public by the board of directors in September 2011, the new international Terminal would be built on the building's eastern flank. The new terminal would have a built-up area of 140,000 m² (1,500,000 sq ft), with departures and arrivals separated at various Levels. The new terminal will have all the newest features of the highest international standards, with an elevation that features Kerala temple architecture. The facility is being built by prominent construction company Larsen & Toubro and will be completed in 30 months. The two-level terminal will have space for 100 immigration counters, 3,716 square metres (40,000 square feet) of duty-free shops in the departure and arrival lounges, 19 boarding gates, 15 aerobridges, six baggage conveyor belts, and a fully covered alighting and boarding area. It will also have 112 check-in counters with in-line baggage screening facilities. The current domestic terminal would be transformed into the "Executive Pavilion," which would accommodate private planes and VIP flights. In addition to more parking spaces, the current international terminal will have 10 boarding gates and 5 aerobridges when it is converted to a domestic terminal. There were 3 Terminals³².

Terminal 1=Domestic

Terminal 2=Executive

Terminal 3=International

³²

https://en.m.wikipedia.org/wiki/Cochin_International_Airport#:~:text=The%20facility%20was%20formally%20inaugurated,CIAL%20on%201%20July%201999

CHAPTER -3

ANALYSIS AND INTERPRETATION

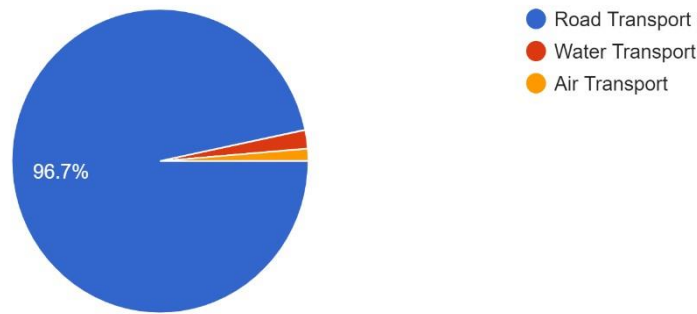
The purpose of analysis is to extract useful insights from collected data and summarize the completed observation in such a manner that they yield answers to the research questions. The purpose of interpretation is to ascertain or determine the meaning of the collected data by linking them to other available knowledge and earlier findings.

The data we procured from various primary and secondary sources had to be processed, organized, compiled and documented so as to draw valuable findings. Data regarding the transportation infrastructure in Kochi was collected from the general public primarily through interview method. The questionnaire approved by our faculty was presented to the subjects and varied responses were acquired. Our respondents comprised of individuals from varied sociocultural backgrounds from different parts of Kochi. The responses to the questions framed were also received from the public through google forms. The collected data was subjected to analysis and interpretation so as to deduct notable findings and reach valuable conclusions. The questionnaire was answered by 152 respondents through google forms. The questions covered the following aspects;

- Most used mode of transportation.
- Most convenient mode of transportation.
- Change in the choice of mode of transportation
- Mode of transportation used when travelling individually and as a family and while taking long distance travel.
- The cheapest and the most expensive mode of transportation.
- Public opinion on the existing modes of transportation and infrastructure.
- Time involved in each mode of transportation.
- Access to different modes of transportation.

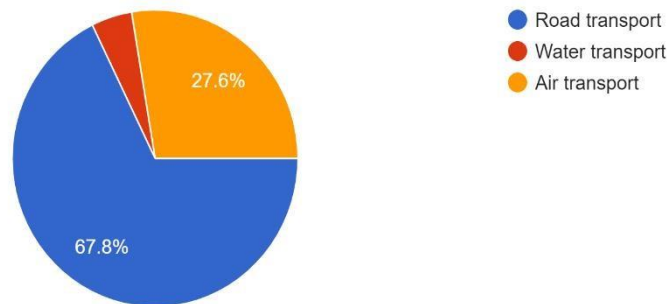
Based on the responses received from the respondents, the following observations can be made:

1) Most used mode of transportation



As detailed in the diagram herein above, 96.7% of the respondents use road transport, 2% use water transport and 1.3 % use air transport.

2) Most convenient mode of transportation



As detailed in the diagram above, 67.8% find road transport to be a convenient mode of transportation while 27.6% prefer air transport and 4.6% prefer water transport.

From both the figures, it can be concluded that road transport is the most used and preferred mode of transportation based on the responses received.

The government-run and private bus networks in Cochin are outstanding, connecting not only the entire city but also the majority of Kerala. In Cochin, buses are another inexpensive mode of transportation. The cheapest way to get around is to take the bus, which is a lot more

convenient than driving.³³ In the city of Cochin, there are additional easy transit options, including Uber, Ola, and automobiles. One of the most significant modes of transportation in Kochi is the auto rickshaw, which is readily available during the day. Both tourists and business travelers alike favor the auto rickshaw as a practical form of transportation throughout the entire city of Kochi.³⁴

Around 54.5% belonging to the income group below 20000 used buses as their mode of travel while 12% use two wheelers as the main mode. As income increases, main mode of transportation shifts to car. 66.66 percent of those who use car as their main mode belong to the income category of more than 80000.³⁵

The proportion of female population in the city are more dependent on public transport than men. Around sixty percentage of women surveyed take buses for work, shopping, leisure etc.³⁶ Ferries are one of the most economic modes of transportation in Kochi. However there is an increased demand for wider roads and more public transport conveyances in the city.³⁷

³³

<https://www.makemytrip.com/travelguide/cochin/transportation.html#:~:text=Cochin%20boasts%20of%20an%20excellent,means%20of%20transportation%20in%20Cochin.>

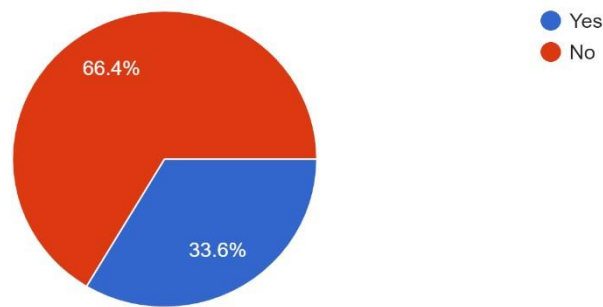
³⁴ www.mapsofindia.com

³⁵ *Mobility and Mode Distribution in Kochi*. Study conducted as part of Kochi transport day by the centre for public policy research, Kochi.2018

³⁶ *Mobility and Mode Distribution in Kochi*. 2018.

³⁷ <http://www.kochionline.in/>

3)Change in the choice of mode of transportation:

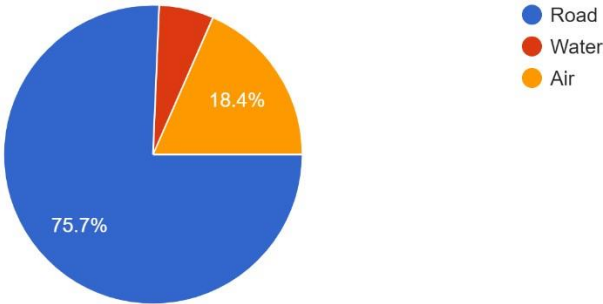


The above figure shows that 66.4% respondents have modified their choice mode of transportation while 33.6% of respondents have not. From it can be inferred that majority of the respondents have made a change in their choice of mode transportation over the years. The first Indian city to use multimodal integration is Kochi. Kochi is currently witnessing the integration of traditionally dominating means of transport such as water ferries, auto- rikshaws and the recently launched Kochi metro rail, into a single fabric. Transportation is essential to a city’s mobility needs and is linked to employment opportunities and the financial security of its residents. Now Kochi serves as the state’s financial, commercial and industrial hub. The mobility alternatives in the city of Kochi has undergone significant changes as a result of shifting employment and demographic patterns.

Since they allow for increased worker and individual mobility, lower transportation costs, and market integration, investments in transportation infrastructure are recognized to have transformative effects. These investments speed up economic structural changes through promoting economic growth, promoting social inclusion, and enhancing sustainability. Kochi's preferred form of transportation has also seen a significant change as a result of this. 73 percent women and 57.7 percent men say that safety is a main issue while choosing public transport. 72 percent of women surveyed consider availability of direct services as a very important factor while choosing public transport.³⁸ Around 100 of the people who responded agreed to have changed their means of transportation, while 50 of them stuck to the same means. People's choice of mode of transportation is influenced by factors such as the cleanliness and good maintenance of the transportation infrastructure, the amount of time required for travel, etc. Due to all of these factors, the majority of people in Kochi City have changed their means of transportation over time.

³⁸ *Mobility and Mode Distribution in Kochi*. 2018.

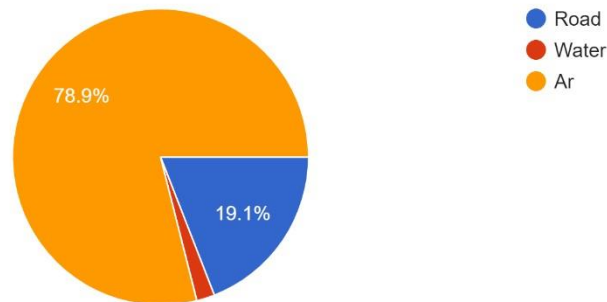
4) Mode of transportation preferred while travelling with family:



The above diagram shows that 75.7% choose road transport over water transport and air transport while travelling with family. 18.4% prefer air and only a minority of 5.9% of respondents prefer water transport when travelling with their family.

Just nine of the 152 respondents favored water transportation, 28 preferred air travel, and 115 who preferred road travel. Road transport is the most preferred and the most affordable means of transportation when it comes to travelling with family.

5) Mode of transportation found advisable for long distance travel :

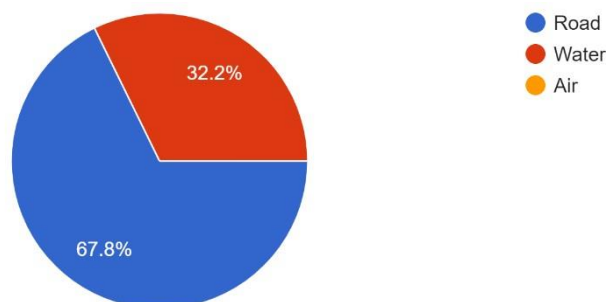


As detailed in the diagram herein above, 78.9% of the respondents find air transport advisable for long distance travel while 19.1% consider road advisable for the same. Only a minority of 2% prefer water since it is more time consuming compared to the other modes of transportation.

Passengers' movement is supported by several kinds of transportation. The kind of transportation that is chosen depends on how far the trip is. Long distance travel includes trips made by all modes including personal vehicles, airplanes, bus, train and boat service for all purposes such as commuting business, pleasure and personal or family business.

Airways helps a passenger to cover a large distance in a small interval of time. However it is more expensive than other means of transport. Travelling by plane is the quickest, the most reliable and comfortable way to get across a country. Out of the 152 respondents, 120 of them chose air transport and 29 chose road transport. Three people, only a tiny minority chose to travel vast distances by boat.

6) Cheapest mode of transportation:

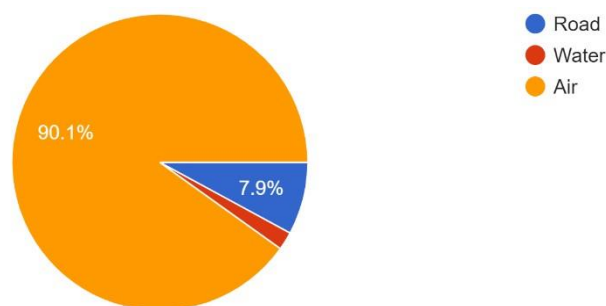


As per the above diagram 67.8% of respondents answered by saying that road is the cheapest mode of transportation over water and air. It can be seen that 32.2%

respondents have disagreed with them by choosing water transportation as the cheapest mode of transportation.

Out of the 152 respondents, 103 selected road travel as the least expensive means of transportation, and 49 picked boat services. None of them opted for air travel since it is too expensive and unaffordable for daily use by the average person. In terms of road travel, buses are the favored mode of transportation in Kochi. In Kochi, buses are the most economical way to get to work, schools, colleges, hospitals, movie theaters, malls, and other destinations. With one bus capable of replacing 30 cars on the road, buses also help ease the traffic congestion in the city of Kochi. Buses also have the lowest carbon footprint per passenger of any form of motorized transport.

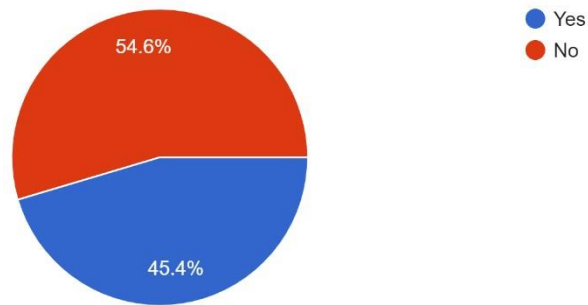
7)Most expensive mode of transportation:



As detailed in the above diagram 90.1% of respondents choose air to be the most expensive mode of transportation, 7.9% choose water transportation and only 2% choose water as the most expensive mode of transportation.

We can deduce from our observations that a sizable portion of the population in Kochi believes that air travel is more expensive than road and water travel. Of the 152 subjects observed, 137 of the respondents agreed that air travel is the most expensive mode of transportation in Kochi, which is beyond the reach of the average consumer. According to the research, 12 people thought that traveling by road was the most expensive option, while just 3 people thought that traveling by water was the most expensive.

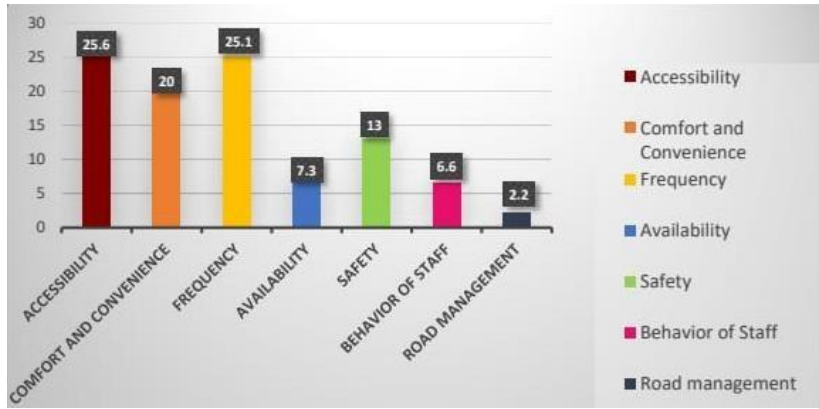
8) Satisfaction on the construction and maintenance of Bridges in Kochi:



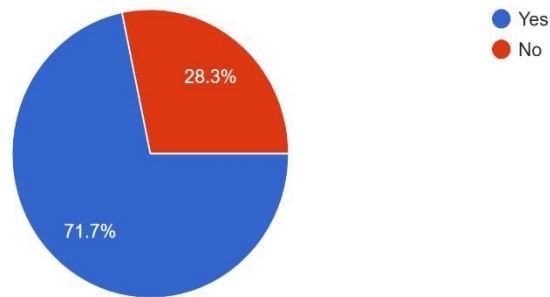
From the above diagram, it can be inferred that 45.4% respondents are satisfied with the construction and maintenance of bridges in Kochi while 54.6% are not satisfied. The use of public transportation is influenced by the infrastructure's cleanliness and appropriate upkeep. Out Of the 152 respondents, 83 expressed dissatisfaction with the building and maintenance of Kochi's bridges. And 69 out of 152 respondents are happy with the building and upkeep of Kochi's bridges. While 69 respondents indicated that they were content with the infrastructure as it was, 83 respondents voiced dissatisfaction with the building and upkeep of Kochi's bridges.

The respondents were asked to suggest measures to improve the public transport system in Kochi. The graph displays the many strategies suggested to improve public transport: 25 percent of respondents indicate accessibility and frequency are the primary changes needed in public transport services. Safety is a concern when using any form of public transportation, along with comfort and convenience.³⁹

³⁹ *Mobility and Mode Distribution in Kochi*. 2018.

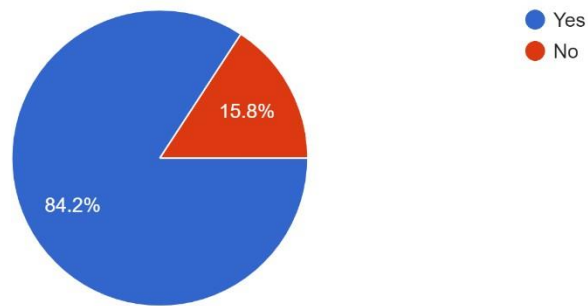


9) **Time involved in water transportation in Kochi:**



The question was whether boats as a means of transportation is time consuming or not. As detailed in the diagram herein above, 71.7% respondents agree that water transportation is time consuming while 28.3% do not think so. In Kochi, using the boat service takes time, according to 109 of the 152 respondents. The boat service is the most frequently utilized mode of transportation in Kochi on a daily basis due to its easy accessibility, reasonable prices, and adequate maintenance. Most people therefore perceive it as time-consuming. 43 of our respondents, however, held a different viewpoint.

10) Access to different modes of transportation:



The above diagram shows that 84.2% respondents have easy access to different modes of transportation in their locality. 15.8% respondents do not have access various modes of transportation in their locality.

Access to transportation services is a key component of mobility, which refers to the ease with which one can move using different modes of transportation. It measures the accessibility of transportation facilities. Kochi offers mobility through public transportation. Communities need access to essential services that will guarantee the maintenance of physical and mental health, career possibilities, and social and leisure activities in order to sustain a higher quality of life and better standards of living.⁴⁰

⁴⁰ www.liftango.com.

CONCLUSION

One of the goals of this study was to chart the growth of Kochi's transportation system with a particular emphasis on its roads, rivers, and airways. So, in the first chapter, we imparted knowledge regarding the modes of transportation in Kochi and the techniques we employed to gather information regarding them.

As a result, we have explored its evolution through the second chapter. It is clear that the growth of these specific transport sectors was a drawn-out process.

They employed water transportation as their primary form of mobility before switching to roads later. Several bridges were built once the British colonists arrived, which simplified and sped up traffic. Another significant event in Kochi's transportation history was the construction of the airport. It aids in Kochi's quicker economic and tourism development.

Since water bodies surrounding Kochi, it was thought to be the most efficient form of transportation. Water transportation enabled the city's commercial growth in antiquity. Pathemaris was initially utilised for water transportation before being superseded by steam boats and then motor boats over time. In Kochi, there were both government-run and privately owned boat services. Similar to jankars and ferries, which carry both passengers and cargo.⁴¹ Kochin Corporation and Kerala State Water Transport Cooperation also run these vessels.

According to the respondents, Kochi's water transportation system is both economical and easy for travellers, and it has a significant impact on both the city's tourism industry and residents' daily lives.

In Kochi, road transportation also advanced alongside water transportation. There were no roads in Kochi that were appropriate for wheeled vehicles until the middle of the 20th century. A network of roads in Kochi that is in great condition was developed thanks in large part to the efforts of the state's rulers, namely Diwan Shankara Variyer and Diwan Sankunni Menon.⁴² Through this project we paid special focus on highways are located under the metropolitan boarders of Kochi. These were the Seaport-Airport Road, Kochi Bypass, MG Road, Banerji Road, Shanmukham Road, and Chittor Road. Although it was challenging to gather information on the history of some of these routes from eyewitnesses during the middle of the 20th century, the majority of our sources come from older books, newspapers, web articles, etc. All of the aforementioned roadways play a significant role in the economic and industrial

⁴¹ Eranakulam district directory - 1984

⁴² Cochin state manual, C Achyutha Menon

growth of Kochi. The recent construction of flyovers between Kundanoor and Vytila in Kochi caused a mobilisation of the populace. According to our survey, the majority of individuals in Kochi prefer to travel domestically by vehicle. In Kochi, the expansion and dispersion of roads have been greatly outpaced by the growth in the number of automobiles. With advancements in bridge construction, the expansion of road transportation accelerated. The building of bridges in Kochi was significantly influenced by British involvement. Robert Bristo created the first bridge in Kochi, the Mattancherry Bridge, which connects the city's mainland to Wellington Island.⁴³ Subsequently, a crucial road connection to the islands of Bolgatty, Vallarpadam, and Vypin was made possible by the Goshree bridge connecting Islands to Kochi. Some of the significant bridges that facilitated simpler mobility and connectivity for people in Kochi included the Mangalapuzha Bridge, the Marthandavarma Bridge in Aluva, and others.

We conducted research for this project on the history of airports as well as their function in the daily lives of Kochi residents. The first airport in Kochi was situated near Wellington Island amid a naval base. But, it was unable to meet the demands of the rapidly growing Kochi city. The K. Karunakaran Ministry in Kerala began to take steps in the early 1990s to build a new airport in Nedumbasseri. This was mostly used by residents of Kochi and visitors from nearby cities for long distance travel. The construction of the airport opened the door for Kochi's economic and tourism growth. We conducted research for this project on the history of airports as well as their function in the daily lives of Kochi residents. The third chapter presents the findings of a statistical analysis conducted among Kochi locals. Since the majority of the respondents were between the ages of 35 and 60, it was possible to track the changes that occurred in the transportation industry and also indicate the shortcomings of the current modes of transportation. The third chapter presents the findings of a statistical analysis conducted among Kochi locals. Since the majority of the respondents were between the ages of 35 and 60, it was possible to track the changes that occurred in the transportation industry and also indicate the shortcomings of the current modes of transportation.

Given that Kochi is commonly regarded as Kerala's commercial hub, the city's economy depends heavily on its transportation system. However there are several issues in the transportation sector. Congestion is one such issue in the major transportation routes

⁴³ Kochin smaranika

deterioration of the transportation network, lengthened travel times, and subpar services supplied to locals and guest.

The investigation indicates that the availability of information regarding routes, times, etc. is the most important aspect to consider when selecting a mode of public transportation. Also, commuters pay attention to qualitative factors such service accessibility, comfort, and safety. Those polled said they would switch to public transportation if it were more effective and offered regularly. A transition would also be made possible by improved road management and employee conduct. There is a need to develop additional roads due to the fast increase in the number of vehicles on the road.

Reliable public transportation and excellent infrastructure. The analysis found that the most important consideration when selecting a public transportation Information about routes, schedules, and other aspects of transportation is readily available. Commuters as well accentuate important qualities like comfort, safety, and service accessibility. Participants would change.⁴⁴

Consequently, it can be seen from chapters 2 and 3 that the development of transportation in Kochi obviously focused on roads, waterways, and airports, as well as to assess how much these advancements affected people's day-to-day lives in Kochi.

⁴⁴ www.liftango.com.

QUESTIONNAIRE on transportation in Kochi

1 Name:

2 Place:

3 Age:

4 Which mode of transportation do you use the most?

- a) Road Transport
- b) Water Transport
- c) Air Transport

5 Has your choice of mode of transportation changed over the years?

- a) Yes
- b) No

6 Which mode of transportation do you think is the most convenient?

- a) Road Transport
- b) Water Transport
- c) Air Transport

7 Which mode of transportation do you think is the most comfortable while travelling with family?

- a) Road Transport
- b) Water Transport
- c) Air Transport

8 Which mode of transportation do you think is advisable for long distance travel?

- a) Road Transport
- b) Water Transport
- c) Air Transport

9 Which do you think is the cheapest mode of transportation?

- a) Road Transport
- b) Water Transport
- c) Air Transport

10 Do you think the transportation infrastructure in Kochi is well maintained?

- a) Yes
- b) No

11 Which do you think is the cheapest mode of transportation?

- a) Road Transport
- b) Water Transport
- c) Air Transport

12 Which do you think is the most expensive mode of transportation?

- a) Road Transport

- b) Water Transport
- c) Air Transport

13 Is using boats time consuming?

- a) Yes
- b) No

14 How far is water transportation convenient on a daily basis?

- a) Very Good
- b) Good
- c) Poor

15 Has the construction of flyovers made transportation easier for you?

- a) Yes
- b) NO

16 Do you have proper access to transportation in your locality?

- a) Yes
- b) No

17 Do you have any suggestions with regard to the development of transportation infrastructure in Kochi?

BIBLIOGRAPHY

1. https://en.m.wikipedia.org/wiki/Kochi_metropolitan_area#:~:text=The%20Kochi%20metropolitan%20area%20or,populous%20metropolitan%20area%20in%20Kerala.
2. <https://www.macrotrends.net/cities/21305/cochin/population#:~:text=The%20current%20metro%20area%20population,a%203.6%25%20increase%20from%202020>.
3. https://en.m.wikipedia.org/wiki/Kochi_metropolitan_area#:~:text=The%20area%20constituted%20on%20the,North%20Paravur%2C%20Perumbavoor%20and%20Angamali.
4. Census Commission of India report
5. https://en.m.wikipedia.org/wiki/Kochi_metropolitan_area#:~:text=The%20area%20constituted%20on%20the,North%20Paravur%2C%20Perumbavoor%20and%20Angamali
6. https://www.oxfordlearnersdictionaries.com/definition/english/transport_1#:~:text=%2F%CB%88tr%C3%A6ns%20p%C9%94CB%90rt%2F,using%20vehicles%2C%20roads%2C%20etc.
7. ERNAKULAM District Directory -1984
8. <https://currentaffairs.adda247.com/water-metro-project/>
9. A memoir of transportation in Travancore and Kochi, A Wilfred
10. Cochin state manual, C Achyutha menon
11. https://en.m.wikipedia.org/wiki/Chittoor_Road
12. https://en.m.wikipedia.org/wiki/S.A_Road
13. ¹ [https://en.m.wikipedia.org/wiki/Mahatma_Gandhi_Road_\(Kochi\)](https://en.m.wikipedia.org/wiki/Mahatma_Gandhi_Road_(Kochi))
14. ¹ <https://yometro.com/travel-guide/attraction-mg-road-kochi>
15. ¹ Swapnagal vilkkunna nagaram, Ravi Kuttikkad
16. ¹ https://en.m.wikipedia.org/wiki/S.A_Road
17. https://en.m.wikipedia.org/wiki/Banerji_Road
18. Cochin smaranika ¹
19. https://en.m.wikipedia.org/wiki/Kochi_Bypass
20. https://en.m.wikipedia.org/wiki/Seaport-Airport_Road
21. https://m.timesofindia.com/city/kochi/vyttila-kundannoor-flyover-works-enter-finalstage/amp_articleshow/79111120.cms
22. https://en.m.wikipedia.org/wiki/Palarivattom_Flyover_Scam
23. ¹ <https://www.newindianexpress.com/cities/kochi/2022/aug/24/palarivattom-flyover-govt-in-a-legal-battle-to-realise-rs-28-crore-2490715.html>
24. ¹ Cochin state manual, C Achyutha Menon

25. https://en.m.wikipedia.org/wiki/Marthanda_Varma_Bridge#:~:text=The%20bridge%20lies%20on%20the,Ilayaraja%20submitted%20to%20the%20land
26. ¹ Kerala district gazetteers, Ernakulam by Sreedhara Menon
27. https://en.m.wikipedia.org/wiki/Cochin_International_Airport#:~:text=The%20facility%20was%20formally%20inaugurated,CIAL%20on%201%20July%201999
28. <https://www.makemytrip.com/travelguide/cochin/transportation.html#:~:text=Cochin%20boasts%20of%20an%20excellent,means%20of%20transportation%20in%20Cochin>.

29. ¹ www.mapsofindia.com

30. ¹ *Mobility and Mode Distribution in Kochi*. Study conducted as part of Kochi transport day by the centre for public policy research, Kochi.2018

31. ¹ *Mobility and Mode Distribution in Kochi*. 2018.

32. ¹ <http://www.kochionline.in/>

APPENDIX



Mahatma Gandhi road



Shanmugham road, Kochi

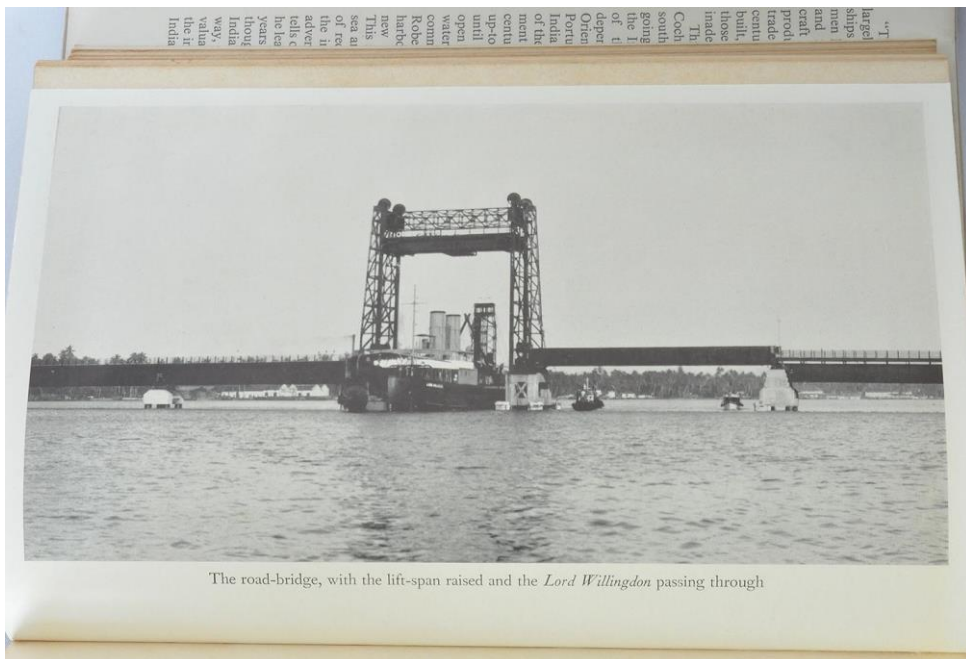
5.High court boat jetty at Ernakulam on 1949



The northern tip of MG Road is called Madhava Pharmacy Junction. File Photo



Goshree bridge



Mattancherry







Irumbu Palam

