INDUSTRIAL AND COMMERCIAL DEVELOPMENT PLANNING: A CASE OF KOCHI MUNICIPAL CORPORATION FOCUSING ON BUSINESS AND PRODUCTION

THESIS REPORT

Submitted by

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in

Urban Planning

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DECLARATION

I hereby declare that the project entitled **"INDUSTRIAL AND COMMERCIAL DEVELOPMENT PLANNING: A CASE OF KOCHI MUNICIPAL CORPORATION FOCUSING ON BUSINESS AND PRODUCTION"** is a bonafide record of mine carried out under the supervision of Prof. Swetha P Devassy, Assistant Professor, Department of Architecture. I declare that the work reported herein does not form any part of any other project report or thesis based on which a degree or award was conferred on an earlier occasion to any other candidate. This study is done as a part of the fourth semester M. Plan (Urban Planning), Post Graduate Degree Course in the Department of Architecture, Thangal Kunju Musaliar College of Engineering, Kollam.

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CERTIFICATE

This is to certify that the Thesis Report **"INDUSTRIAL AND COMMERCIAL DEVELOPMENT PLANNING: A CASE OF KOCHI MUNICIPAL CORPORATION FOCUSING ON BUSINESS AND PRODUCTION"** submitted by **Arun M R (TKM21MUP007)** of MUP (2021-2023) Batch, in fulfilment of the requirements for the fourth semester final examination in **PL 6401 – PLANNING THESIS**, under the **APJ Abdul Kalam Technological University** is a bonafide work carried out under our guidance and supervision.

THESIS GUIDE
Prof. Swetha P Devassy

HEAD OF THE DEPARTMENT
Prof. Dr. Annie John

INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

Creating an industrial and commercial development plan for Kochi Municipal Corporation requires a comprehensive understanding of the local economic, social, and political landscape. The study encompassed various research methods, including an extensive literature review, parameter identification, sample surveys, and in-depth case studies. These methodologies were employed to gather relevant data and insights into the current state of industrial development in the region. By analyzing market trends, economic indicators, and best practices, the research aimed to propose effective strategies for promoting industrial growth and enhancing commercial activities. The project also involved collaboration with key stakeholders, including government officials, industry experts, and community representatives, to ensure a comprehensive and inclusive approach. The outcomes of this research serve as a valuable resource for the Kochi Municipal Corporation, providing guidance on infrastructure development, investment incentives, skill enhancement initiatives, and the fostering of innovation and entrepreneurship. Ultimately, the project aims to drive sustainable economic growth, attract investments, and establish Kochi as a vibrant center for industrial and commercial endeavors.

Keywords: Industrial development, Commercial development, Economy, Analytic Hierarchy Process, Business

ABBREVIATIONS

AHP Analytic Hierarchy Process. 3, 7, 13, 37, 39, 40

AMRUT Atal Mission For Rejuvenation And Urban Transformation. 13, 58, 100

BART Bay Area Rapid Transit. 8, 73, 74, 76

CI Concentration Index. 8, 11, 60–62

CIAL Cochin International Airport. 45

CSEZ Cochin Special Economic Zone. 91

CSO Central Statistics Office. 24, 99

DIC District Industries Centre. 60

GOI Government of India. 27, 99

IPRS Industrial Park Rating System. 7, 31

ISIC International Standard Industrial Classification. 20, 22, 23

IT Information Technology. 8, 11, 92, 93

KMC Kochi Municipal Corporation. 11, 13, 17, 18, 37, 38, 43, 46, 48, 54, 58, 91, 100

KSIDC Kerala State Industrial Development Corporation. 92

MMRDA Mumbai Metropolitan Region Development Authority. 84

MSME Micro, Small and Medium Enterprises. 18

MTC Metropolitan Transportation Commission. 74, 100

NIC National Industrial Classification. 24, 99

NICDC National Industrial Corridor Development Corporation. 53, 100

NPCS National Product Classification for Services. 15, 24, 99

PESTEL Political, Economic, Sociocultural, Technological, Environmental, and Legal factors. 7, 31

SAC Seoul Appia Consortium. 80

SCP Smart City Platform. 80

SECK State Election Commission of Kerala. 47

SEZ Special Economic Zone. 50

SIDCO Small Industries Development Corporation. 8, 11, 93, 94

SMART Specific, Measurable, Achievable, Relevant, Time-bound. 76

SMG Seoul Metropolitan Government. 80, 101

SWM Solid Waste Management. 63

TDR Transferable Development Rights. 91

TOC Transit Oriented Communities. 8, 11, 74–76

TOD Transit Oriented Development. 8, 91, 92

UNIDO United Nations Industrial Development Organisation. 23, 101

URDPFIG Urban and Regional Development Plans Formulation and Implementation Guidelines. 17

WB World Bank. 7, 32

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CHAPTER 1 INTRODUCTION

This chapter will serve as an introduction to the study by outlining the background , need , context, the research problem, the research aim, objectives, scope and ultimately the limits.

1.1 Introduction

Ernakulam is a district located in the Indian state of Kerala, and Kochi is its major city and commercial center. The district of Ernakulam has a diverse industrial base and is known for its flourishing business environment. Kochi, in particular, has been a hub of industrial development in Kerala, with a wide range of industries that include textiles, chemicals, electronics, and food processing. The city is also home to a number of major national and international companies, including BPCL, HMT, and Crompton Greaves, among others. As per the NPCS, Business and Production Services are one among the five industrial services categorisation (see 2.3). Ernakulam district is a major economic hub in Kerala. It has a strong industrial base, with several industrial parks and estates that provide facilities and support services to businesses. The Cochin Special Economic Zone (CSEZ) is one of the most prominent industrial parks in the district, and it houses several major industries, including IT and IT-enabled services, engineering, and pharmaceuticals. The district has also made significant strides in renewable energy, with several wind and solar power projects. Additionally, the district has several ports, including the Cochin Port Trust, which is one of the major ports in India and is a significant contributor to the region's economic growth.

Ernakulam district is also committed to promoting entrepreneurship and innovation. The district has several startup incubators and accelerators, and the Kerala Startup Mission provides support to startups in the region, including funding and mentorship. The district's economic development is a positive sign for the state of Kerala. The district's strong industrial base, focus on renewable energy, and commitment to entrepreneurship and innovation are all contributing factors to the region's economic growth. In summary, the district of Ernakulam and the city of Kochi have a diverse and thriving industrial base, with a range of industries that span multiple sectors. The region's commitment to innovation, entrepreneurship, and renewable energy has contributed to its overall economic growth and development, making it an attractive destination

for businesses and investors alike. Kochi Municipal Corporation is a bustling urban center located in the southern state of Kerala, India. As one of the fastest-growing cities in the country, it has become a hub for industrial and commercial activity, attracting businesses and investors from all over the world. To capitalize on this growth and ensure sustainable development, the Kochi Municipal Corporation needs an ambitious industrial and commercial development plan. The plan aims to promote the city's economic development by fostering a favorable business environment, attracting new investments, and supporting the growth of existing businesses. Through targeted initiatives, strategic partnerships, and innovative policies, the Kochi Municipal Corporation seeks to position itself as a leading destination for industrial and commercial growth in the region.

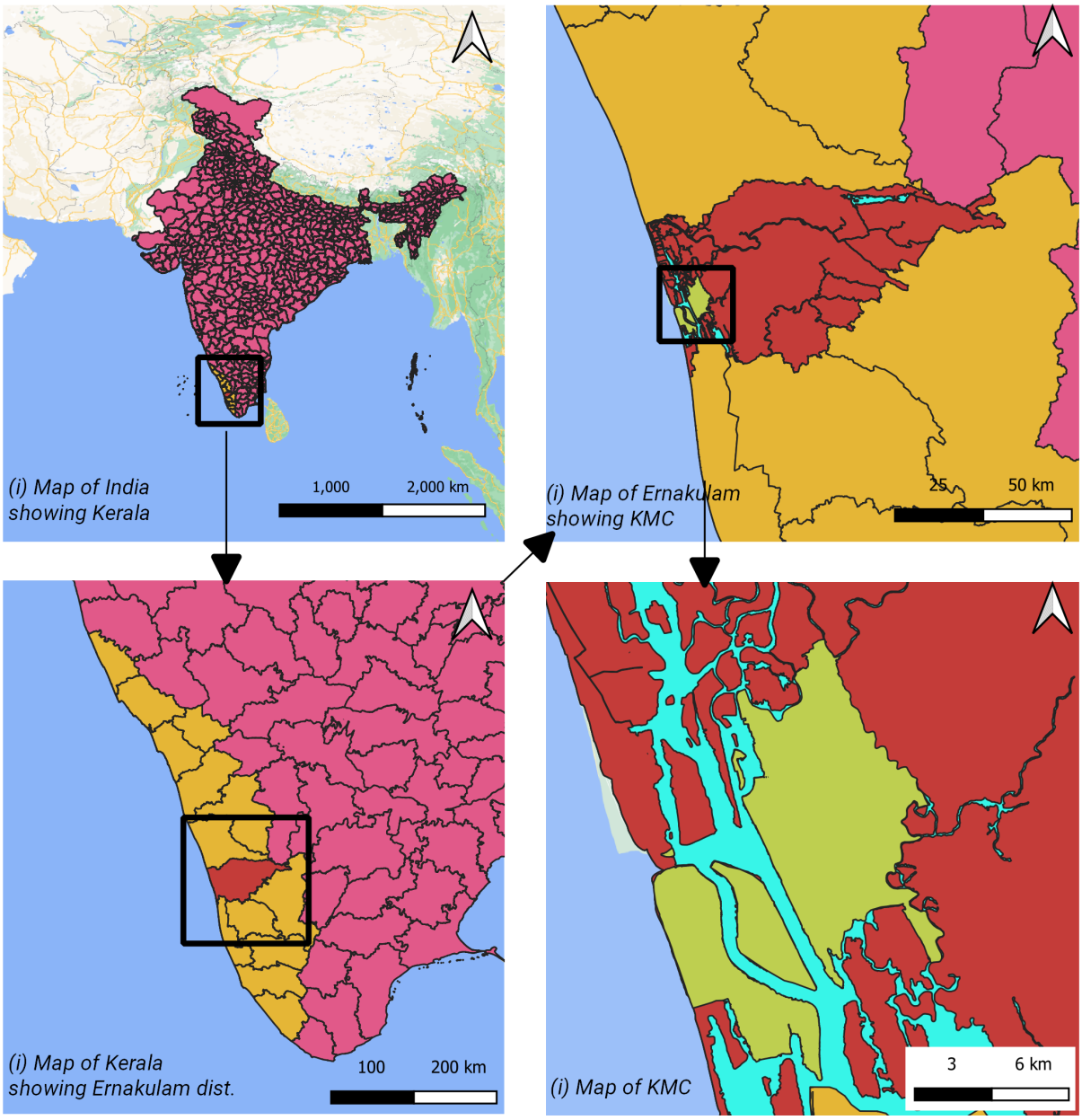
1.2 Aim

The aim of the study is to create an integrated Industrial and Commercial development plan for Kochi Municipal Corporation focussing on Business and production sectors, to attract investment and drive sustainable economic growth by capitalizing on strengths, addressing challenges, and improving the business environment.

1.3 Objectives

1. To gain an in-depth understanding of Industrial and Commercial Planning.
2. To identify the parameters used to assess the Industrial and Commercial scenario of a region.
3. To identify and analyse the current challenges and obstacles facing in the Industrial and Commercial Sectors of Kochi Municipal Corporation.
4. To identify and analyse best practices from other regions and countries that could be adapted and applied to support the Business and Production sectors of Industrial and Commercial environment of Kochi Municipal Corporation.
5. To develop an Industrial and Commercial Plan focusing on Business and Production sectors for Kochi Municipal Corporation.

Figure 1.1: Location Map of KMC



source: Author

1.4 Scope and Limitations

1.4.1 Scope

1. The project comes Within the scope of a Special Purpose Plan as per URDPFIG.

2. This project would then identify potential growth sectors by analysing market trends, assessing the region's competitive advantages, and considering global and regional economic trends.

3. It would throw light on the cities technological innovation and entrepreneurship which is one of the ways of the future business scenario.

1.4.2 Limitations

1. Study analysis does not cover exact figures of financial data of enterprises, but is based on primary survey which can result in low accuracy.
2. The research primarily depends on the data about the MSME which may be inaccurate in defining the entire economy of KMC.

CHAPTER 2 LITERATURE REVIEW

This chapter provides a comprehensive review of the literature on the topic of Industrial and Commercial development. The review begins with a brief overview of the history of the topic, followed by a discussion of the key concepts and theories. The review then examines the research that has been conducted on the topic, highlighting the major findings and trends. The chapter concludes with a discussion of the implications of the research for practice and policy.

2.1 History of Industry and Commerce

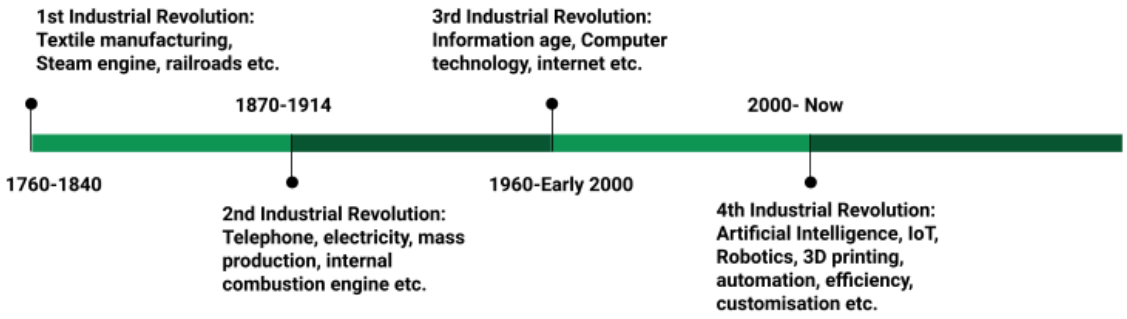
Industry and commerce have played a crucial role in the development of human societies since the beginning of civilization. The history of industry and commerce can be traced back to the ancient times when people first started trading goods and services with each other. From the barter system to the modern-day global economy, the evolution of industry and commerce has been shaped by various factors such as technological advancements, changes in political systems, and economic philosophies. The growth and development of industry and commerce have not only improved the standard of living but also led to the creation of jobs, wealth, and social progress. In this essay, we will explore the history of industry and commerce, from its early beginnings to the present day, and the impact it has had on society.

2.1.1 Industrial Revolution

The Industrial Revolution, on the other hand, began in the late 18th century and continued into the 19th century. This period marked a significant shift in manufacturing processes, as machines and new technologies replaced manual labor. The Industrial Revolution was fueled by the growth of capitalism and the desire for increased efficiency and production (Groumpos, 2021). The development of steam engines, textile mills, and iron production allowed for the mass production of goods, leading to the rise of industrial capitalism.The Industrial Revolution also brought about profound social and economic changes, including the emergence of urbanization and the factory system. As people migrated from rural areas to cities in search of employment, the landscape of society transformed, giving rise to crowded industrial centers and the formation of a working class. Moreover, the Industrial Revolution paved the way for

advancements in transportation and communication, with the invention of the steam locomotive and the telegraph, revolutionizing the way goods were transported and information was disseminated.

Figure 2.1: Industrial revolution timeline



Source: (Sharma and Singh, 2020)*

2.1.2 Commercial Revolution

The Commercial Revolution occurred in the late Middle Ages and early modern period, roughly from the 15th to the 18th century. During this time, European nations began to expand their trade networks, establish colonies, and engage in overseas exploration. This period saw the rise of mercantilism, a form of economic policy that aimed to accumulate wealth through trade, and the development of new financial systems, such as banks and stock exchanges. The Commercial Revolution created a more interconnected global economy and increased the flow of goods and ideas across borders(Greif, 1992).

2.2 Definitions

The ISIC defines industry as a group of establishments primarily engaged in the same activity or producing similar products or services. The classification is based on the type of economic activity, such as agriculture, manufacturing, or services. The Indian government has provided various definitions for the term ”industry” in different contexts. The most commonly used definition, as stated in the Industrial Disputes Act of 1947, encompasses businesses, trades, undertakings, manufacturing activities, and occupations of employers, employees, and workers. Courts have further interpreted this definition to include any activity involving the production or provision of goods and services, regardless of profit motive or sector (public or private).

Additionally, the government has established specific definitions of industry for taxation, regulation, and other policies. For instance, the Factories Act of 1948 defines a factory as premises where a specific number of workers are engaged in manufacturing processes with or without the use of power.

The definition of industry carries significant implications. It determines the extent of government regulation for businesses and influences taxation practices. Moreover, it can impact the rights and benefits granted to workers. Given its complexity, the definition of industry has sparked debates and legal disputes. The Indian government has made efforts to provide clarity on the matter, but ongoing interpretation remains a relevant aspect.

The WTO defines commerce as ”the exchange of goods and services between countries.” This means that when two countries trade with each other, they are exchanging goods and services for mutual benefit. For example, India might export tea to China in exchange for Chinese smartphones. This trade benefits both countries because it allows them to access goods and services that they would not otherwise be able to get. The UNSD defines commerce as ”the exchange of goods and services between individuals, businesses, or countries.” This definition is more inclusive than the WTO’s definition because it includes the exchange of goods and services between individuals and businesses, as well as between countries. This is important because it recognizes that commerce is not just limited to international trade, but also includes the exchange of goods and services within countries. The Ministry of Commerce and Industry, Government of India defines commerce as ”the exchange of goods and services between individuals, businesses, or countries with the objective of earning profits.” This definition is similar to the UNSD’s definition, but it adds the element of profit. This is important because it recognizes that commerce is not just about the exchange of goods and services, but also about the generation of wealth.

In conclusion, commerce is the exchange of goods and services between individuals, businesses, or countries. It is an important activity that benefits both individuals and countries. Commerce can be international or domestic, and it can be motivated by a variety of factors, including the desire to obtain goods and services, to generate wealth, or to improve social welfare. The WTO defines business services as ”services that facilitate the operation of other sectors of the economy, such as finance, transportation, communication, and distribution, as well as services that facilitate the operation of businesses themselves.”

This means that business services are a broad category of services that support the production

and delivery of goods and services in other sectors of the economy. For example, financial services help businesses to raise capital and manage their finances, transportation services help businesses to move their goods and products, and communication services help businesses to communicate with their customers and suppliers. The UNSD defines business services as ”services provided to businesses and other organizations to support their operations and facilitate their commercial transactions.”

This definition is similar to the WTO’s definition, but it focuses on the services that are provided to businesses directly. For example, accounting and legal services help businesses to comply with regulations, marketing and advertising services help businesses to reach their target customers, and human resources services help businesses to hire and train their employees. The ISIC defines business services as ”services primarily intended to facilitate and support the activities of other businesses or individuals, including professional, technical and specialized services.”

This definition is broader than the WTO’s and UNSD’s definitions because it includes a wider range of services, such as professional, technical, and specialized services. For example, engineering and architectural services help businesses to design and build new facilities, management consulting services help businesses to improve their efficiency, and research and development services help businesses to develop new products and services.

In conclusion, business services are a broad category of services that support the production and delivery of goods and services in other sectors of the economy. They are an important part of the global economy, and they play a vital role in the growth and development of businesses.

2.3 Classifications

2.3.1 Type of Industry

Global System

The International Standard Industrial Classification (ISIC) is a hierarchical classification system, which means that it is divided into a series of nested categories. The top level of the ISIC is divided into two main categories: industries and services. Industries are further divided into sub-industries, which are then divided into divisions, groups, classes, and subclasses.

The ISIC is used by countries all over the world to collect and analyze economic data. It is also used by international organizations, such as the World Bank and the International Monetary Fund, to compare economic data between countries.

The ISIC is a valuable tool for understanding the structure of the global economy. It is also a useful tool for businesses, governments, and other organizations to track the performance of the economy and to make informed decisions about economic policy (UNIDO, 2006). Here are some of the benefits of using the ISIC:

1. It provides a consistent and internationally comparable framework for classifying economic activities.
2. It is a flexible classification system that can be adapted to the needs of different countries and organizations.
3. It is a comprehensive classification system that covers all sectors of the economy.
4. It is a user-friendly classification system that is easy to understand and use.

Classifications of Industry as per ISIC

1. Division 01 — Agriculture, forestry and fishing
2. Division 02 — Mining and quarrying
3. Division 03 — Manufacturing
4. Division 04 — Electricity, gas, steam and air conditioning supply
5. Division 05 — Water supply; sewerage, waste management and remediation activities
6. Division 06 — Construction
7. Division 07 — Wholesale and retail trade; repair of motor vehicles and motorcycles
8. Division 08 — Transportation and storage
9. Division 09 — Accommodation and food service activities
10. Division 10 — Information and communication
11. Division 11 — Financial and insurance activities
12. Division 12 — Real estate activities

13. Division 13 — Professional, scientific and technical activities
14. Division 14 — Administrative and support service activities
15. Division 15 — Education
16. Division 16 — Human health and social work activities
17. Division 17 — Arts, entertainment and recreation
18. Division 18 — Other service activities (CSO, 2008)

Indian System

The most common classification system is based on the nature and scale of economic activities. The government of India uses the National Industrial Classification (NIC) and National Product Classification for Services (NPCS) system to classify industries and related services.

Figure 2.2: Classification of Industries

Source: (CSO, 2011)

2.3.2 Size of the Industry

The latest classification of industries in India is based on the turnover or investment in plant and machinery, and it was revised in 2020. According to the latest classification, industries are classified into three categories based on their investment in plant and machinery:

1. Micro Enterprises: Industries with investment up to Rs. 1 crore and turnover up to Rs. 5 crore.

2. Small Enterprises: Industries with investment up to Rs. 10 crore and turnover up to Rs. 50 crore.

3. Medium Enterprises: Industries with investment up to Rs. 50 crore and turnover up to Rs. 250 crore.

4. Large Scale Enterprises: Industries with investment above Rs. 250 crore are classified as large scale industries, and they are not covered under the MSME definition. However, large scale industries may also be eligible for various incentives and benefits offered by the government.

The latest classification of industries in India is an improvement over the previous classification, which was based only on investment in plant and machinery. The new classification also takes into account the turnover of the industry, which provides a more accurate picture of the size and scale of the industry.

This classification is important for various purposes, such as determining eligibility for government incentives and schemes, providing financial support, and promoting the growth of small and medium enterprises (Veena, 2020). It also helps in policy-making, as it provides a clear understanding of the size and nature of different industries in India. Overall, the latest classification of industries in India is a step towards promoting the growth and development of the MSME sector, which is an important contributor to India's economy.

2.4 Legal Aspects

Industrial and commercial development in the global and Indian contexts involves a range of complex legal issues. These issues include intellectual property rights, competition law, labor law, environmental law, corporate law, contract law, and tax law.

To protect their intellectual property assets, businesses must be aware of relevant laws and regulations. For example, globally, there are conventions such as the Paris Convention for the Protection of Industrial Property, the Berne Convention for the Protection of Literary and Artistic Works, and the TRIPS Agreement. In India, laws such as the Patents Act, 1970, the

Copyright Act, 1957, and the Designs Act, 2000 govern intellectual property rights.

Compliance with competition laws is crucial for businesses. The United States has the Sherman Antitrust Act, the Clayton Antitrust Act, and the Federal Trade Commission Act, while the European Union follows the Competition Act. In India, the Competition Act, 2002 regulates competition law (Ghanavati et al., 2009). Labor laws protect the rights of employees globally and in India. The International Labour Organization's (ILO) Declaration on Fundamental Principles and Rights at Work guides global labor standards. In India, the Factories Act, 1948, the Mines Act, 1952, and the Employees' Compensation Act, 1923 address labor-related matters.

Environmental laws play a significant role in industrial and commercial development. Internationally, agreements like the United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement focus on environmental protection (Kotzé and Adelman, 2022). India has laws such as the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, and the Environment (Protection) Act, 1986 to regulate environmental concerns .

Corporate laws play a critical role in governing the formation, operation, and dissolution of businesses worldwide. Different countries have their own specific legal frameworks to regulate corporate entities. For instance, in the United States, businesses generally adhere to the guidelines set forth in the Model Business Corporation Act. On the other hand, the United Kingdom follows the Companies Act to govern corporate affairs. In India, the legal provisions for corporate entities are outlined in the Companies Act of 2013.

Apart from corporate laws, contracts are another fundamental aspect of business transactions. They establish the rights and obligations between parties involved in a business deal. The United Nations Convention on Contracts for the International Sale of Goods (CISG) serves as a global agreement that governs international sales contracts. In India, the Indian Contract Act of 1872 provides the legal framework for contract law, ensuring fairness and enforceability of agreements.

These examples highlight the diverse laws and regulations that impact industrial and commercial development, both on a global scale and within India. For businesses to thrive and navigate the complex legal landscape, it is essential to familiarize themselves with these legal frameworks. By doing so, businesses can ensure compliance, protect their interests, and mitigate the risk of potential legal complications that may arise from non-compliance or inadequate under-

standing of the applicable laws and regulations.

2.5 Organisations

- Global organizations:

  The World Bank: The World Bank is a global financial institution that provides loans to developing countries for capital programs. The World Bank also provides technical assistance and policy advice to developing countries. The International Monetary Fund (IMF): The IMF is an international organization that provides loans to countries experiencing balance of payments difficulties. The IMF also provides technical assistance and policy advice to countries. The United Nations Industrial Development Organization (UNIDO): UNIDO is a specialized agency of the United Nations that promotes industrial development in developing countries. UNIDO provides technical assistance, training, and investment promotion services to developing countries. The Asian Development Bank (ADB): The ADB is a regional development bank that provides loans and grants to developing countries in Asia. The ADB also provides technical assistance and policy advice to developing countries.

- Indian organizations:

  The Department of Industrial Policy and Promotion (DIPP): The DIPP is a government agency that is responsible for promoting industrial development in India. The DIPP provides a number of services to businesses, including investment promotion, market research, and trade facilitation (GOI, 2015). The Small Industries Development Bank of India (SIDBI) is a government-owned financial institution that provides loans and other financial services to small and medium enterprises (SMEs). SIDBI also provides training and other support services to SMEs. The National Manufacturing Competitiveness Council (NMCC) is a government-appointed body that is responsible for improving the competitiveness of the manufacturing sector in India. The NMCC provides a number of services to the manufacturing sector, including policy advice, training, and benchmarking. The Confederation of Indian Industry (CII) is a non-profit organization that represents the interests of the Indian business community. The CII provides a number of services to businesses, including advocacy, training, and networking.

- State organisations:

  Kerala Industrial Infrastructure Development Corporation (Kinfra) is a state-owned company that is responsible for developing industrial infrastructure in Kerala. Kinfra provides a number of services to businesses, including land development, factory sheds, and common facilities. Kerala State Industrial Development Corporation (KSIDC): KSIDC is a state-owned company that is responsible for promoting industrial development in Kerala. KSIDC provides a number of services to businesses, including investment promotion, market research, and trade facilitation. Kerala Small Industries Development Corporation (KSSIDC): KSSIDC is a state-owned company that is responsible for providing financial and technical assistance to small and medium enterprises (SMEs) in Kerala. KSSIDC provides a number of services to SMEs, including loans, grants, training, and market linkages. Kerala Startup Mission (KSUM): KSUM is a state-owned company that is responsible for promoting entrepreneurship and innovation in Kerala. KSUM provides a number of services to startups, including incubation, mentorship, and funding. Kerala State Information Technology Infrastructure Limited (KSITIL): KSITIL is a state-owned company that is responsible for developing and managing IT infrastructure in Kerala. KSITIL provides a number of services to businesses, including data centers, cloud computing, and networking.

2.6 Indian Scenario

India has experienced notable growth in its industrial and commercial sectors in recent years. This growth can be attributed to several factors, including economic reforms, infrastructure improvements, foreign investments, skill enhancement, and facilitation of business operations.

The implementation of economic reforms since 1991 has played a significant role in stimulating industrial and commercial development by fostering a more open and competitive economy. These reforms have simplified business operations and promoted growth opportunities.Substantial investments by the government in infrastructure development have also contributed to the progress. Enhanced transportation networks, improved power supply, and better availability of essential services have facilitated business operations and expansion (Ahluwalia, 1986).

Foreign investments have been instrumental in driving industrial and commercial development in India. These investments have brought advanced technology and expertise, bolstering the competitiveness of Indian businesses. The government's focus on skill development has played a vital role as well. By investing in developing a skilled workforce, India has ensured that it has the necessary talent pool to support industrial and commercial growth (Sharma and Nagendra, 2016). The government has also taken measures to improve the ease of doing business in India. This has streamlined processes, making it more convenient for businesses to establish and operate. Consequently, it has attracted greater investments and fostered growth.

As a result of these factors, India has witnessed significant advancements in industrial and commercial sectors. The manufacturing industry has experienced rapid growth, and the country has become a major exporter of goods and services. Additionally, the services sector, particularly IT and ITES services, has flourished.

This progress in industrial and commercial development has had a positive impact on the Indian economy. It has created employment opportunities, boosted exports, and reduced poverty levels. Furthermore, it has positioned India as an appealing investment destination.

The Indian government remains committed to promoting further industrial and commercial development, with a target of achieving a $5 trillion economy by 2024. To attain this goal, the government is focused on implementing additional reforms, fostering infrastructure development, enhancing skills, and facilitating ease of doing business.

The outlook for industrial and commercial development in India is highly promising. With a large and expanding population, a young workforce, and a rapidly growing economy, India presents itself as an attractive investment destination and a potential economic powerhouse.

2.7 Regional Scenario: Kerala Perspective

Kerala, a state in India, has a long-standing history of commercial and industrial development. It offers a range of advantages that make it an attractive destination for businesses, including a skilled workforce, well-developed infrastructure, and a favorable business environment.

Various industries contribute to Kerala's thriving economy. The state encompasses manufacturing sectors such as textiles, food processing, and electronics. Additionally, its popularity as a tourist destination has established tourism as a major contributor to the state's economy.

Furthermore, Kerala has emerged as a significant hub for information technology (IT) and information technology-enabled services (ITES), providing substantial employment opportunities and bolstering economic growth.

The commercial and industrial development in Kerala can be attributed to several factors. The state boasts a highly educated and skilled workforce, with a literacy rate of 94%, the highest in India. Technical and vocational training institutes further contribute to creating a competent workforce. Kerala also benefits from a robust infrastructure, including well-connected roads, reliable power supply, and ample water resources. The presence of ports and airports facilitates efficient transportation of goods and people (Kannan, 2023). Moreover, the state maintains a favorable business environment characterized by a low tax rate, simplified regulatory framework, and incentives such as tax breaks and subsidies for businesses.

These factors have collectively contributed to significant commercial and industrial growth in Kerala in recent years. The state has successfully attracted major businesses, resulting in rapid economic expansion, job creation, increased exports, and poverty reduction.

The Kerala government is dedicated to promoting further commercial and industrial development. It actively encourages investment through various schemes and outreach efforts. Additionally, the government emphasizes skill development by establishing technical and vocational training institutes and providing financial assistance to businesses for employee training. Infrastructure development is also a priority, with upgrades to roads, power supply, water management systems, and the construction of new ports and airports.

These plans and initiatives are geared towards driving commercial and industrial growth, with the ultimate goal of transforming Kerala into a $1 trillion economy by 2030. The Kerala government's new Industrial and Commercial Policy for 2023-2028 with 25 objectives and 7 policy focus pillars. The policy aims to create a sustainable industrial ecosystem that attracts investment and innovation. The objectives of the policy include building a robust entrepreneurial ecosystem, making Kerala a thriving startup destination, and upgrading traditional industries with new technologies. The policy also aims to enhance industry-ready skill sets, attract industry players from emerging sectors, and foster a seamless environment for doing business in the state. Additionally, the policy aims to promote sustainable industries and enhance RD capabilities and linkages in new and emerging sectors of industry and economy(CPCB, 2019).

To achieve the objectives of the policy, seven policy focus pillars have been identified, including

fostering entrepreneurship, enabling infrastructure, being hi-tech, building futuristic skill sets for employment, creating a supportive business environment, enhancing the ”Kerala” brand equity, and building sectoral ecosystems. The policy aims to maximise private investments in industrial infrastructure development, strengthen logistics infrastructure to achieve multifold growth in exports, and create an Industry 4.0 compliant industry ecosystem. Additionally, the policy aims to build global linkages to foster foreign investments and exports, enable access to foreign markets for increased trade volumes, and encourage businesses to adopt best ESG practices.

2.8 Parameters

2.8.1 IPRS

It is a rating system developed by the Ministry of Commerce and Industry of the Government of India to evaluate and assess the quality and infrastructure of industrial parks in the country. The IPRS provides a framework for rating industrial parks based on various parameters such as location, connectivity, infrastructure, environmental sustainability, social infrastructure, and business support services. The rating system aims to encourage the development of world-class industrial parks in India and attract more investments from both domestic and foreign companies.

2.8.2 PESTEL

It is a framework used in strategic management and business analysis to identify and evaluate the external factors that can impact an organization’s operations and decision-making processes. In business analysis and strategic planning, organizations often consider external macro-environmental factors that could impact their operations, performance, and overall success. These factors include political, economic, sociocultural, technological, environmental, and legal factors. Political factors encompass government policies, regulations, and stability that could influence organizational operations. Economic factors include economic conditions, inflation, exchange rates, and other indicators that could affect organizational performance. Sociocultural factors refer to social and cultural norms, attitudes, and beliefs that could impact consumer behavior and market trends. Technological factors involve advancements in technol-

ogy, innovations, and the impact of automation and digitalization on business operations. Environmental factors encompass the impact of climate change, natural disasters, and sustainability on an organization's operations and reputation. Lastly, legal factors include laws, regulations, and the legal environment that could affect the organization's operations, industry, and market (Janet, 2013). Considering these factors can help organizations make informed decisions and develop effective strategies to navigate potential challenges and opportunities in the external environment.

2.8.3 Ease of Doing Business- WB

The World Bank's Ease of Doing Business index is an annual report that assesses the ease of doing business in 190 economies around the world. The report covers various indicators, such as starting a business, getting credit, paying taxes, enforcing contracts, and more.

The purpose of the report is to provide policymakers with data and insights that can help them identify areas of improvement and implement reforms that can make it easier for businesses to operate and thrive. It also serves as a tool for investors and entrepreneurs looking to make informed decisions about where to invest their time and money.

Figure 2.3: Ease of doing business parameters

Ease of starting a business.	Dealing with construction permits.
Getting electricity for the same.	Registering your property.
Getting credit for your business.	Protecting minority investors.
Paying taxes.	Trading across borders.
Enforcing contracts.	Resolving insolvency.

Source: (World Bank Group, 2020)

The Ease of Doing Business report uses a scoring system to rank countries based on their overall business environment. The higher the score, the easier it is to do business in that country. The report also provides detailed information on each indicator, including the procedures, time, and cost involved in each process. The "Starting a Business" parameter evaluates the ease of starting a business in a particular country by considering the number of formalities and procedures involved, the time and cost required, and complying with all necessary permits, licenses, and

tax requirements. This parameter also takes into account the minimum capital requirement for starting a business in that country.

The ”Dealing with Construction Permits” parameter assesses the ease of obtaining construction permits in a country by looking at the number of procedures, time, and cost involved in getting the necessary permits and complying with building regulations for constructing a commercial building. The ”Getting Electricity” parameter evaluates the ease of getting new electricity connections for businesses in a country, including the procedures, time, and cost required for obtaining necessary permits, inspections, and fees. The ”Registering Property” parameter assesses the ease of registering property ownership in a country by considering the procedures, time, and cost involved in transferring property ownership, obtaining necessary documents, paying fees, and registering the transfer. The ”Getting Credit” parameter measures the ease of getting credit for a business in a country by evaluating the legal framework and credit reporting system, as well as the availability of credit information. The ”Protecting Minority Investors” parameter measures the degree to which the legal framework in a country protects the rights of minority shareholders and provides remedies for violations. The ”Paying Taxes” parameter evaluates the ease of complying with tax regulations in a country by considering the number of tax payments, time and cost required for tax preparation and filing, and the overall tax burden on businesses. The ”Trading Across Borders” parameter measures the ease of trading goods across borders in a country, including the time and cost required to comply with customs and border regulations and the quality of trade infrastructure and logistics. The ”Enforcing Contracts” parameter assesses the ease of resolving commercial disputes through the legal system in a country by evaluating the time and cost required and the quality of the judicial process. The ”Resolving Insolvency” parameter measures the ease of resolving insolvency cases in a country, including the time, cost, and recovery rate, and the legal framework for insolvency proceedings.

2.8.4 Parameters for Assessment

These parameters are used to generate the survey questionnaires to assess the current scenario of the study area. These are collected and comprised from various indices mentioned above.

Internal Infrastructure

This section focuses on the internal infrastructure of the enterprise. It addresses the availability and reliability of essential utilities such as power, gas, and water supply. The enterprise is asked to assess the reliability of these utilities, indicating whether they have a consistent and uninterrupted supply, face occasional interruptions, or lack a reliable supply altogether. Additionally, the section evaluates the presence and adequacy of street lights within the enterprise premises.

External Infrastructure and Connectivity

In this section, the attention shifts to the external infrastructure and connectivity of the enterprise. It explores the accessibility of the business location in terms of transportation of goods and overall connectivity. The enterprise is asked to rate the accessibility on a scale from ”very poor” to ”very good,” considering factors such as road networks, transportation modes, and connectivity to other regions. The section also inquires about the commonly used modes of transportation for the enterprise, which can include roadways, railways, waterways, and airways.

Technological Factors

This section delves into the technological aspects of the enterprise. It assesses the organization’s current level of technological knowledge and expertise, allowing them to rate it on a scale from ”very low” to ”very high.” Furthermore, the section investigates the frequency at which the enterprise upgrades its technological infrastructure, providing options ranging from less than once a year to three times a year or more.

Social Factors

The focus of this section is on social factors within the enterprise. It examines the organization’s efforts towards promoting diversity and inclusion in the workplace, allowing the enterprise to rate its performance on a scale from ”very poor” to ”very good.” The section also explores the extent of the organization’s involvement in community events and sponsorship of local charities. Additionally, it inquires about the frequency of employee training or awareness programs conducted by the organization regarding social issues and causes.

Political Factors

In this section, the focus shifts to economic factors. It explores how the enterprise has utilized funds obtained from financing, such as expansion of operations, investment in research and development (R&D), purchase of equipment and machinery, or other purposes. The section also inquires about the type of financing utilized, whether it be loans, grants, both, or other sources. Furthermore, it examines whether the company has experienced an increase or decrease in return on investment compared to previous years.

Environmental Factors

The last section considers environmental factors relevant to the enterprise. It assesses the percentage of the enterprise's operations powered by renewable energy sources, allowing options from 0-25% to more than 75%. The section also addresses major hazards faced by the enterprise in the Kochi, Kerala region, such as floods, cyclones/hurricanes, earthquakes, fire, or other specified hazards. Additionally, it measures the enterprise's level of preparedness in terms of disaster management on a scale from "not at all prepared" to "extremely prepared."

CHAPTER 3 METHODOLOGY

The "Methodology" chapter lays the foundation for the research to develop a comprehensive development plan in Kochi, outlining systematic approaches, research methods, and effective strategies to foster sustainable growth in the industrial and commercial sector.

3.1 Introduction

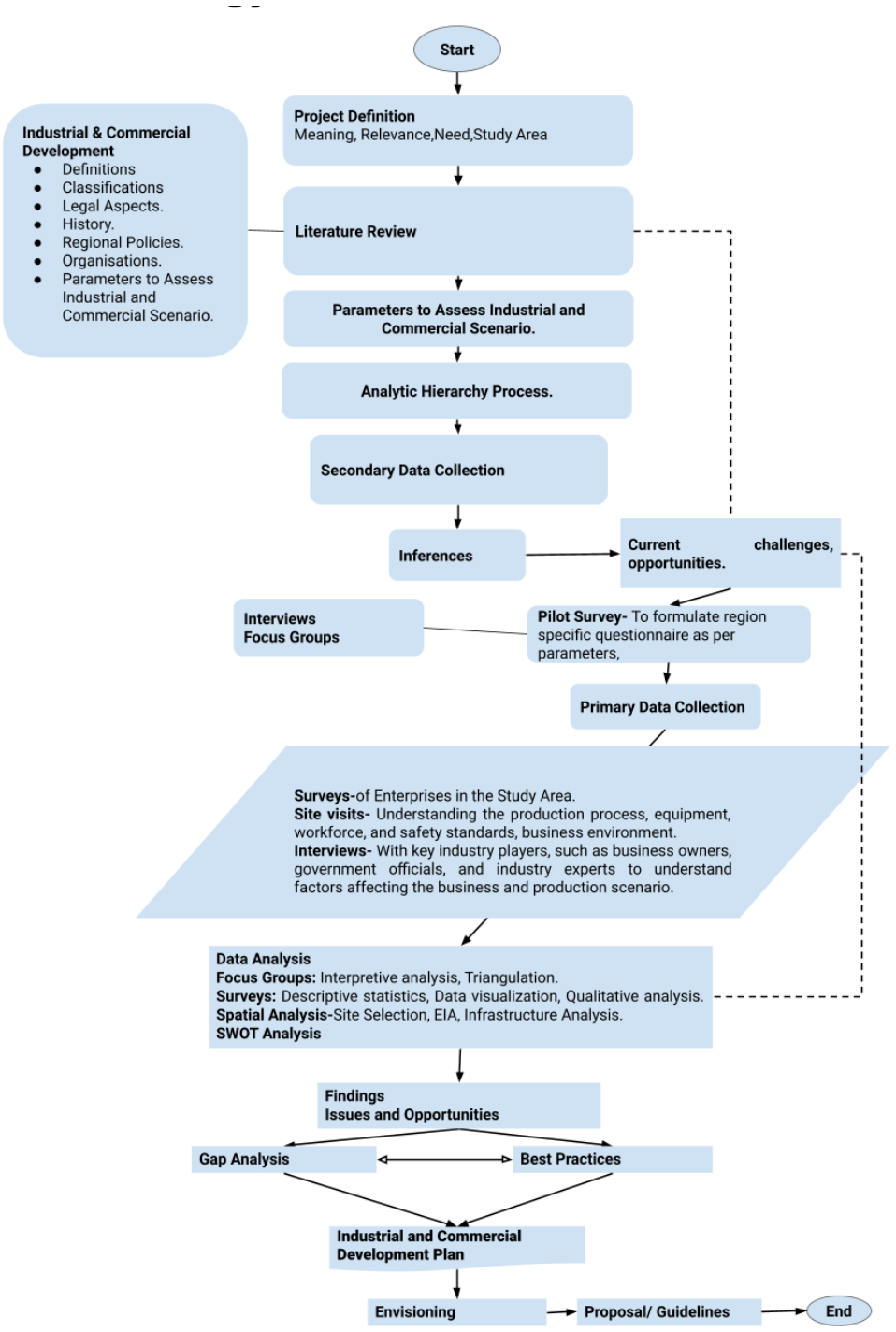
This methodology process outlines a comprehensive approach to studying the industrial and commercial development of a specific region, with a focus on the Kochi Municipal Corporation (KMC). The process starts with defining key concepts and classifications related to industries and commerce, followed by a literature review and collection of secondary data. The method of Analytic Hierarchy Process (AHP) is used to determine the parameters to assess the currrent scenario of the city. The next step involves conducting interviews with industry experts, business owners, and stakeholders to identify current opportunities and challenges. This is followed by a pilot survey to formulate a region-specific questionnaire, which is then used for primary data collection through surveys and site visits. Data analysis involves interpretive analysis and descriptive statistics. The final output is an industrial and commercial development plan that incorporates best practices and its bench-marking. This methodology provides a comprehensive framework for studying and planning for the development of industries and commerce in a region.

3.2 Major Steps

1. Conduct initial research and identify key concepts, classifications, laws, and related concepts of industries and commerce. This involves a literature review and secondary data collection to inform the study.
2. Conduct an Analytic Hierarchy Process (AHP) to finalise the parameters that could be used for the study purpose.
3. Conduct interviews with industry experts, business owners, and stakeholders to identify current opportunities and challenges.

4. Analyze industrial and commercial development history and global, national, and state-level scenarios, with a specific focus on the study area such as the Kochi Municipal Corporation (KMC).

Figure 3.1: Methodology



source: Author

5. Conduct primary data collection through surveys, site visits, and with industry experts,

business owners, and stakeholders. Analyze the data using interpretive analysis, descriptive statistics, and other methods, including GIS mapping and SWOT analysis.

6. Develop an industrial and commercial development plan that incorporates the participatory approach, best practices, and benchmarking. This includes identifying issues and opportunities, conducting a gap analysis, and creating actionable steps to address them.

3.3 Analytic Hierarchy Process

The Analytic Hierarchy Process (AHP) is a decision-making framework developed by Thomas L. Saaty. It is a structured and systematic approach used to solve complex problems and make decisions in various fields, including business, engineering, and social sciences. The AHP involves breaking down a complex decision problem into a hierarchy of criteria and alternatives. The hierarchy consists of multiple levels, with the top level representing the main objective or goal, and subsequent levels representing different criteria and sub-criteria that contribute to achieving the goal. At the lowest level, the alternatives or options being evaluated are listed.

In the AHP, decision-makers assign numerical values called pairwise comparisons to evaluate the relative importance of criteria and alternatives. These pairwise comparisons are done through a series of judgments where decision-makers compare each criterion or alternative to every other criterion or alternative and assign values based on their relative importance. The pairwise comparison values are used to derive weightings for each criterion and alternative, representing their relative importance in achieving the overall goal. The weightings are then used to calculate priority scores, allowing decision-makers to rank the alternatives and make informed decisions.

A key aspect of the AHP is the use of a consistency check to ensure the reliability of the judgments made during the pairwise comparisons. Decision-makers are asked to compare some pairs of criteria or alternatives multiple times to check for consistency. Inconsistent judgments are adjusted until an acceptable level of consistency is achieved.

The Analytic Hierarchy Process provides a structured methodology for decision-makers to systematically evaluate and prioritize criteria and alternatives based on their relative importance. It helps to bring clarity to complex decision problems and facilitates more informed and rational decision-making (ScienceDirect, 2021).

Table 3.1: AHP weightage results

	Internal Infrastructure	External Infrastructure and Connectivity.	Technological Factors	Social Factors	Political Factors	Economic Factors	Environmental Factors	Weightage
Internal Infrastructure	1.00	3.00	2.00	5.00	3.00	0.50	0.50	19.56%
External Infrastructure and Connectivity.	0.33	1.00	2.00	2.00	3.00	0.50	2.00	15.28%
Technological Factors	0.50	0.50	1.00	6.00	4.00	1.00	6.00	20.91%
Social Factors	0.20	0.50	0.17	1.00	2.00	0.33	3.00	7.71%
Political Factors	0.33	0.33	0.25	0.50	1.00	0.50	6.00	7.96%
Economic Factors	2.00	2.00	1.00	3.00	2.00	1.00	3.00	23.09%
Environmental Factors	2.00	0.50	0.17	0.33	0.17	0.33	1.00	5.49%

Source: Author

The weightages assigned to the factors of 'Internal Infrastructure', 'External Infrastructure and Connectivity', 'Technological Factors', 'Social Factors', 'Political Factors', 'Economic Factors', and 'Environmental Factors' are 19.56%, 15.28%, 20.91%, 7.71%, 7.96%, 23.09%, and 5.49% respectively. These weightages provide insights into the importance of each factor in assessing industrial and commercial development. 'Internal Infrastructure', with a weightage of 19.56%, signifies the significance of the infrastructure within an organization or industry. It highlights the importance of having well-established systems, processes, and resources to support efficient operations. 'External Infrastructure and Connectivity', allocated a weightage of 15.28%, emphasizes the role of external resources, such as transportation networks, communication systems, and access to markets. This factor underscores the necessity of a well-connected and accessible environment for businesses to thrive.

'Technological Factors', holding a weightage of 20.91%, recognizes the impact of technology on industrial and commercial development. It emphasizes the need for advanced technological capabilities, innovation, and digital transformation to remain competitive in today's fast-paced business landscape. 'Social Factors', assigned a weightage of 7.71%, acknowledges the influence of societal aspects on industrial and commercial growth. This factor takes into account factors such as consumer behavior, cultural norms, demographics, and social trends, which can shape market demand and business strategies. 'Political Factors', with a weightage of 7.96%, highlights the significance of the political environment in determining industrial and commercial development. It considers factors such as government policies, regulations, stability, and political support, which can create opportunities or pose challenges for businesses. 'Economic

Factors', allocated a substantial weightage of 23.09%, underscores the critical role of economic conditions in driving industrial and commercial growth. It encompasses factors such as GDP growth, inflation rates, interest rates, market stability, and overall economic performance, which significantly impact business operations and opportunities. 'Environmental Factors', with a weightage of 5.49%, recognizes the growing importance of environmental sustainability and responsibility in industrial and commercial development. It emphasizes the need for businesses to consider environmental impact, conservation, and eco-friendly practices to ensure long-term viability and contribute to a sustainable future. By understanding the weightages assigned to these factors, stakeholders can better assess and prioritize their efforts in fostering industrial and commercial development, taking into account the varying degrees of importance each factor holds in the overall landscape.

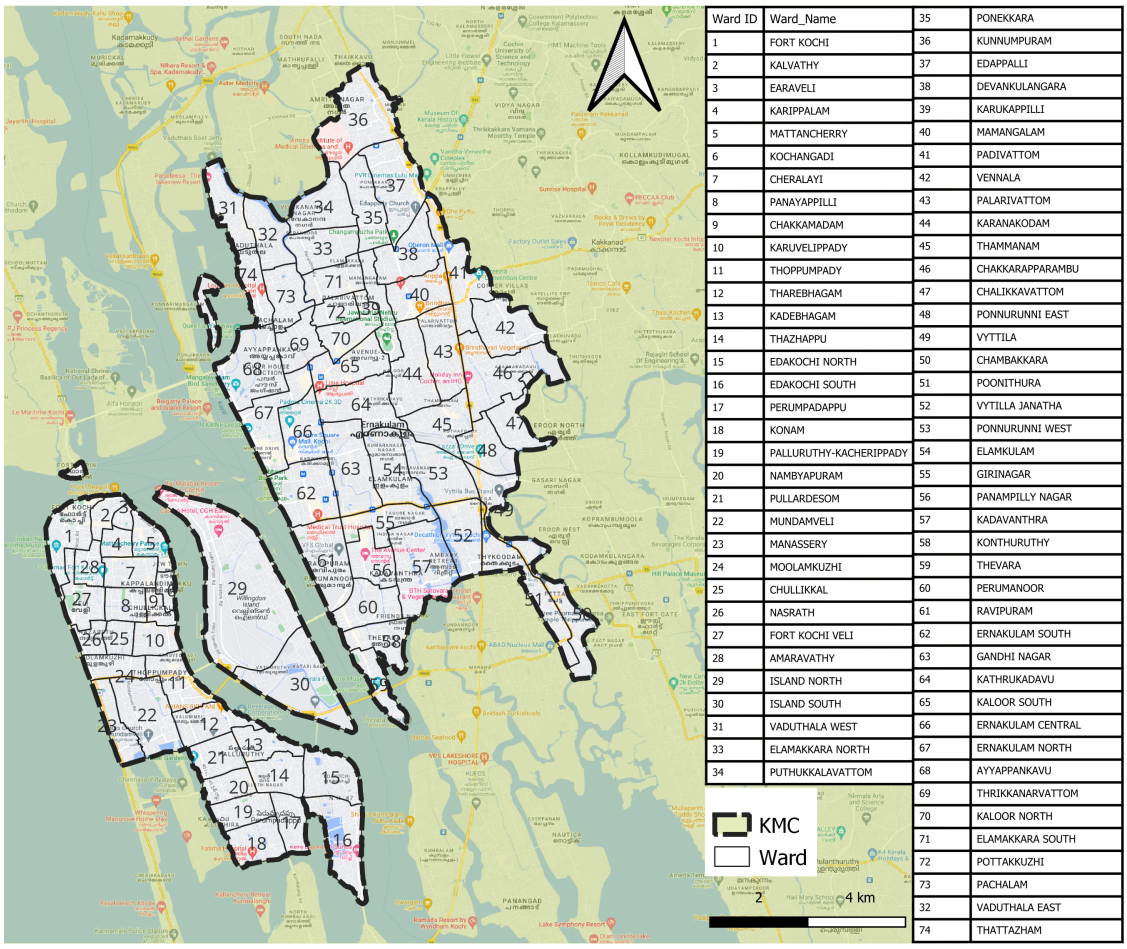
CHAPTER 4 SITE STUDY

This chapter discusses the pivotal role of studying the site of KMC in formulating a development plan for Kochi's industrial and commercial environment. It encompasses both primary and secondary data collection methods, highlighting the systematic gathering and analysis of relevant information to inform decision-making and guide the formulation of effective strategies for sustainable growth in the region.

4.1 Secondary Data Collection

4.1.1 Study Area - Basemap

Figure 4.1: Basemap of Study Area



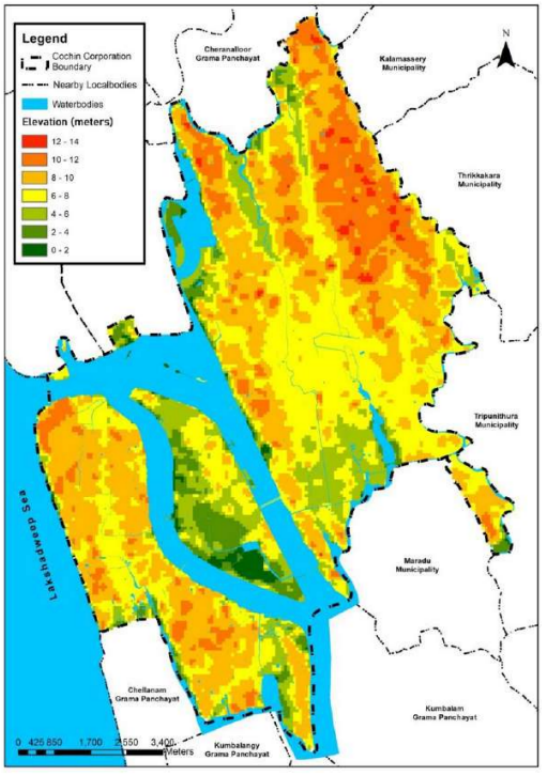
Ward ID	Ward_Name	35	PONEKKARA
1	FORT KOCHI	36	KUNNUMPURAM
2	KALVATHY	37	EDAPPALLI
3	EARAVELI	38	DEVANKULANGARA
4	KARIPPALAM	39	KARUKAPPILLI
5	MATTANCHERRY	40	MAMANGALAM
6	KOCHANGADI	41	PADIVATTOM
7	CHERALAYI	42	VENNALA
8	PANAYAPPILLI	43	PALARIVATTOM
9	CHAKKAMADAM	44	KARANAKODAM
10	KARUVELIPPADY	45	THAMMANAM
11	THOPPUMPADY	46	CHAKKARAPPARAMBU
12	THAREBHAGAM	47	CHALIKKAVATTOM
13	KADEBHAGAM	48	PONNURUNNI EAST
14	THAZHAPPU	49	VYTTILA
15	EDAKOCHI NORTH	50	CHAMBAKKARA
16	EDAKOCHI SOUTH	51	POONITHURA
17	PERUMPADAPPU	52	VYTILLA JANATHA
18	KONAM	53	PONNURUNNI WEST
19	PALLURUTHY-KACHERIPPADY	54	ELAMKULAM
20	NAMBYAPURAM	55	GIRINAGAR
21	PULLARDESOM	56	PANAMPILLY NAGAR
22	MUNDAMVELI	57	KADAVANTHRA
23	MANASSERY	58	KONTHURUTHY
24	MOOLAMKUZHI	59	THEVARA
25	CHULLIKKAL	60	PERUMANOOR
26	NASRATH	61	RAVIPURAM
27	FORT KOCHI VELI	62	ERNAKULAM SOUTH
28	AMARAVATHY	63	GANDHI NAGAR
29	ISLAND NORTH	64	KATHRUKADAVU
30	ISLAND SOUTH	65	KALOOR SOUTH
31	VADUTHALA WEST	66	ERNAKULAM CENTRAL
33	ELAMAKKARA NORTH	67	ERNAKULAM NORTH
34	PUTHUKKALAVATTOM	68	AYYAPPANKAVU
		69	THRIKKANARVATTOM
		70	KALOOR NORTH
		71	ELAMAKKARA SOUTH
		72	POTTAKKUZHI
		73	PACHALAM
		32	VADUTHALA EAST
		74	THATTAZHAM

source: Author generated with QGIS

Topography

The majority of the city is situated in the low-lying coastal areas of the district. The average height on the eastern outskirts is approximately 7.5 meters above mean sea level (MSL), while towards the west, the average elevation is less than one meter. Figure 4.2 illustrates the elevation map of the Kochi Corporation area. The central part of the mainland exhibits a lower elevation, forming a trough-like structure. The water from this area primarily flows through the Thevara-Champakkara region to reach the backwaters. This emphasizes the increasing importance of periodic operations for canal deepening and desilting in these areas. The flat terrain of the central city, with its low altitude, is interlaced with a network of canals that provide a connection to the backwaters (Kumar et al., 2014). These terrain features also have a negative impact on the sewerage and drainage system of the area. To maintain the required gradient, the drains often need to be deepened below sea level, and the sewage must be regularly pumped to specific outfall regions for disposal.

Figure 4.2: Topographic map

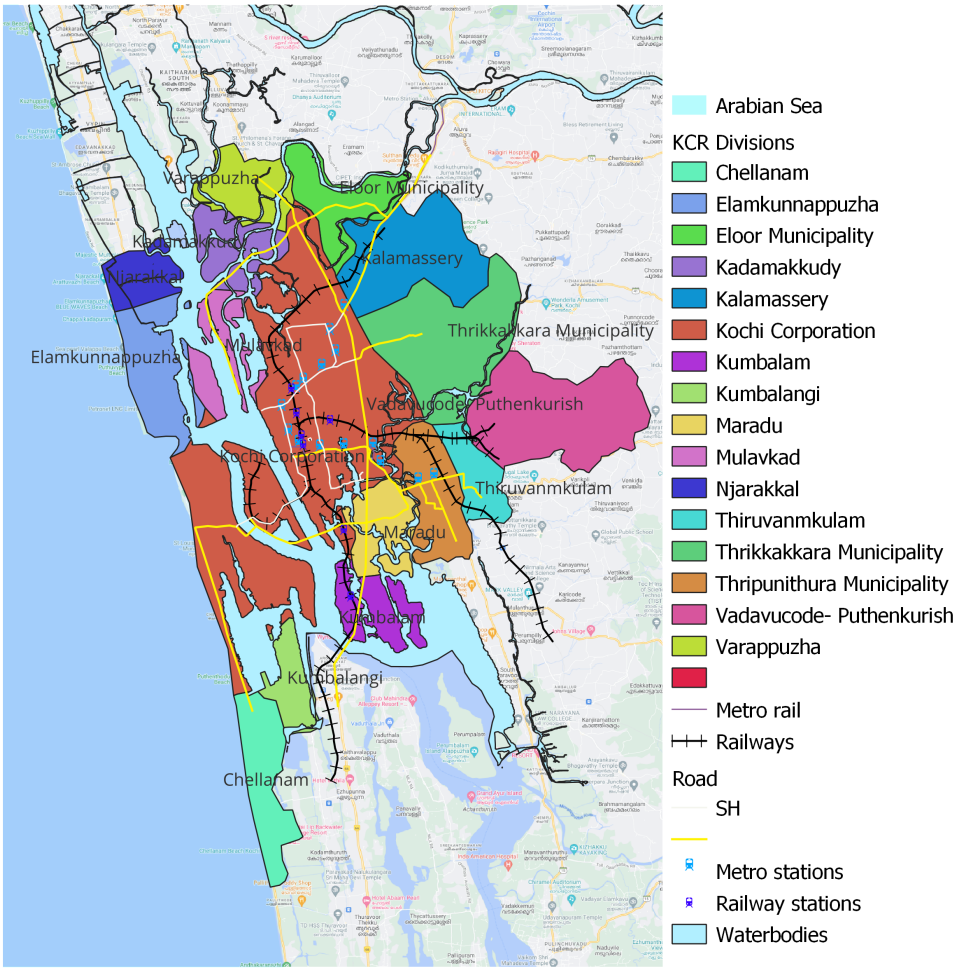


source: Kochi City Region Master plan 2031

4.1.2 Regional Setting & Connectivity

Ernakulam district possess the highest total road length of 2172 km among all districts in the state. Kochi, being one of the fortunate cities in India, enjoys excellent connectivity to other parts through major transportation modes such as road, rail, air, metro rail, and waterways. The Thiruvananthapuram-Shoranur railway line, along with National Highways NH-66, NH-544, and NH-85, serves as vital links connecting the district to other towns within the state and various cities across India. This facilitates easy access for commercial traffic from both the airport and seaport to the national transportation network.

Figure 4.3: Regional Setting



source: Author

The Cochin International Airport (CIAL), located in Nedumbassery within Ernakulam District, is the largest and busiest airport in Kerala. It serves domestic and international passengers from Kochi and surrounding regions. Additionally, there is another airport situated at Wellington

Island under the jurisdiction of the Defense Department. The district also benefits from a well-established network of inland waterways comprising backwaters, canals, lagoons, and estuaries. Kochi city alone has approximately 1100 km of waterways and canals, with around 40 km navigable by motorized crafts. The region is traversed by National Waterway No.3, connecting Kollam and Kottapuram. The state capital, Thiruvananthapuram, lies approximately 200 km to the south, accessible by road and rail, while Kozhikode city is situated around 200 km north of the district. The Kochi corporation area has a good road network system, strong rail network, well connected metro corridor and well-connected inland water transportation. The major National Highways in Kochi corporation area are NH66, NH85 and NH 966B. Other major roads in Mainland are Park Avenue rd, Shanmugham rd, Abraham Madammakkal rd, Banerji rd, MG rd, Chittoor rd, Kaloor-Kadavanthara rd, Sahodharan ayyapan rd, Vylopilly rd, Ernakulam-Ettumannor rd etc. There are five railway stations out of which Ernakulam North/Town, Ernakulam South/Junction and Edappally railway stations are the active stations. Old Railway Station situated in Mangalavanam and Cochin Harbour Terminus situated in Willington Island are currently not operational. A proper and well laid out management of water network system would have helped to reduce the load of the road and also to connect with the major points of Kochi corporation area.

4.1.3 Demography

According to 2011 census the population of Kochi Corporation area is 6,01,574 across an area of 94.88 sq.km and 74 wards.The current estimate population of Kochi city in 2023 is 829,000 , while literacy rate, sex ratio and density are mentioned below.

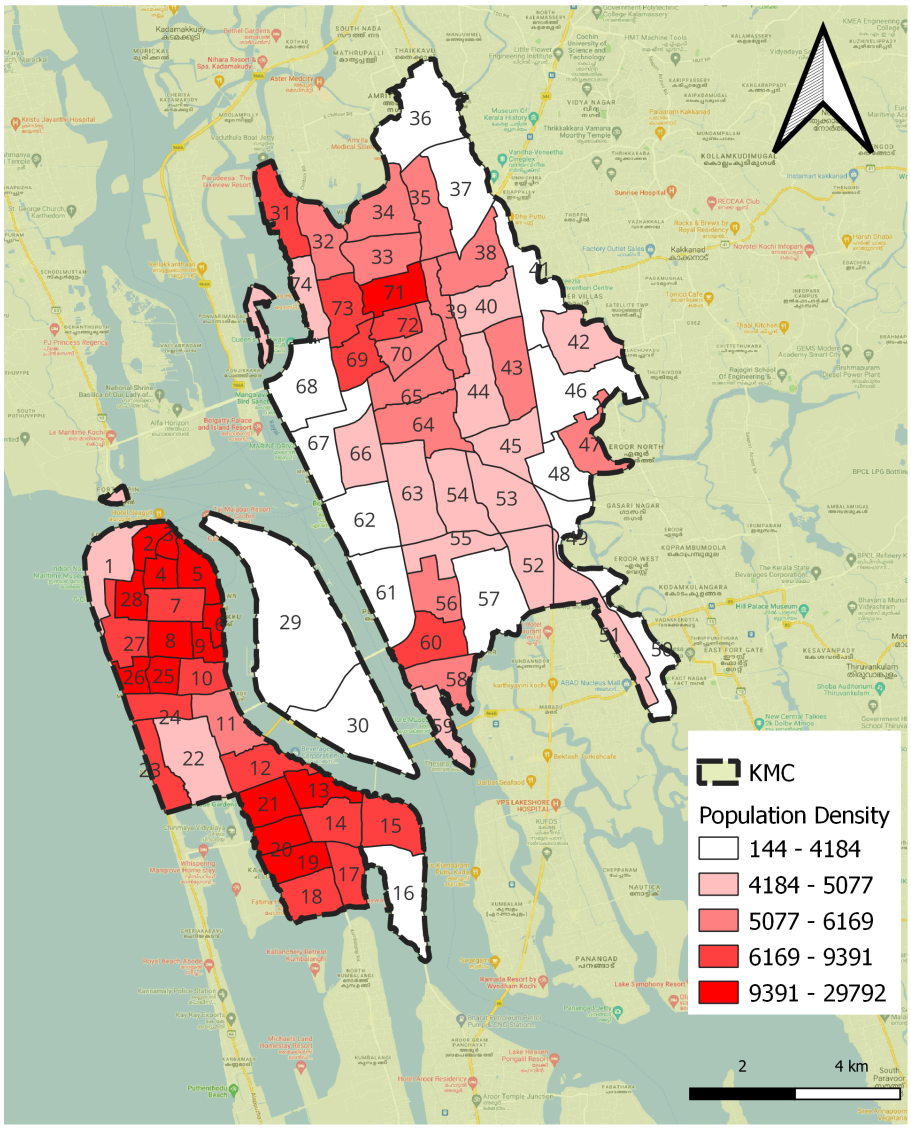
Table 4.1: Population details of Kochi Municipal Corporation (KMC)

Year	Projected Population		
	Arithmetic Increase Method	Geometric Increase Method	Incremental Increase Method
2011	601574	601574	601574
2021	929493	929493	929493
2031	962285	970763	963698
2041	995077	1013865	999316
2051	1027869	1058880	1036347

source: Author

The last census was conducted in 2011 and the schedule census for Kochi city in 2021 was postponed due to Covid. The current estimates of Kochi city are based on past growth rate. The corporation area comprises of mainland, three islands i.e. Fort Kochi and Mattancherry, Willington Island and Thanthonni thuruth as well as the small portion of Vypeen. The corporation area is flanked by the IT hub Kakkanad and Special Economic Zone Vallarpadam. Their connection to the corporation area is by means of road as well as water; road being the main flow of access gives in way for vehicular congestion in the city (Kuriakose and Philip, 2021). Hence they have a major role in the inflow of traffic to the city.

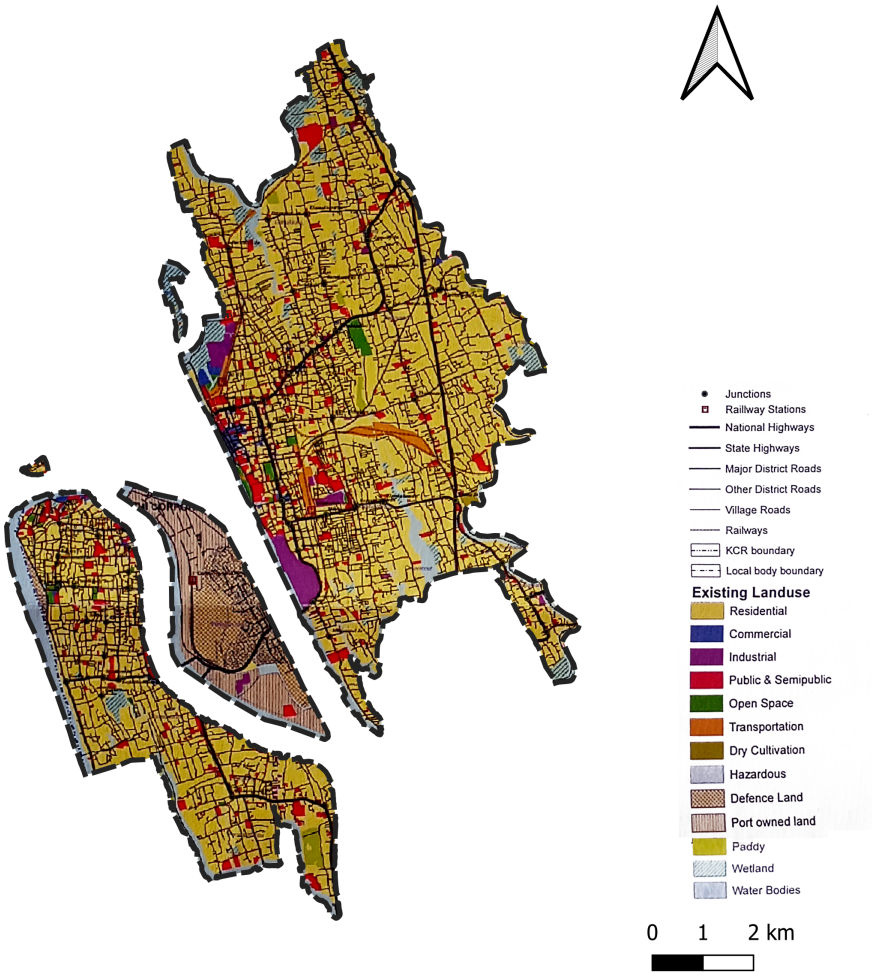
Figure 4.4: Population density



source: Author generated with QGIS, data from SECK

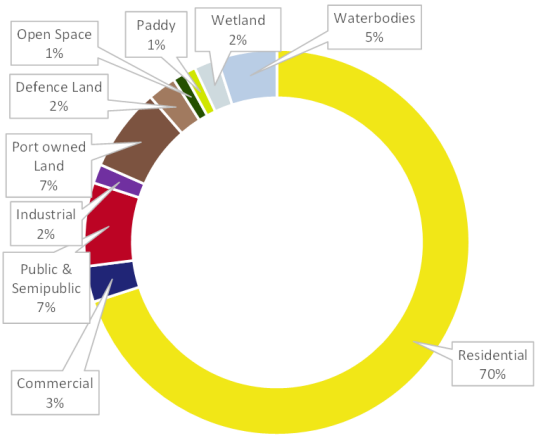
4.1.4 Land Use and Regulations

Figure 4.5: Land Use Map of KMC 2009



source: Kochi City Region Master plan 2031

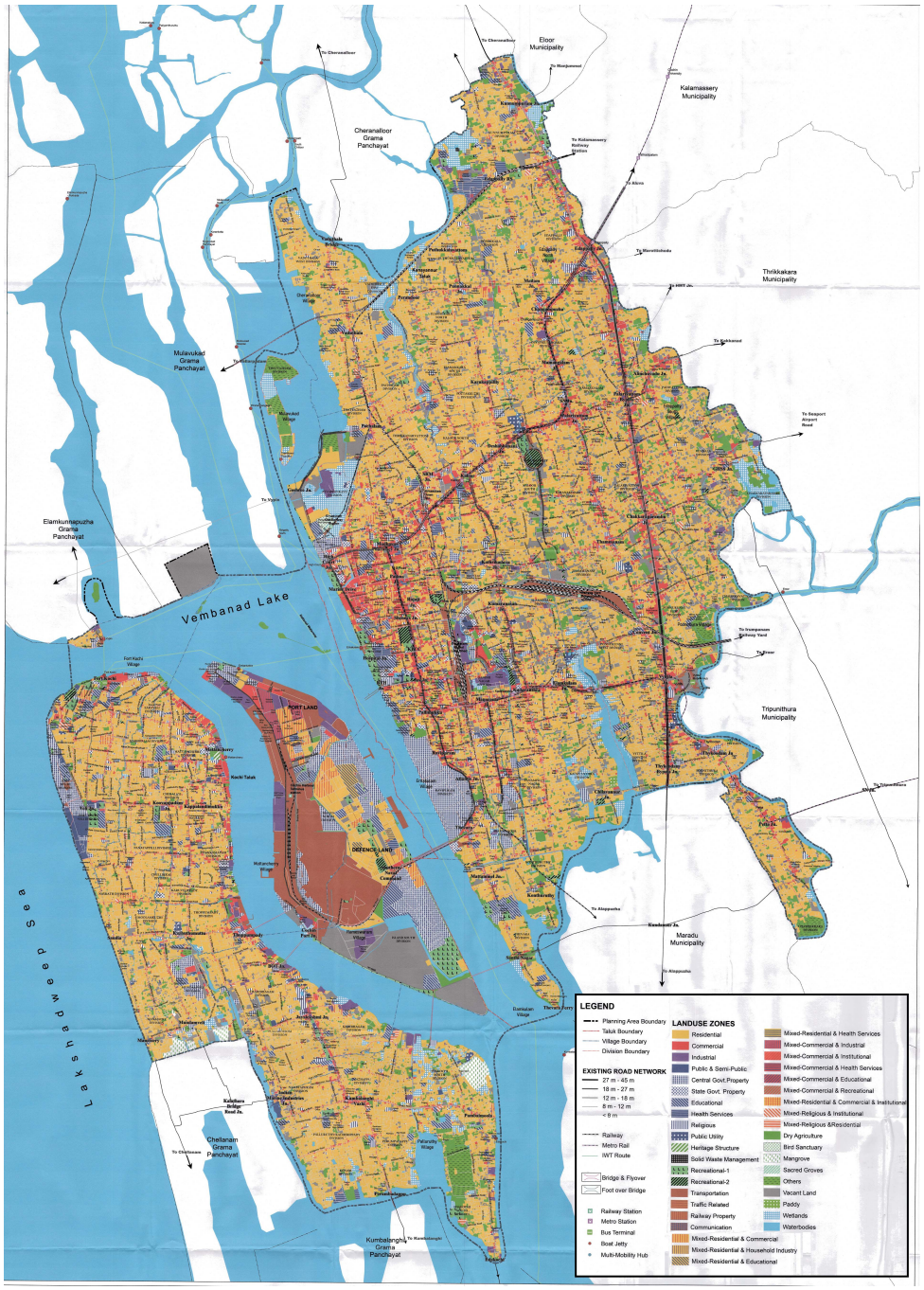
Figure 4.6: Land Use Composition 2009



source: Kochi City Region Master plan 2031

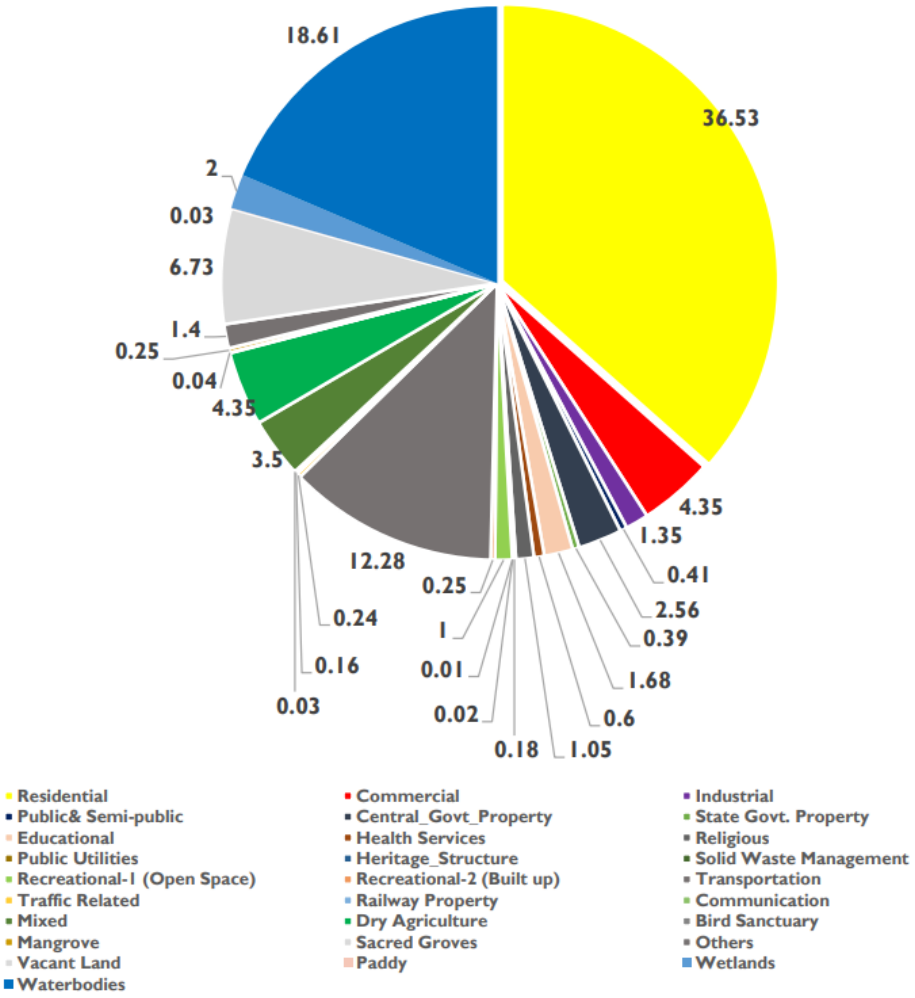
According to 2009 land use report, the highest category is residential of 70% after that commercial 3 % as well as public & semi-public category 7%. The least category was agriculture/ dry cultivation and park/ open spaces were 1% and 1% respectively.

Figure 4.7: Land Use map 2021



source: Kochi City Region Master plan 2031

Figure 4.8: Land Use Composition 2021



source: Kochi City Region Master plan 2031

Special Economic Zone (SEZ)

Cochin Shipyard is part of a Special Economic Zone (SEZ) in India. The Cochin Shipyard SEZ was set up in 2011 under the Special Economic Zones Act of 2005, and it is spread over an area of around 41 acres within the Cochin Port Trust (CPT) area.

The Cochin Shipyard SEZ is focused on the manufacture and repair of ships and other marine vessels, as well as the production of marine-related goods and services. The SEZ provides various benefits to businesses operating within it, such as tax exemptions, streamlined regulatory processes, and access to world-class infrastructure.

Being part of an SEZ can be beneficial for businesses, as it provides a favorable business environment with various incentives and facilities. This, in turn, can lead to increased investment, job creation, and economic growth in the region.

4.1.5 Economy

Commercial Centers

1. MG Road: Located in the heart of the city, MG Road is one of the oldest and most popular shopping destinations in Kochi. The street is lined with shops selling clothing, jewelry, electronics, and other consumer goods.
2. Marine Drive: This is a popular waterfront promenade that runs along the backwaters of Kochi. The area is known for its upscale restaurants, cafes, and shopping centers.
3. Broadway: This is one of the oldest commercial areas in Kochi and is known for its wholesale markets for textiles, spices, and other goods. The area also has several retail shops selling clothing, jewelry, and electronics.
4. Jew Town: Located in the historic Mattancherry neighborhood, Jew Town is known for its antique shops, spice markets, and traditional handicrafts. The area is also home to several art galleries and boutiques.
5. Lulu Mall: This is one of the largest shopping malls in India and is located on the outskirts of Kochi Municipal Corporation. The mall has over 200 retail stores selling clothing, electronics, and other consumer goods, as well as a cinema complex and several restaurants.
6. Ernakulam Market: One of the oldest and largest wholesale markets in Kerala, it is known for a wide range of goods such as spices, grains, fruits, vegetables, and textiles. The market is located in the heart of the city and is easily accessible by public transportation.
7. Kaloor: A rapidly developing commercial area in Kochi, known for its office complexes, shopping centers, and restaurants. It is also home to the Jawaharlal Nehru International Stadium, a major sports venue in Kerala.
8. Panampilly Nagar: A posh residential area that has developed into a commercial hub in recent years. It is known for its upscale boutiques, jewelry shops, and restaurants.
9. Gold Souk Grande: A popular shopping mall located in the Vytilla area of Kochi, with a wide range of retail stores selling clothing, electronics, and other consumer goods, as well as a cinema complex and food court.
10. Abad Nucleus Mall: A popular shopping and entertainment destination located in the

Maradu area of Kochi, with a wide range of retail stores, as well as a cinema complex, bowling alley, and food court.

11. MG Road Metro Station: A major transportation hub in Kochi, located in the heart of the city. The area around the station has developed into a commercial hub, with several shops, restaurants, and cafes.

Industrial centers

Kochi has emerged as a prominent hub for IT and ITES companies, earning the distinction of being ranked the second-most attractive city in India for IT-based services by NASSCOM. Its advantageous position lies in the availability of affordable bandwidth facilitated by undersea cables and lower operational costs compared to other major cities in India. The city encompasses various technology and industrial campuses, including government-promoted InfoPark, Cochin Special Economic Zone, and KINFRA Export Promotion Industrial Park, located in the outskirts. The development of a larger hi-tech business campus known as the Smart City, which encompasses the existing InfoPark, is currently in the final stages of discussion. Eloor, situated about 17 kilometers north of the city, stands as Kerala's largest industrial belt, housing over 250 industries engaged in the manufacturing of a diverse range of products such as chemicals, petrochemicals, pesticides, rare earth elements, rubber processing chemicals, fertilizers, zinc and chrome compounds, and leather goods. Additionally, a biotechnology campus is under construction in Kalamassery. Kochi serves as the headquarters of the Southern Naval Command, which acts as the primary training center for the Indian Navy. The Cochin Shipyard, located in Kochi, holds the distinction of being the largest shipbuilding facility in India. The fishing harbor at Thoppumpady, known as the Cochin fishing harbor, serves as a major fishing port in the state, supplying fish to both local and export markets. Furthermore, efforts are underway to harness the full potential of the deep-water harbor in Kochi, including the construction of a marina and an international container trans-shipment terminal. Exports and related activities also contribute significantly to the city's economy. Kochi's historical reliance on trade continues to the present day, with the city being a major exporter of spices and serving as the home to the International Pepper Exchange, where black pepper is globally traded. The Spices Board of India, responsible for the regulation and promotion of spices, is headquartered in Kochi. Additionally, Kochi is home to the Kochi Refineries Limited (KRL) at Ambalamugal, an oil refinery. Several central government establishments, such as the Coconut Development Board, the Coir

Board, and the Marine Products Export Development Authority (MPEDA), also have their head offices located in the city.

Figure 4.9: Industrial Corridors in India

source: (NICDC, 2012)

4.1.6 Infrastructure

Kochi Municipal Corporation (KMC) is the governing body responsible for providing basic civic services to the residents of Kochi, a major city in the Indian state of Kerala. The corporation is responsible for maintaining essential services such as waste management, water supply, sanitation, and other basic amenities in the city.

The infrastructure of the Kochi Municipal Corporation is divided into several departments that work together to ensure the smooth functioning of the city's services. These departments include:

1. Engineering Department: This department is responsible for maintaining the city's infrastructure such as roads, bridges, buildings, and public facilities. It also oversees the construction and maintenance of municipal buildings, water supply, drainage systems, and public parks.

2. Health Department: The health department is responsible for providing health services to the residents of Kochi. It ensures that public health standards are met, and disease prevention and control measures are taken. The department also runs various health programs to improve the health and well-being of the citizens.

3. Revenue Department: The revenue department is responsible for the collection of taxes, fees, and other charges levied by the Kochi Municipal Corporation. It also oversees the registration of births and deaths, and the issuance of licenses and permits.

4. Solid Waste Management Department: The solid waste management department is responsible for collecting and disposing of the city's waste. It ensures that waste is collected regularly from households, commercial establishments, and public places, and is disposed of in an environmentally friendly manner.

5. Water Department: The water department is responsible for providing the city with a clean and reliable water supply. It manages the city's water treatment plants, water supply network, and ensures that the water is safe for consumption.

6. Town Planning Department: The town planning department is responsible for the overall development of the city. It prepares the city's development plans, and ensures that building regulations and zoning laws are followed.

4.1.7 Cultural and Social Factors

Fort Kochi- The Heritage perspective.

1. St. Francis Church: This church was built in 1503 and is considered one of the oldest European churches in India. It was also the burial place of the Portuguese explorer Vasco da Gama.
2. Dutch Palace: This palace was built by the Portuguese in the 16th century and later renovated by the Dutch. It is now a museum that displays the history and culture of the region.
3. Jewish Synagogue: Also known as the Paradesi Synagogue, this synagogue was built in 1568 and is the oldest active synagogue in the Commonwealth of Nations.
4. Chinese Fishing Nets: These nets are a popular tourist attraction and are believed to have been introduced by Chinese traders in the 14th century.
5. Fort Kochi Beach: This beach is a popular destination for tourists and locals alike, offering stunning views of the Arabian Sea and the nearby fishing boats.
6. Vasco da Gama Square: This square is named after the famous Portuguese explorer who landed in Kochi in 1498. It is a popular gathering place and features a statue of Vasco da Gama.
7. Santa Cruz Basilica: This church was built in the 16th century by the Portuguese and is considered one of the finest examples of Gothic architecture in India.
8. Indo-Portuguese Museum: This museum is located inside the Bishop's House and showcases the influence of Portuguese culture on Kerala's art, architecture, and lifestyle.
9. Koder House: This historic house was built in the early 1800s by a wealthy Jewish businessman named Samuel S. Koder. It is known for its beautiful architecture and antique furniture.
10. Bishop's House: This beautiful building was built in 1506 and served as the residence of the Portuguese Governor. It was later used by the British and is now the official residence of the Bishop of Kochi.
11. Bastion Bungalow: This colonial bungalow was built in the early 17th century and is

known for its unique architecture and beautiful gardens.

12. Pierce Leslie Bungalow: This bungalow was built in the 19th century and is known for its beautiful architecture, antique furniture, and historic artifacts.
13. Princess Street: This historic street is lined with beautiful colonial buildings and is a popular destination for shopping, dining, and sightseeing.
14. David Hall: This historic building was built in the 17th century and was once the residence of the Dutch Governor. It is now an art gallery and cultural center that hosts exhibitions, concerts, and other events (Kasthurba, 2013).

Willingdon Island

1. Maritime Museum: A museum showcasing the maritime history of Kochi, with a collection of old boats, models, and other artifacts.
2. Willingdon Island Jetty: A busy jetty located on the eastern shore of Willingdon Island, from where ferries and boats depart to various destinations.
3. Kochi Port: One of the busiest ports in India, located on the western shore of Willingdon Island. Visitors can watch the ships arriving and departing, and take a boat ride to explore the harbor.
4. Bolgatty Island: A small island located adjacent to Willingdon Island, which is home to the Bolgatty Palace, a popular heritage hotel, as well as a golf course, a marina, and a park.
5. Vallarpadam Church: A popular pilgrimage center located on Vallarpadam Island, which is connected to Willingdon Island by a bridge.
6. Mattancherry Palace: A palace located in the nearby Mattancherry neighborhood, which is now a museum showcasing the history and culture of Kochi.

Kochi Mainland

1. Kerala Folklore Museum: A museum showcasing the rich cultural heritage of Kerala with a collection of traditional art, crafts, and artifacts. It also features live performances of traditional music and dance.

2. Subhash Bose Park: A popular park named after the Indian freedom fighter, Subhash Chandra Bose, featuring a children's play area, a musical fountain, and lush greenery.

3. Queens Walkway: A scenic walkway along the Arabian Sea, offering stunning views of the water and the nearby islands. It is a popular spot for jogging, walking, and cycling.

4. Marine Drive: A popular promenade along the shoreline, lined with shops, restaurants, and cafes. It offers stunning views of the sunset and is a popular spot for leisurely strolls.

5. Panamkuzhy Eco Tourism: A picturesque destination located in the outskirts of Kochi, featuring a variety of eco-tourism activities such as trekking, bird watching, and boating.

6. Mangalavanam Bird Sanctuary: A natural sanctuary located in the heart of Kochi, home to a variety of migratory and resident birds. It is a popular spot for bird watching and nature photography.

7. COPT Park: A park located in the heart of Kochi, featuring lush greenery, a children's play area, and a jogging track. It is a popular spot for picnics and outdoor activities.

8. Indira Priyadarshini Park: A park named after the former Prime Minister of India, Indira Gandhi, featuring a musical fountain, a butterfly garden, and a children's play area.

9. Aspinwall House: A historic building located in Fort Kochi, which now houses art exhibitions, cultural events, and music concerts. It is a popular spot for art lovers and history enthusiasts.

4.1.8 Political factors, Governance, Development and Administration

Development Agencies

The Kochi municipal corporation (KMC) is headed by a Mayor and divided into administrative wards from which the members of the corporation council are elected. The KMC functions include providing major civic services like roads, street lighting, SWM, and slum improvement. The corporation has its central office situated in Ernakulam and has zonal offices at various locations. The spatial planning for scientific and economic development has become a municipal function in the wake of the 73rd and 74th constitutional amendments, and a comprehensive master plan has become essential for the decentralized planning efforts. The Greater Cochin Development Authority (GCDA) is responsible for the orderly and planned development of the

Greater Cochin Region, while the Goshree Islands Development Authority (GIDA) is responsible for developing the infrastructure facilities of scattered islands in and around the Kochi city.

Kochi is one of the Amrut Cities in Kerala, and in accordance with the Amrut guidelines, a City Mission Management Unit has been established to coordinate the activities of Amrut Projects. The funds have been allocated for various projects in the city, including water supply, sewerage, drainage, urban transport, and parks. A total of 272.06Cr has been allocated, with water supply receiving the highest amount at 114.84Cr, followed by sewerage at 61.08Cr and drainage at 60.89Cr. The allocation for urban transport is 31.24Cr, and for parks, it is 4.006Cr. The table below shows the fund allocation in more detail:

Table 4.2: Fund details of AMRUT

Sector	Fund (Cr.)
Water Supply	114.8
Sewerage	61
Drainage	60.9
Urban transport	31.2
Park	4
Total	271.9

source:(KMC, 2015)

4.2 Primary Data Collection

4.2.1 Traffic and transportation

One of the major challenges faced by the city is traffic congestion. The city's narrow roads and increasing number of vehicles have led to significant traffic jams during peak hours. To address this issue, the KMC has undertaken several road widening projects, including the widening of NH 66 and the construction of the Kochi Metro Rail.

The Kochi Metro Rail is a rapid transit system that operates on an elevated and underground network. The metro has become a popular mode of transportation for commuters, reducing the number of private vehicles on the roads. The KMC is also exploring the feasibility of implementing other public transportation options like water taxis and e-buses.

In addition to public transportation, the KMC is promoting the use of bicycles as a sustain-

able mode of transportation. The city has several dedicated bicycle lanes, and the KMC has launched several initiatives to encourage more people to use bicycles. These initiatives include the introduction of bicycle rental services and the establishment of cycle stations across the city.

The KMC is also focusing on improving parking facilities in the city. The construction of new parking lots and the introduction of pay-and-park systems have helped to reduce traffic congestion and improve traffic flow.

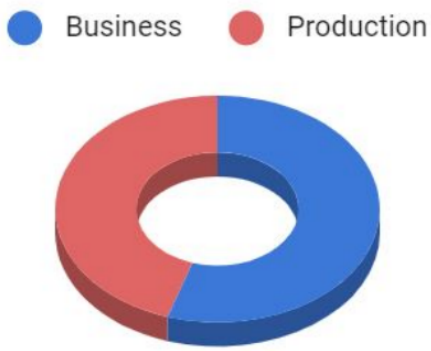
Cochin possess a well-developed inland waterway system consisting of backwaters, canals, lagoons, and estuaries. National Waterway No.3, which connects Kollam and Kottappuram, passes through this region. Boat services are operated by the Kerala Shipping and Inland Navigation Corporation, the State Water Transport Department, and private firms from various boat jetties in the city. Additionally, junkarferry services are available for the transshipment of vehicles and passengers between the islands.

Cochin port is a fully protected all-weather port with midstream mooring facilities in the channels and wharfs located on both sides of Willigton Island facing the channels. As the only major port in Kerala state, it is administered by a statutory autonomous body and holds an ISO 9001-2000 certification. The port provides berths for handling cargo and passenger ships, cargo handling equipment, storage facilities, a dry dock, bunkering services, and a fisheries harbor. In the past, passenger ships operated from Cochin Port to Colombo and the Lakshadweep Islands. The entrance to Cochin Port is through the Cochin Gut, located between the Vyppin peninsular headland and Fort Cochin. Furthermore, the International Container Transshipment Terminal (ICTT), which is part of Cochin Port, stands as the largest container transshipment facility in India. The terminal spans 605 meters in length and has a capacity of 1 million TEUs in the first phase, with plans to expand its ultimate capacity to 3 million TEUs.

In conclusion, while Kochi's traffic and transportation scenario is still evolving, the KMC is taking proactive steps to address the challenges faced by the city. Through the development of new roads, public transportation options, and alternative modes of transportation, the KMC is working towards creating a sustainable and efficient transportation system that benefits both the residents and the visitors of the city.

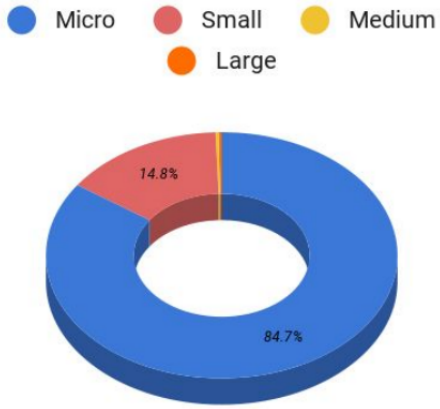
4.3 Business and Production services

Figure 4.10: Percentage of Business with production in KMC



source: DIC Ernakulam

Figure 4.11: Enterprises Composition



source: DIC Ernakulam

4.4 Concentration Index (CI)

The Concentration Index (CI) is a measure used to assess the concentration or distribution of a particular land use within a given geographic area, such as a division or municipality. It provides insights into the spatial pattern and extent of a specific land use within the larger context of the division and municipality.

$$CI = \frac{\text{Area of that land use in a Division}/\text{Total area of the Division}}{\text{Area of that land use in the Municipality}/\text{Total area of the Municipality}}$$

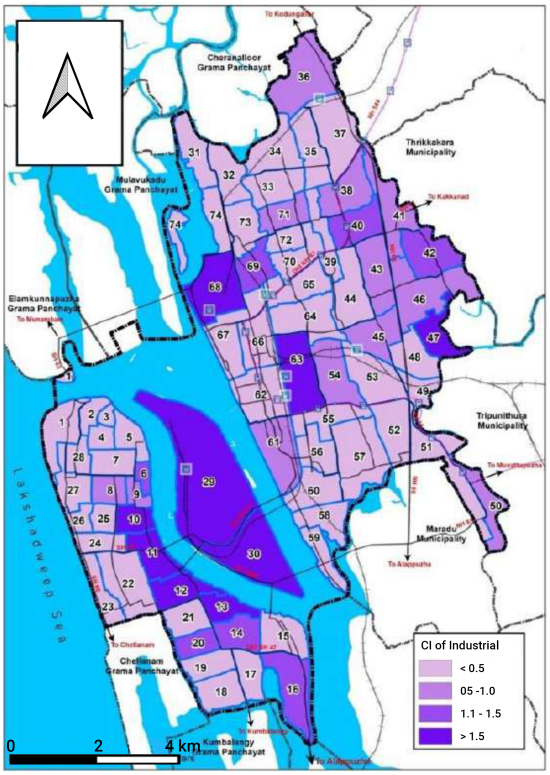
where,

CI : Concentration Index

The numerator of the formula represents the proportion of the land area occupied by the specific land use within the division, relative to the total area of the division. The denominator represents the proportion of the land area occupied by the same land use within the municipality, relative to the total area of the municipality. By comparing these ratios, the Concentration Index provides a measure of how concentrated or dispersed the land use is within the division, relative to its distribution in the municipality as a whole. A CI value greater than 1 indicates a higher concentration of the land use in the division compared to the municipality, suggesting a

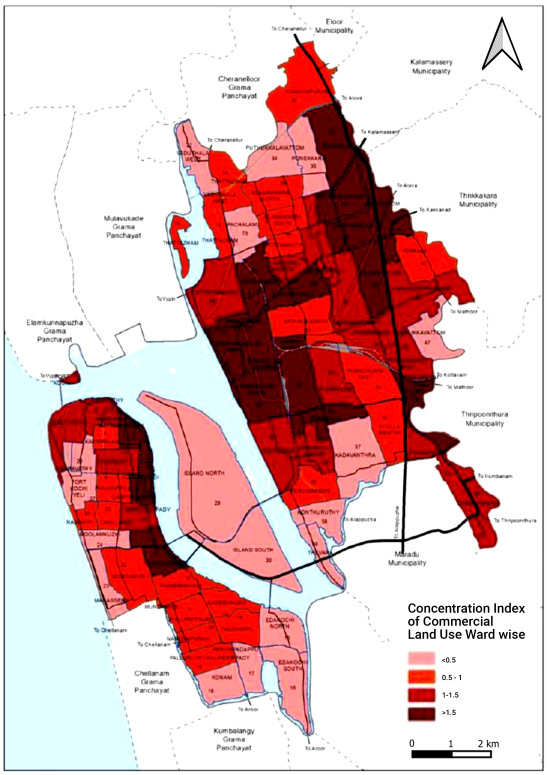
localized or clustered pattern. Conversely, a CI value less than 1 suggests a lower concentration or a more dispersed distribution within the division.

Figure 4.12: Industrial Land Use CI



source: Author

Figure 4.13: Commercial Land Use CI



source: Author

The analysis reveals that industrial activities are primarily clustered within Divisions 10, 11, 12, 13, 29, 30, 47, 63, and 68, indicating the presence of large-scale industries. However, the concentration is particularly noticeable in Wellington Island, Gandhinagar, and the eastern part of the city. The municipal corporation hosts significant industrial enterprises such as Hindustan Lever at Ayyappankavu, Cochin Shipyard, Civil Supplies Corporation, and Caltex. Moreover, areas like Chambakkara, Chalikkavattom, Vennala, Thrikkanarvattom, Mamangam, and Island North exhibit a high concentration of industrial activity.

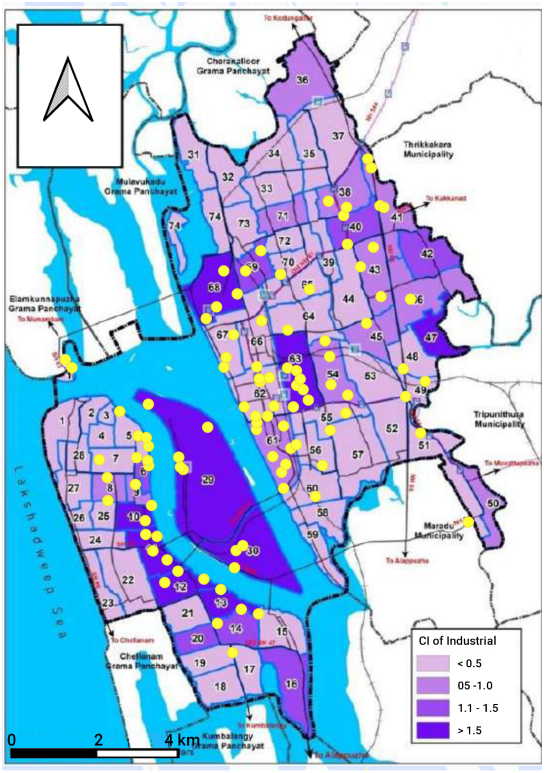
In the western part of Kochi, commercial developments are primarily focused in the eastern wards along Bazaar Road. Additionally, new commercial developments are emerging in Thoppumpady with the construction of the BOT Bridge that connects West Kochi with the mainland. Central areas and wards along Banerjee Road, stretching from High Court Junction to Kacherippady Junction, as well as MG Road, SA Road from Pallimukku to Kadavanthra, NH Bypass from Chakkaraparambu to Kunumpuram, and Vyttila, also exhibit concentrated com-

mercial activity. Moreover, the heritage areas of Fort Kochi and Mattancherry display a notable level of commercial concentration.

4.5 Sample Survey

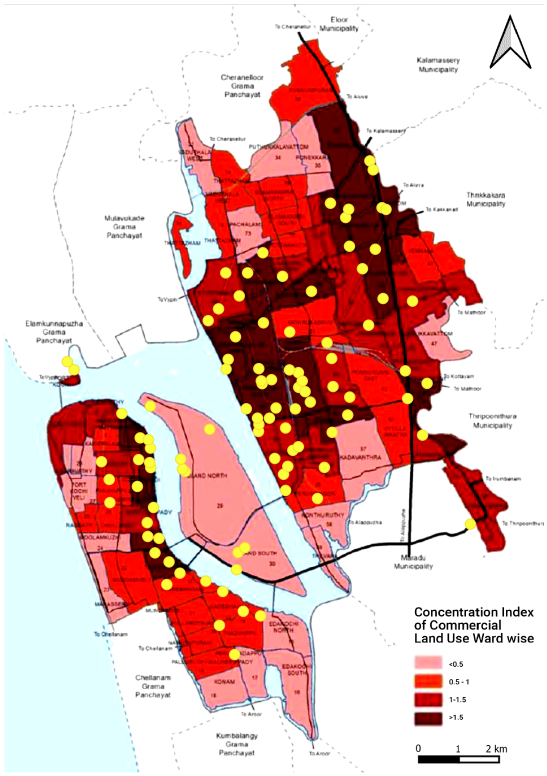
A survey was conducted to gather data from 200 samples of industries and service enterprises in the Kochi Municipal Corporation area, as part of the preparation for a development plan. The selection of these samples was based on the concentration index of industrial and commercial land use. The concentration index served as a criterion to identify areas with significant industrial and commercial activities, ensuring a representative sample that reflects the economic landscape of the region. By collecting data from these samples, a comprehensive understanding of the existing industrial and commercial sectors was obtained. This survey aimed to assess the current state of industrial and commercial development, identify key trends, and gather insights to inform the formulation of an effective development plan for the future.

Figure 4.14: Location of Samples overlaid with Industrial Land Use CI



source: Author

Figure 4.15: Location of Samples overlaid with Commercial Land Use CI

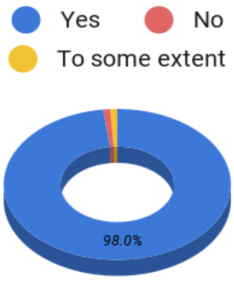


source: Author

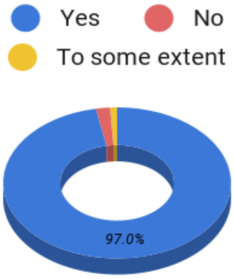
4.6 Results

Figure 4.16: Results

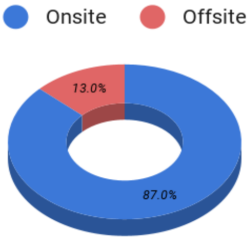
(a) Essential Services



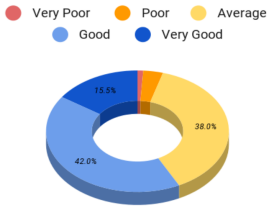
(b) Street Lighting



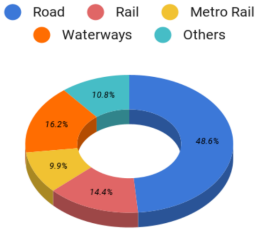
(c) SWM



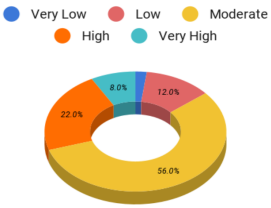
(d) Connectivity



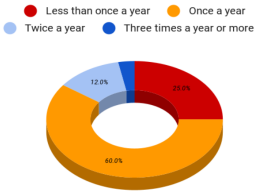
(e) Modes of Transport



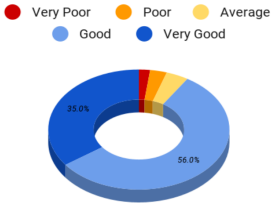
(f) Technology



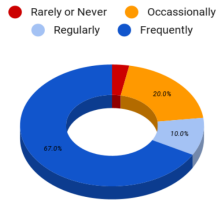
(g) Infrastructure Upgradation



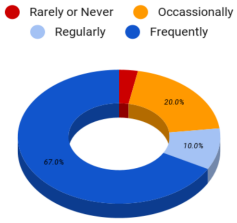
(h) Diversity and Inclusion



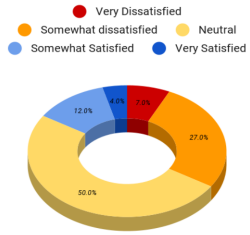
(i) Community events



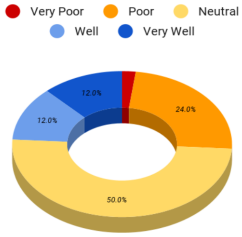
(j) Employee training



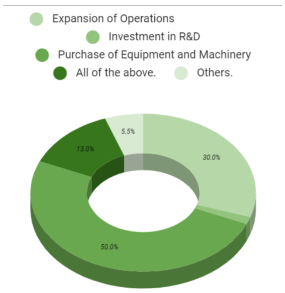
(k) Regulatory environment



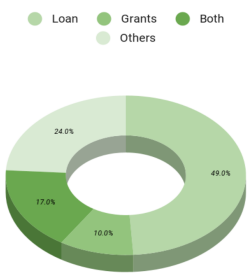
(l) Govt Support



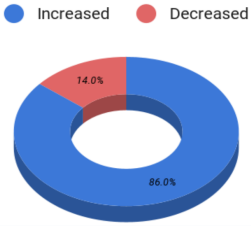
(m) Fund Utilisation



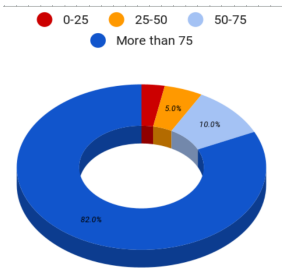
(n) Funding



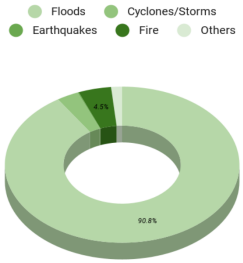
(o) Business growth



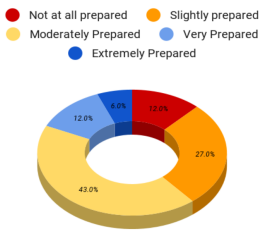
(p) Renewable resources



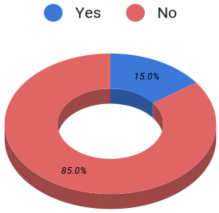
(q) Major Hazards



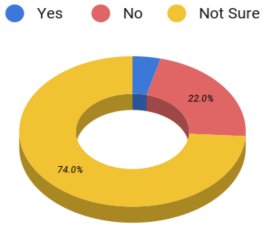
(r) Disaster management



(s) Health effects



(t) Pollution



Source: Primary Survey

These results are used to refine the concepts for the industrial and commercial development plan.

CHAPTER 5 DATA ANALYSIS & INFERENCES

This chapter will discuss the different steps involved in data analysis, including data cleaning, data mining, and data visualization. The chapter will also discuss the importance of data processing and analysis in decision-making.

5.1 SWOT Analysis

5.1.1 General City Profile

Strength:

1. Strategic Location Infrastructure: Kochi's modern port, near airports, and highways make it an ideal location for industrial and commercial development.
2. Skilled Workforce: Kochi has a large pool of skilled and educated workers.
3. Emerging IT Hub: Kochi is emerging as a major IT hub, with many software companies setting up their offices here.

Weakness:

1. Limited Land Availability: With increasing population density, Kochi faces limited land availability for industrial and commercial development.
2. Improper Waste Management and Implementation: Kochi needs to improve its waste management system to maintain its image as a growing city.
3. High Cost of Real Estate: The high cost of real estate in Kochi makes it difficult for small and medium-sized enterprises (SMEs) to set up their businesses in the city.

Opportunity:

1. Bengaluru-Kochi Industrial Corridor: The Bengaluru-Kochi Industrial Corridor presents an excellent opportunity for industrial and commercial development in Kochi.

2. Emerging Sectors: Kochi is emerging as a hub for sectors such as IT, tourism, and healthcare, presenting opportunities for companies in these sectors.

3. Government Support: The Kerala government is actively promoting industrial and commercial development in Kochi, offering various incentives and subsidies to companies.

Threat:

1. Environmental Concerns: Industrial and commercial development can have a negative impact on the environment, and Kochi needs to address these concerns to maintain its image as a sustainable and growing city.

2. Flood Prone Area: Kochi is prone to flooding, which can cause disruption to business activities and discourage companies from investing in the city.

3. Competition: Kochi faces stiff competition from other cities in India, such as Bengaluru, Hyderabad, and Chennai, which are also emerging as major IT and industrial hubs.

5.1.2 Employment

Table 5.1: SWOT Employment Sector

STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
The main-marginal composition of workers in 2011 indicates that the Corporation provides its workers with work for most of the year, when compared to the other urban and rural areas of the district.	The proportion of workers in the household industries sector in Kochi City is 1.8% which is not high compared to the state figure in 2011. The past trend indicates that this sector is reducing.	refernces Low FWPR shows women-centered work centers and job opportunities need to be planned to ensure inclusive development. The existence of literate population, low capital and technological requirements, a ready and vast market for a variety of consumer goods, and organizations like Kudumbashree are favorable points for generating employment in traditional and household industries.	Balanced development of Kochi and the Region is essential and this requires policy and investment decisions in line with the spatial plan. Infrastructure development would require substantial mobilization of resources. Implementation of projects and management of facilities created are critical.

Source: Author

5.1.3 Economy

Table 5.2: SWOT Economy Sector

STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
More than 60% of the tax revenue of the State comes from Kochi. Kochi has a diversified economic base surrounded by various types of industries, port, tourism and a strong commercial and financial base. Cheaper real estate costs compared to other metros in India, good communications infrastructure, low labour costs.	Major economic activities are largely concentrated in the corporation area puts pressure on the available infrastructure. Inadequate supply of land and infrastructure to support further development.	Projects being undertaken at Kochi would further bolster economic development potential of Kochi. Global investment opportunity in various sectors such as IT, Tourism, Industry, Infrastructure and Education. An integrated and comprehensive development strategy could exploit the factors that are conducive for further development of Kochi as a Global City	Balanced development of Kochi and the Region is essential and this requires policy and investment decisions in line with the spatial plan. Infrastructure development would require substantial mobilization of resources. Implementation of projects and Management of facilities created are critical.

Source: Author

5.1.4 Commerce

Table 5.3: SWOT Commerce Sector

STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Commercial capital of Kerala. Port access. High Concentration Index of Commercial Land Use in the Mainland.	Inadequate supply of land and infrastructure to support further development.		Presence of Petroleum industries in the western coast may affect sea level rise and other climate changing issues. Rise in problems of proper Solid waste management.

Source: Author

5.1.5 SWOT Industries

Table 5.4: Industries

STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Has a good and diversified industrial sector surrounding the Municipal limits. Good connectivity by air, water and land. Presence of technical institutions and good manpower and qualified youth. Good trade and marketing facilities	Non availability of suitable land for Large scale industries. Hike in Land Value. Absence of wholesale markets for input resources. Deline of traditional industries.	Service sector industries and green category micro enterprises (micro food products, printing press, IT and traditional industries like handicrafts and handloom industries can be set up). Handicrafts and Handloom industries linked with tourism sector.	Presence of Petroleum industries in the western coast may affect sea level rise and other climate changing issues. Rise in problems of proper Solid waste management.

Source: Author

CHAPTER 6 CASE STUDY

This chapter discusses the different types of case studies which are relevant in industrial and commercial development. The cities are chosen with its similarity with the study area and its growth.

6.1 Cities with best industrial and commercial development

Here are some carefully chosen cities which exhibit similarities to the study area and demonstrate remarkable growth, providing valuable insights into the strategies and factors contributing to their success. These examples also uncover the commonalities and unique characteristics that have propelled these cities towards economic prosperity and competitiveness.

1. Singapore: A small island city-state with a highly diversified economy and a strategic location that has made it a hub for international trade and finance (Huff, 1995).
2. Dubai: A city in the United Arab Emirates that has rapidly grown into a center for business and commerce in the Middle East, with a highly diversified economy ranging from finance to logistics.
3. Shanghai: China's largest and most important cities, with a population of over 24 million people, and a major hub for international trade and finance, with some of the world's largest ports and airports.
4. New York City: A global center for finance, media, and culture, with a highly developed infrastructure and some of the world's largest banks and financial institutions.
5. London: One of the world's most important financial centers, with a diverse range of industries and the London Stock Exchange, one of the largest and most important stock exchanges in the world.
6. Tokyo: The capital city of Japan and a major center for innovation and technology, with some of the world's largest and most innovative companies.
7. Hong Kong: A highly developed city-state in southeastern China, with a strong focus on finance, logistics, and technology, and a major center for international trade.

8. Seoul: The capital city of South Korea and one of the largest cities in the world, home to some of the world's largest companies, including Samsung, LG, and Hyundai, and a major hub for technology and innovation (Joo, 2018).

9. San Francisco: A major center for technology and innovation in the United States, home to some of the world's largest and most innovative tech companies.

10. Bengaluru: Also known as Bangalore, a major technology hub in India, home to some of the world's largest and most innovative tech companies, including Infosys, Wipro, and Flipkart.

11. Navi Mumbai, India: With an area of 108.05 km², Navi Mumbai has developed into a major center for the information technology and manufacturing industries. The city has implemented policies to attract foreign investment, promote entrepreneurship, and support sustainable development (Shaw, 2003).

12. Sapporo, Japan: With an area of 1,121.26 km², Sapporo is the fourth largest city in Japan and has developed into a major center for tourism, agriculture, and technology. The city has implemented policies to promote innovation, entrepreneurship, and sustainable development.

13. Bilbao, Spain: With an area of 40.56 km², Bilbao has undergone a major transformation in recent years, becoming a center for the arts, culture, and tourism. The city has implemented policies to attract foreign investment, promote sustainable development, and support the growth of small and medium-sized enterprises.

14. Basel, Switzerland: With an area of 37.51 km², Basel is recognized as a major center for the pharmaceutical and chemical industries. The city has implemented policies to promote innovation, attract foreign investment, and support entrepreneurship.

15. Adelaide, Australia: With an area of 1,826.91 km², Adelaide has developed into a major center for education, defense, and health services. The city has implemented policies to promote innovation, attract foreign investment, and support the growth of small and medium-sized enterprises.

16. Daegu, South Korea: With an area of 883.54 km², Daegu has developed into a major economic hub, with a focus on the textile and machinery industries. The city has implemented policies to attract foreign investment and support the growth of small and

medium-sized enterprises.

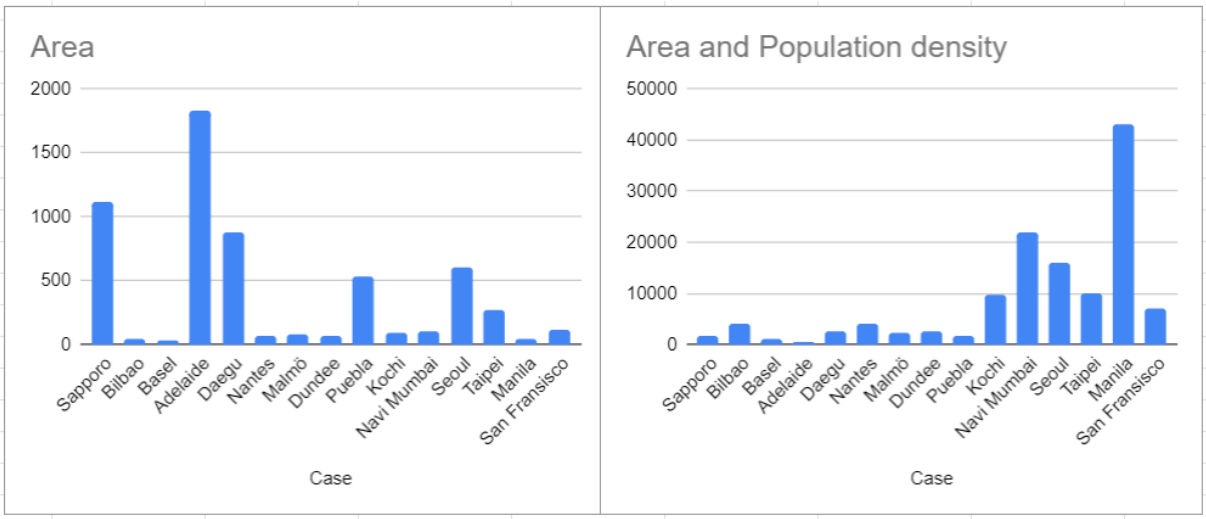
17. Nantes, France: With an area of 65.19 km², Nantes has developed into a major center for innovation and technology, with a focus on the green and renewable energy industries. The city has implemented policies to promote sustainable development, attract new industries, and support entrepreneurship.

18. Malmö, Sweden: With an area of 77.06 km², Malmö has developed into a major center for the IT and creative industries. The city has implemented policies to support entrepreneurship, innovation, and sustainable development, and has developed a strong startup ecosystem.

19. Dundee, United Kingdom: With an area of 67.43 km², Dundee has developed into a major center for the gaming and creative industries. The city has implemented policies to support entrepreneurship, innovation, and cultural development, and has developed a world-class video game industry.

20. Puebla, Mexico: With an area of 534.32 km², Puebla has developed into a major center for the automotive and aerospace industries. The city has implemented policies to attract foreign investment, support the growth of small and medium-sized enterprises, and promote innovation and technological advancement.

Figure 6.1: Area and density comparison



source: Author

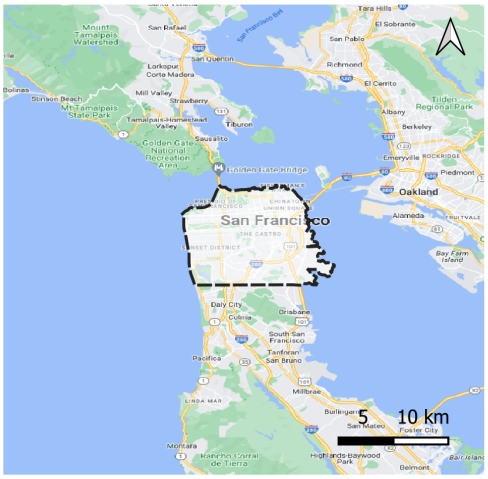
6.2 Case Study selection

To facilitate industrial and commercial development in Kochi, case studies have been carefully chosen based on performance and a comparative analysis of similar areas and densities. The aim is to adapt successful development strategies from other cities to benefit Kochi. Three specific cases have been selected for study: San Francisco, Seoul, and Navi Mumbai. These cities were chosen because they share several similarities with Kochi in terms of area, port accessibility, population density, and growth patterns.

Figure 6.2: Kochi

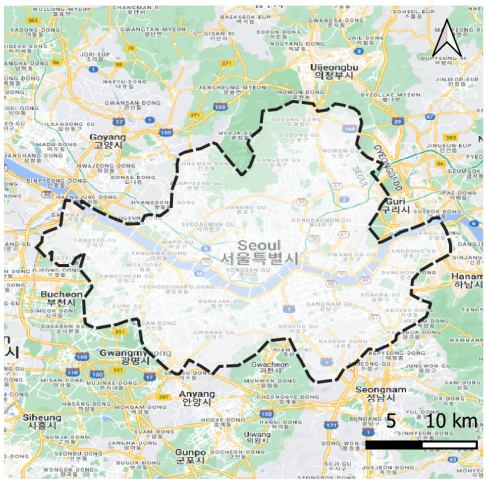
source: Author generated from Google maps

Figure 6.3: San Francisco



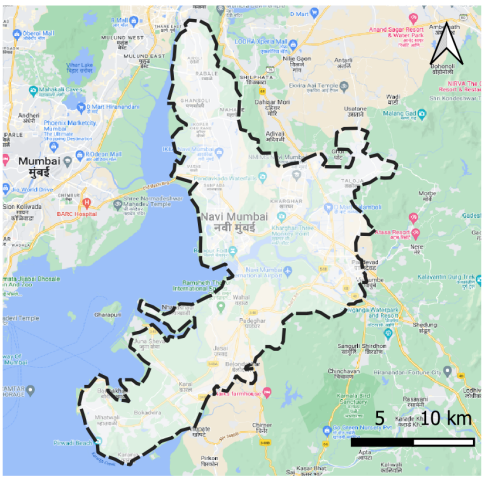
source: Author generated from Google maps

Figure 6.4: Seoul



source: Author generated from Google maps

Figure 6.5: Navi Mumbai



source: Author generated from Google maps

San Francisco, renowned for its thriving tech industry, bears resemblance to Kochi as a coastal city with a significant port presence. By studying San Francisco's development trajectory, Kochi can gain insights into fostering innovation and attracting technology-driven industries.

Seoul, the capital of South Korea, is known for its robust infrastructure and urban development. With a similar population density and rapid growth patterns, Kochi can analyze Seoul's strategies for managing urbanization, transportation networks, and attracting global investments.

Navi Mumbai, located near Mumbai, India's financial capital, shares similarities with Kochi in terms of port connectivity, planned urban development, and a burgeoning commercial sector. By studying Navi Mumbai's experiences, Kochi can understand how to create an investor-friendly environment and promote a diversified economic base.

6.3 San Francisco

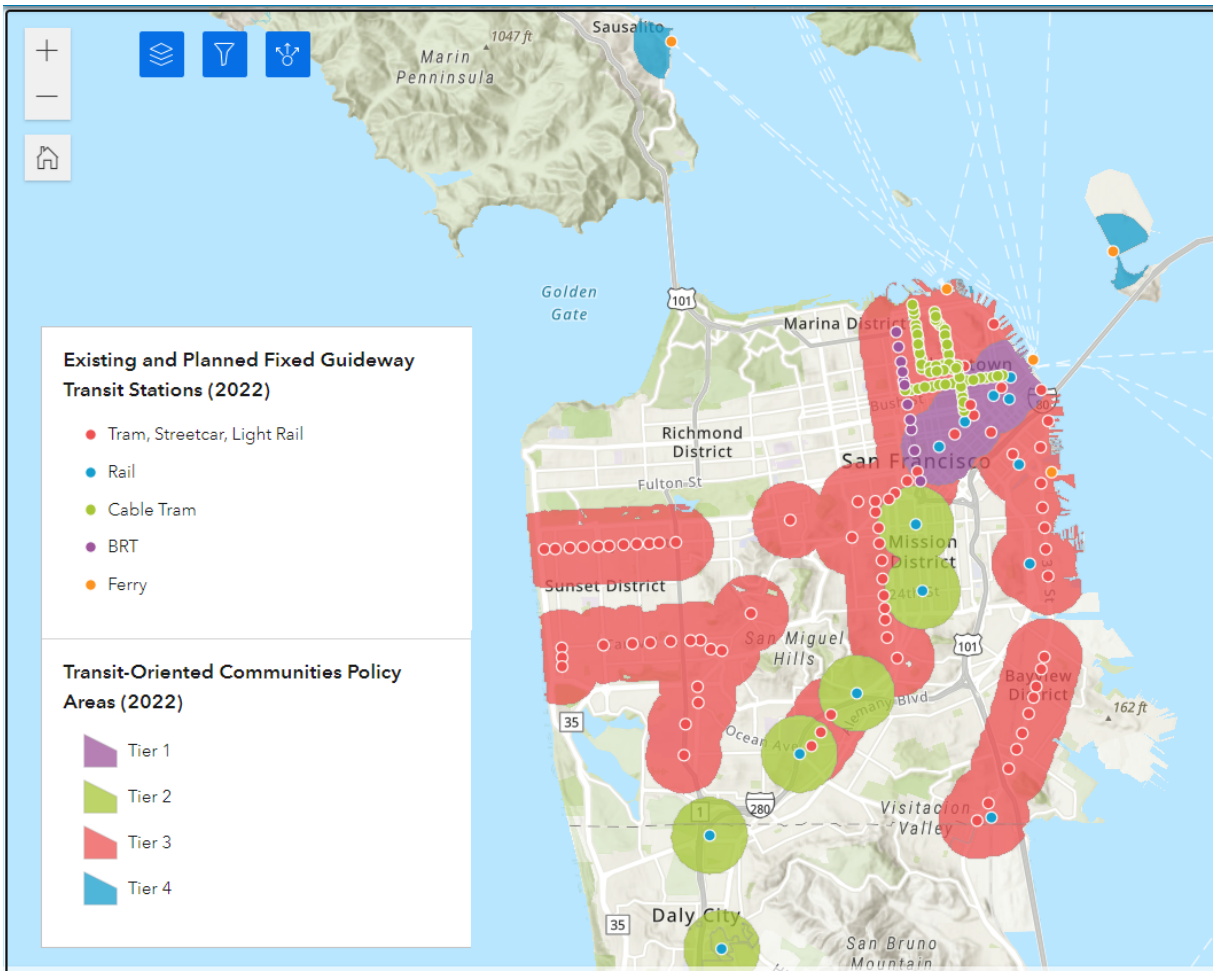
San Francisco is a bustling city located on the west coast of the United States, known for its vibrant culture, scenic beauty, and dynamic economy. Over the years, San Francisco has transformed from a small trading post to a major commercial and financial hub, attracting businesses from all over the world. Its strategic location, diverse population, and entrepreneurial spirit have contributed to its success as a case study on industrial and commercial development. In this study, we will examine the history of San Francisco's industrial and commercial development, explore the factors that have contributed to its growth and success, and discuss the challenges and opportunities that lie ahead for the city (Hoerter and Wiseman, 1988).

6.3.1 Bay Area Rapid Transit (BART) System

BART is a rapid transit system serving the San Francisco Bay Area in California, United States. It includes five counties: Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara. BART operates rapid rail services, connecting various cities and suburbs in the Bay Area, and is a popular mode of transportation for commuters and tourists. A bay area is a geographic region consisting of a large bay or a group of bays, typically surrounded by land on three sides. One of the most well-known bay areas in the world is the San Francisco Bay Area, located in Northern California, which includes major cities such as San Francisco, Oakland, and San Jose. Bay areas are often important centers of commerce, trade, and transportation, as well as popular

tourist destinations due to their scenic beauty and recreational opportunities.

Figure 6.6: TOC map, San Fransisco



source: (MTC, 2022)

BART is a public transportation system in the San Francisco Bay Area that primarily operates trains in underground and elevated tunnels. However, BART does have connections to other forms of transit, including bus and ferry services. BART stations often have bus connections to local destinations, and some stations also have connections to ferry services that provide transportation across the bay to cities such as San Francisco and Oakland. So, while BART itself does not operate buses or boats, it does have connections to these modes of transportation (Winter et al., 2004).

6.3.2 Transit Oriented Communities (TOC)

The TOC Policy plays a key role in advancing the Plan Bay Area 2050, with the aim of making it easier for people to lead a lifestyle that is not dependent on cars. In 2005, the Transit-Oriented Development Policy (TOD Policy) was put into effect by the Metropolitan Transportation Commission (MTC) with the aim of achieving various goals such as enhancing the efficiency of new transit investments, promoting the construction of residential properties in proximity to transit, and fostering collaboration among cities, transit operators, regional agencies, and developers (Dong, 2021). As per a survey report by the planning body in 2014, recommendations and issues were pointed out for the policy.

1. Key Recommendations:

   (a) Continue applying housing thresholds to transit corridors: Cities should maintain their existing policies of setting housing targets along transit corridors to support transit-oriented development and reduce car dependency.

   (b) Continue to exclude jobs from transit corridor thresholds: Employment targets should not be set along transit corridors to prevent conflicts between housing and job growth.

   (c) Continue to apply performance metrics to evaluate future transit investments: Future transit investments should be evaluated based on their potential to reduce car use and increase transit ridership.

   (d) Adopt a consistent methodology for evaluating compliance: Cities should develop a consistent methodology for evaluating compliance with transit-oriented development policies to ensure they are achieving their intended goals.

2. Issues for Consideration:

   (a) Address corridor phasing: Transit-oriented development should be phased in to ensure that it aligns with transit infrastructure and ridership patterns.

   (b) Promote affordable housing in station areas: Affordable housing should be prioritized in station areas to ensure that transit-oriented development benefits all residents, including those with lower incomes.

   (c) Reinforce parking management strategies: Parking management strategies should be reinforced to discourage car use and encourage transit ridership.

(d) Assess composition or role of corridor working groups: Cities should assess the composition and role of corridor working groups to ensure that they are representative of the community and effectively guiding transit-oriented development.

The TOC Policy is applicable to areas that are located within a half-mile of current and proposed stops and stations that are served by various transit options, including BART, Caltrain, SMART, Capitol Corridor, ACE stations, Muni and VTA light-rail stations, Muni and AC Transit bus rapid transit stops, and ferry terminals. The policy stipulates certain requirements which include setting minimum densities for new residential and commercial office development, promoting the production and preservation of affordable housing, protecting businesses from displacement, managing parking, and ensuring easy access to transit stations.

Figure 6.7: San Francisco map

source:San Francisco Planning

6.3.3 Planning Innovations

San Francisco's planning innovation revolves around

- The revision and enforcement of its PDR zoning code to protect urban industrial lands and limit competing uses.

- Zoning variances and incentives aimed at leveraging real estate demand to increase the supply of industrial space, and
- An industrial rebranding campaign led by non-profit industrial advocacy group, SFMade.

These adaptations were solidified and promoted in former Mayor Ed Lee's five-point Plan for Manufacturing, which aimed to preserve existing industrial space, incentivize the development of new PDR space on private land, and build and upgrade space on public lands(Grodach and Martin, 2019).

6.4 Seoul

6.4.1 Introduction

Seoul, the capital city of South Korea, is a bustling metropolis that has undergone rapid industrial and commercial development over the past few decades. With a population of over 10 million people, Seoul is one of the most populous cities in the world and has become a hub of economic activity in East Asia. The city's transformation from a war-torn capital to a global economic powerhouse is a fascinating case study in industrial and commercial development. The Seoul metropolitan area is home to many large corporations, including Samsung, LG, and Hyundai, which have played a significant role in driving the city's economic growth. In this essay, we will explore the factors that have contributed to Seoul's development as a center of industry and commerce, as well as the challenges that the city has faced along the way.

6.4.2 The growth

Seoul's history of industrial and commercial development can be traced back to the 1960s when the South Korean government implemented a series of economic policies aimed at promoting industrialization and export-oriented growth. The government's policies included the creation of state-owned enterprises and the establishment of export processing zones, which provided tax breaks and other incentives to foreign investors. As a result, Seoul became a center of manufacturing, particularly in the electronics and automobile industries. Companies such as Samsung, LG, and Hyundai established their headquarters in the city, and their growth contributed to Seoul's rapid economic development.

In the 1980s, Seoul experienced a shift towards a more service-oriented economy. The city's financial sector grew rapidly, and many foreign banks and financial institutions established their presence in the city. The city also saw a rise in the tourism industry, as Seoul became a popular destination for both business and leisure travelers. The construction industry boomed, as the city's infrastructure was improved and expanded. The growth of service industries, such as finance, tourism, and construction, has continued to drive Seoul's economic development, making it one of the most prosperous cities in Asia.

6.4.3 Achievements

Seoul's current achievements in industrial and commercial development are impressive. The city is a hub for innovation and technology, with a thriving startup ecosystem and a strong emphasis on research and development. It has been ranked as the world's fourth-largest city for startup activity, with over 30,000 startups in various industries. Seoul has also been recognized as a leading smart city, with a focus on implementing cutting-edge technology to improve urban services and sustainability.

Seoul's economy is highly diversified, with a mix of traditional industries such as manufacturing and finance, as well as newer industries such as biotechnology and software development. The city's GDP has grown steadily over the past few decades and is expected to reach $600 billion by 2025. Seoul is also home to some of the world's largest corporations, such as Samsung, LG, and Hyundai, which continue to play a significant role in driving the city's economic growth.

Furthermore, Seoul has been recognized as a leading global city, ranking as the world's 6th most economically powerful city and the 10th most influential city in the world. The city has also been recognized for its efforts to improve sustainability and reduce carbon emissions. In 2020, Seoul was awarded the Lee Kuan Yew World City Prize, one of the most prestigious awards in urban planning and development, for its efforts to create a more livable and sustainable city.Seoul's achievements in industrial and commercial development are a testament to its resilience, innovation, and commitment to progress. The city continues to be a leader in driving economic growth and creating a better future for its residents and visitors alike.

6.4.4 City planning

Seoul's city planning characteristics reflect its status as a leading global city, with a focus on sustainability, livability, and innovation. The city has implemented several initiatives to improve the quality of life for its residents, such as expanding green spaces and promoting pedestrian-friendly neighborhoods (An and Kim, 2015).

One of Seoul's most notable city planning characteristics is its "Cheonggyecheon Stream Restoration Project." This project involved the removal of an elevated highway and the restoration of a natural stream that runs through the heart of the city. The project has become a symbol of Seoul's commitment to sustainable urban development and has helped to improve air and water quality in the area.

Another key aspect of Seoul's city planning is its emphasis on public transportation. The city has a comprehensive network of buses, subways, and trains, with an integrated ticketing system that makes it easy for residents and visitors to get around. The city's subway system is one of the most advanced and efficient in the world, with 22 lines and over 600 stations. Seoul's city planning also places a strong emphasis on the preservation of its cultural heritage. The city has several UNESCO World Heritage Sites, such as the Changdeokgung Palace Complex and the Jongmyo Shrine, and has implemented measures to protect and promote these sites. The city also has several museums and cultural centers that showcase its rich history and culture.

Finally, Seoul's city planning reflects its commitment to innovation and technology. The city has implemented several smart city initiatives, such as the Seoul Digital Master Plan, which aims to create a city-wide digital ecosystem that improves the delivery of public services and enhances the quality of life for residents. The city is also home to several research and development centers, such as the Seoul National University Technology Incubation Center, which supports the development of new technologies and startups.

6.4.5 Seoul Smart City Platform

The Seoul Smart City Platform is an integrated digital platform that enables the city of Seoul to collect and analyze data from various sources, including IoT sensors, CCTV cameras, and other city systems, to better manage urban services and improve quality of life for citizens. The platform uses advanced technologies such as big data analytics, artificial intelligence, and cloud computing to enable real-time monitoring of city services and the prediction of future

trends (Lee, 2023). It also provides open data and APIs to enable developers and entrepreneurs to create innovative new services and solutions for the city.

The Seoul Appia Consortium (SAC) is a public-private consultative body formed by the Seoul Metropolitan Government, the World Smart Sustainable Cities Organization (WeGO), the Seoul Urban Solutions Agency (SUSA), Hancom Group, Korean Smart Card, and Korean Small&Medium ICT Business Export Cooperative (KOSMIC). The SAC was established to meet the growing demands from cities worldwide that are seeking consulting on Seoul's cutting-edge ICT administration and technology. The consortium aims to share Seoul's smart city policies and corporate technology with other cities around the world, offering customized solutions that meet the specific needs of each city. To achieve this, the SAC provides participation support to corporations who built the actual system, and it also offers two types of OSS-based solutions for smart city platforms. Cities can choose either the current version of the SCP system, which was built in 2016-2017, or the upgraded version that was converted for solutions for cities abroad. Overall, the SAC plays a vital role in promoting Seoul's smart city policies and sharing its expertise with cities around the world.

6.4.6 Seoul Urban Planning Concepts

Figure 6.8: Seoul Urban Planning Concepts

source: (SMG, 2016)

6.5 Navi Mumbai

Navi Mumbai is a planned township located on the west coast of India, across the harbor from Mumbai. It is a fast-growing city that has become a significant hub for industrial and commercial development in the country. The development of Navi Mumbai was initiated by the Indian government in the 1970s to alleviate the pressure of rapid population growth and urbanization in Mumbai. The city's strategic location, well-planned infrastructure, and abundant land availability have made it an attractive destination for businesses seeking to expand in India. Navi Mumbai is home to a wide range of industries, including information technology, pharmaceuticals, engineering, and manufacturing, among others (Bhagat, 2016). The city's proximity to Mumbai's international airport and seaport has also contributed to its success as a major commercial center. In this study, we will examine the history of Navi Mumbai's industrial and commercial development, explore the factors that have contributed to its growth and success, and discuss the challenges and opportunities that lie ahead for the city.

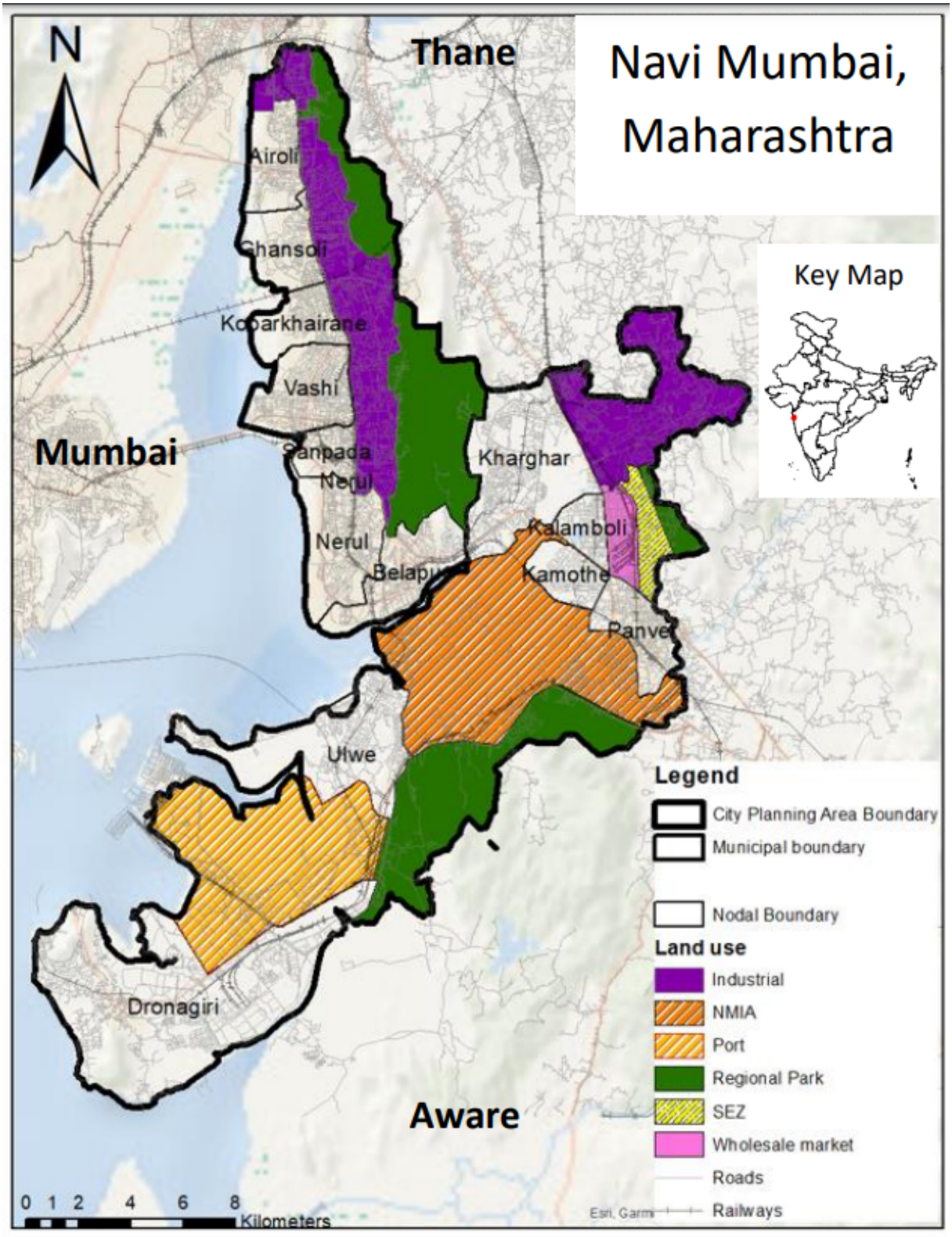
The success of the Navi Mumbai project can be attributed to its unique planning approach. To prevent the concentration of activities in a single area, which often leads to the issues faced by Mumbai, a polycentric nodal pattern of development was adopted. This approach follows the principle of decentralization, dispersing population and activities across different nodes throughout the city. Rather than having a single center, the city functions like a cluster of nodes, resembling a bunch of grapes. This strategy ensures a balanced distribution of residential areas, job centers, wholesale markets, non-polluting industries, and population density across various areas of the city.

The polycentric model facilitates a well-balanced and equitable distribution of land and resources, minimizing the need for long travel distances. The city comprises 12 self-contained nodal townships strategically located along mass rapid transport corridors. This design aims to reduce travel time and distance between nodes and neighboring cities, promoting efficient connectivity and convenience for residents and businesses.

6.5.1 Nodes of development

A multimodel development is used in the planning concepts of Navi Mumbai with the below mentioned node cities.

Figure 6.9: Navi Mumbai Land Use map



source: Navi Mumbai Planning

1. The **Dronagiri** node, planned by CIDCO, stands as the largest node in terms of size. However, its challenging topography has posed difficulties in its development. The node's

advantageous location near the port makes it well-suited for industries related to port activities. CIDCO initiated the development of this node after 1989, and it continues to be maintained by the organization.

2. **Panvel** holds significant importance as a railway station along the Konkan Railway route. The maintenance and management of this node are still under the responsibility of CIDCO.

3. Vashi, known as the King of Navi Mumbai, was the initial node selected for development by CIDCO. Situated on the mainland, Vashi is located directly across the Thane Creek bridge. Development activities commenced promptly after the opening of the Thane Creek Bridge in 1972. Today, Vashi serves as the bustling commercial center of Navi Mumbai.

4. The joint development of the Vashi-Sanpada node commenced in 1972, focusing on creating a well-connected and thriving area. The node benefits from excellent railway and road connectivity. Sanpada is emerging as an increasingly favorable location for expanding businesses.

5. Nerul, often referred to as the queen of Navi Mumbai, stands as the second most well-developed node following Vashi. Primarily known for its residential character, the development of this node was initiated in 1981.

6. Kopar Khairane node is adjacent to the industrial area and Vashi. Development of this node was started In 1986. Kopar Khairane is also known as extended suburb of the Vashi. The node is well connected by train as well as road. Located south to Ghansoli.

7. Kopar Khairane, situated in close proximity to the industrial area and Vashi, began its development in 1986. It is often referred to as an extended suburb of Vashi, benefitting from its vicinity. The node enjoys excellent connectivity via both train and road networks. Positioned to the south of Ghansoli, Kopar Khairane offers convenient transportation links for residents and visitors alike.

8. The initiation of development in this Ghansoli node took place approximately in 1993, with the primary objective of offering affordable housing options to individuals employed in the neighboring industries. Positioned to the south of the Airoli node, it enjoys excellent connectivity with Thane city through both railway and road networks. Additionally, it is connected to Mumbai through the Mulund-Airoli bridge, facilitating convenient trans-

portation between the two locations.

9. Kharghar, envisioned as the progressive node of Navi Mumbai, commenced its development in the late 1980s. Renowned for its innovative design, Kharghar stands as one of the most creatively planned nodes in the city, incorporating unique concepts and ideas. It is often hailed as the model township of Navi Mumbai, exemplifying the forward-thinking approach to urban development.

10. Kalamboli emerges as a bustling node within Navi Mumbai, characterized by its high level of activity. On the other hand, Kamothe is an up-and-coming node that began its development in 2000. The development of Kalamboli witnessed the establishment of a steel market and warehousing complex by CIDCO in 1979-80, followed by a residential complex in 1982. Notably, this node also falls within the Navi Mumbai Special Economic Zone, further contributing to its significance.

11. The Ulwe node is situated to the south of CBD Belapur, separated by the creek, and its development is already underway. This node holds significance as part of the Navi Mumbai Special Economic Zone and is adjacent to the proposed Navi Mumbai International Airport. Ulwe is an emerging node within Navi Mumbai, with limited information available on its progress until 2010.

12. The CBD Belapur node is situated at the center of the city, making it an ideal location for the establishment of the 'Central Business District.' The northern side of the node is dedicated to residential purposes, while the southern side is designated for commercial, mercantile, and office uses.

6.5.2 TOD Zones

. In Navi Mumbai, the concept of Transit-Oriented Development (TOD) zones has gained significant attention and importance in urban planning and development. TOD zones are strategically planned areas that aim to create sustainable and livable communities by integrating land use, transportation, and infrastructure. The TOD zones are a collaborative effort between the railways and MMRDA, with the aim of reducing congestion in Mumbai's overcrowded transport systems

Navi Mumbai, a planned satellite city adjacent to Mumbai, has recognized the need for efficient

transportation systems and smart urban planning to accommodate its growing population. As a result, several TOD zones have been identified and established within Navi Mumbai to promote sustainable development and reduce dependence on private vehicles.

One prominent TOD zone in Navi Mumbai is the Central Business District (CBD) Belapur. CBD Belapur is a major commercial and administrative hub and is well-connected to various modes of transportation, including suburban railways and bus networks. The area features a mix of commercial, residential, and institutional developments, promoting a walkable environment and reducing the need for long commutes.

Another notable TOD zone in Navi Mumbai is Vashi, which is strategically located near the Vashi railway station and is a bustling commercial and residential center. The area is characterized by mixed-use developments, including offices, retail spaces, and residential complexes. The integration of different land uses and the presence of transportation options contribute to a vibrant and sustainable urban environment.

Furthermore, Juinagar is another TOD zone in Navi Mumbai that has been developed with a focus on efficient public transportation and pedestrian-friendly infrastructure. The Juinagar railway station acts as a transportation hub, providing easy access to other parts of Navi Mumbai and Mumbai. The area features a mix of residential and commercial developments, encouraging a compact and connected community.

These TOD zones in Navi Mumbai demonstrate a comprehensive approach to urban planning, where transportation infrastructure, land use patterns, and community facilities are integrated to create sustainable and livable neighborhoods. The emphasis on mixed-use developments, efficient public transportation, pedestrian-friendly environments, and accessibility to amenities aims to reduce congestion, promote a greener environment, and enhance the overall quality of life for residents.

The implementation of TOD zones in Navi Mumbai reflects a forward-thinking approach to urban development, with a focus on creating well-connected, sustainable, and vibrant communities that cater to the needs of residents and businesses alike. By prioritizing transit-oriented development, Navi Mumbai aims to address the challenges of urbanization and pave the way for a more sustainable and inclusive future.

6.6 Major Takeaways

Table 6.1: Key Points from Case Studies

San Fransisco	Seoul	Navi Mumbai
• Embracing Innovation: Using innovation and entrepreneurship as key drivers of economic growth. • Flexible Zoning Policies: Adopting flexible zoning policies to revitalize older neighborhoods and attract new businesses. • Public-Private Partnerships: Establishing public-private partnerships to promote economic growth and community development. • Transit-Oriented Development: Prioritizing transit-oriented development to reduce traffic congestion and improve accessibility. • Sustainability: Implementing policies and initiatives to reduce the city's carbon footprint and become a zero-waste city.	• Smart City Development: Leveraging technology and data to optimize city management and services. • Focus on SMEs: Recognizing the importance of small and medium-sized enterprises as key drivers of economic growth and job creation. • Urban Regeneration: Transforming old industrial areas into vibrant, mixed-use spaces through public-private partnerships. • Sustainable Development: Making significant efforts to reduce environmental impact and promote sustainability through policies and initiatives. • Internationalization: Attracting foreign investment and promoting cross-cultural exchange through infrastructure and policies.	• Large-scale industrial development: Mumbai has been a hub for large scale industrial development, particularly in the manufacturing and textiles sectors. • Entrepreneurship and innovation: Mumbai has a thriving startup ecosystem, with numerous incubators, accelerators, and co-working spaces supporting entrepreneurship and innovation. • Redevelopment of old industrial sites: Mumbai has been redeveloping old industrial sites, particularly in the city center, to create mixed-use spaces. • Transportation infrastructure: Mumbai has an extensive transportation infrastructure that includes an extensive network of suburban trains, buses, and taxis. • Slum redevelopment: Mumbai has implemented various policies and initiatives to improve the living conditions of its slum dwellers.

Source: Author

CHAPTER 7 DEVELOPMENT PLAN

This chapter charts the path to establish Kochi as a pioneering hub for sustainable industrial and commercial ventures in South India, propelling regional economic growth and social progress. It outlines a mission to foster a dynamic business ecosystem, promote entrepreneurship, ensure sustainability and social equity, and unlock Kochi's full potential as a premier business destination.

7.1 Vision

To establish Kochi as a leading hub for innovative and sustainable industrial and commercial enterprises in South India, driving economic growth and social development for the region and beyond.

7.2 Mission

1. Foster a dynamic and supportive business ecosystem in Kochi, attracting high-growth enterprises in technology, manufacturing, and logistics sectors.
2. Cultivate an entrepreneurial culture of collaboration through strategic investments in infrastructure, workforce development, and innovation.
3. Promote environmental sustainability and social equity across all operations.
4. Unlock Kochi's full potential as a premier destination for thriving businesses and investors.

7.3 Projected Requirements

The data provided represents projected population figures in Lakhs (hundreds of thousands) for the years 2020, 2030, and 2040, along with the estimated migration and floating population. In 2020, the projected population stands at 6.64 Lakhs, indicating a significant base population. Looking ahead to 2030, the projection shows a slight increase to 6.81 Lakhs, suggesting a

Table 7.1: Population Projection

Year	2020	2030	2040
Projected Population(in Lakhs)	6.64	6.81	6.83
Migration + Floating (20%)	1.33	1.36	1.37

Source: Author

gradual growth trend. By 2040, the projected population is expected to reach 6.83 Lakhs, indicating a relatively stable population size over the long term.

It is worth noting that these population projections take into account various factors such as birth rates, mortality rates, and net migration. Additionally, the data considers a 20% estimate for migration and floating population, which accounts for individuals who may move to or temporarily reside in the area. This factor contributes to the overall population dynamics and can influence the social, economic, and infrastructure planning of the region.

7.4 Development Strategies

1. **Zone 1**- Lowering the FSI. FSI stands for Floor Space Index, which is a ratio representing the total floor area of a building in relation to the size of the plot of land it occupies. In Zone 1, the strategy is to implement lower FSI values. This approach aims to control and restrict the intensity of development in this zone, resulting in lower building density and potentially more open spaces.

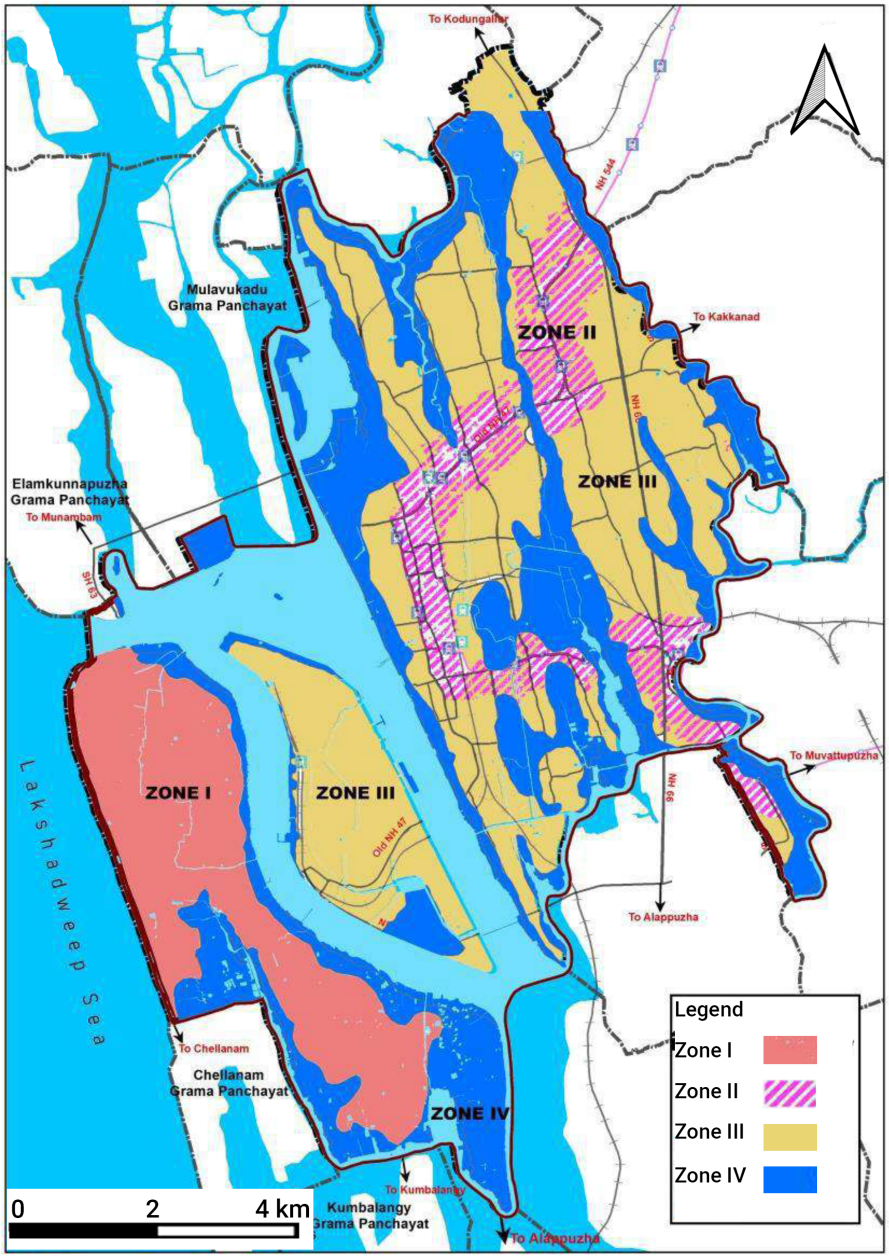
2. **Zone 2**- Higher FSI, compact development , Mixed Use Development, High quality infrastructure. In Zone 2, the strategy involves allowing higher FSI values. This approach promotes more intensive development, allowing for taller buildings and increased density. The emphasis is on compact development, meaning efficient utilization of available land. Mixed-use development refers to the integration of different land uses within a specific area, such as residential, commercial, and recreational, fostering a vibrant and diverse community. Additionally, this strategy emphasizes the need for high-quality infrastructure to support the increased density.

3. **Zone 3**- FSI to be regulated as per how the city gets congested. Zone 3 focuses on dynamically regulating the FSI based on the level of congestion in the city. The idea is to monitor and assess the city's congestion levels and adjust the FSI limits accordingly.

This approach allows for flexible zoning regulations that can adapt to changing urban conditions and aims to prevent excessive congestion in the designated area.

4. **Zone 4**- Risk Informed guidelines, regulatory development. Zone 4 employs risk-informed guidelines and regulatory measures for development. This strategy takes into account potential risks such as natural disasters, environmental hazards, or specific local concerns. The goal is to establish development regulations and guidelines that mitigate risks and ensure the safety and resilience of the built environment.

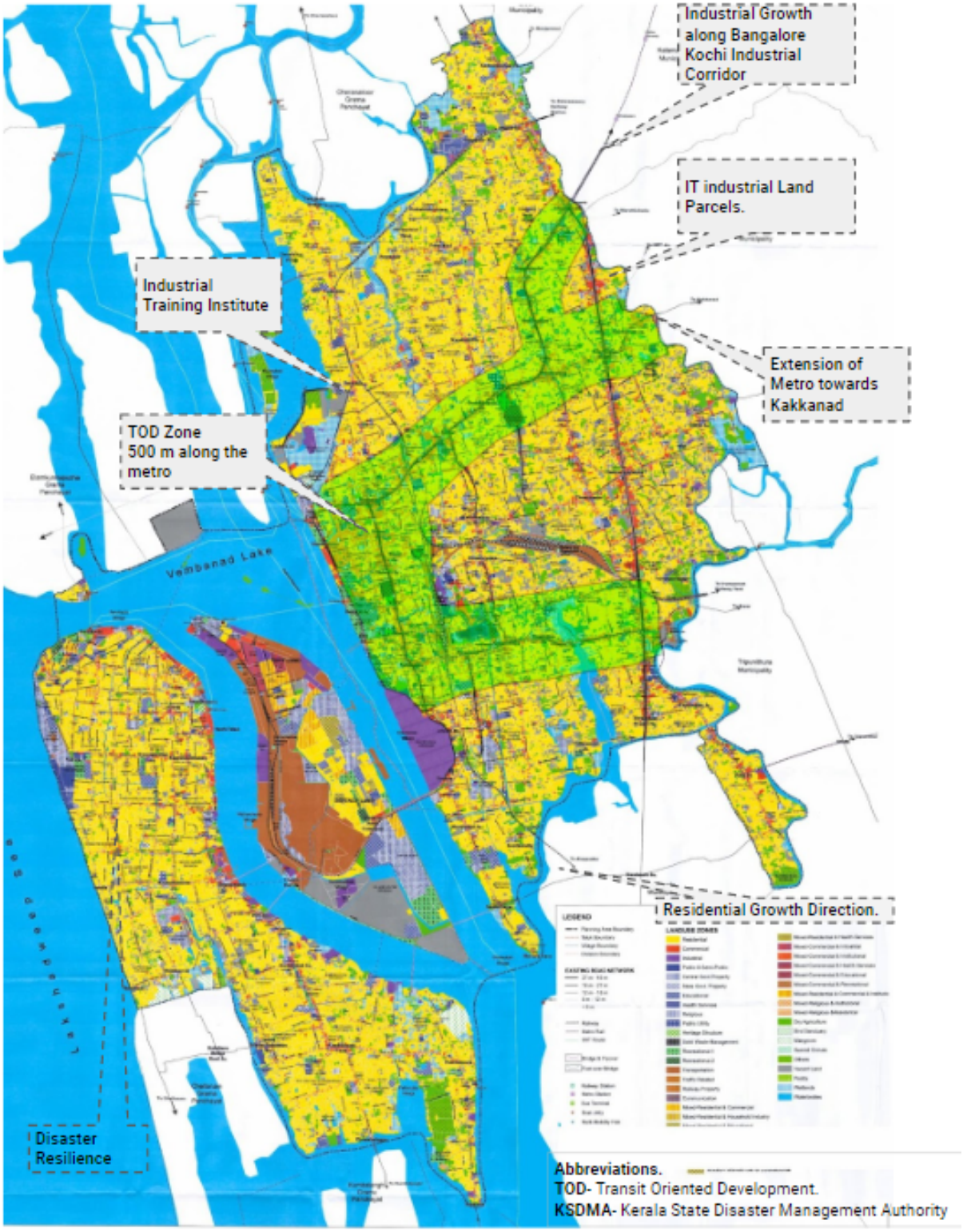
Figure 7.1: Development Zoning



Source: Author

7.5 Proposals

Figure 7.2: Proposal Masterplan



Source: Author

These are the proposals envisaged for Kochi Municipal Corporation (KMC) as part of the development plan.

1. TOD for Compact Urban Commercial development along the metro network.
2. Improving efficient commuting within the city region by expanding the metro rail network to Kakkanad CSEZ area.
3. Information technology industries to the periphery of Corporation Area nearer to CSEZ.
4. Industrial institutions and growth along the Bangalore Kochi Industrial Corridor.
5. Business and Production Support Initiatives to boost the entrepreneurship environment.

7.6 Proposals Detailed

7.6.1 Transit Oriented Development along KMRL stations

A TOD zone can be designated on both sides of the metro corridor, covering a continuous distance of 500 meters. The current density in the vicinity of the metro corridor is relatively low. In order to achieve an optimal density for transit-oriented development (TOD) in each station area, a combination of density baselines such as population and residential density, along with density bonuses, need to be implemented like the TDR initiatives.

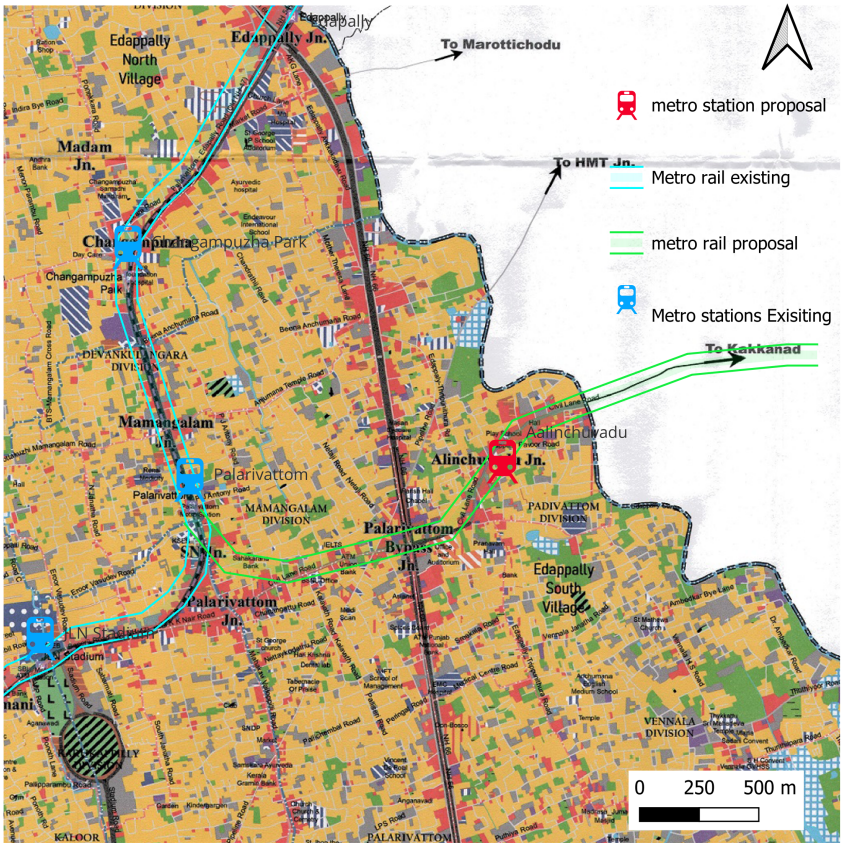
Transit Oriented Development (TOD) is generally defined as a compact, mixed use high density development near transit facilities with high-quality walking environments. One of the key principles of TOD is to have a mix of uses around the transit station. The other reason for mixed-use development is so integral to TOD is that it balances the peak ridership flow on the transit system. This type of compact development reduces infrastructure asset requirement and costs. Transit Oriented Development may be oriented along the metro stations.

7.6.2 Expansion of Metro towards Kakkanad

Kakkanad CSEZ (Cochin Special Economic Zone) is strategically located in the proximity of the Kochi municipal corporation, the largest city in Kerala. This proximity is significant as it provides a readily available pool of skilled professionals, infrastructure, and resources that are crucial for the growth and development of the CSEZ. This has made Kakkanad CSEZ an attrac-

tive destination for IT and software companies seeking to establish a base in the region. The close proximity also allows for greater collaboration and partnerships between the CSEZ and other organizations in the region, creating a supportive ecosystem for innovation and growth. Overall, the proximity of Kakkanad CSEZ to the Kochi municipal corporationshould be efficiently utilised to result in a collaborative success.

Figure 7.3: Metro rail proposal



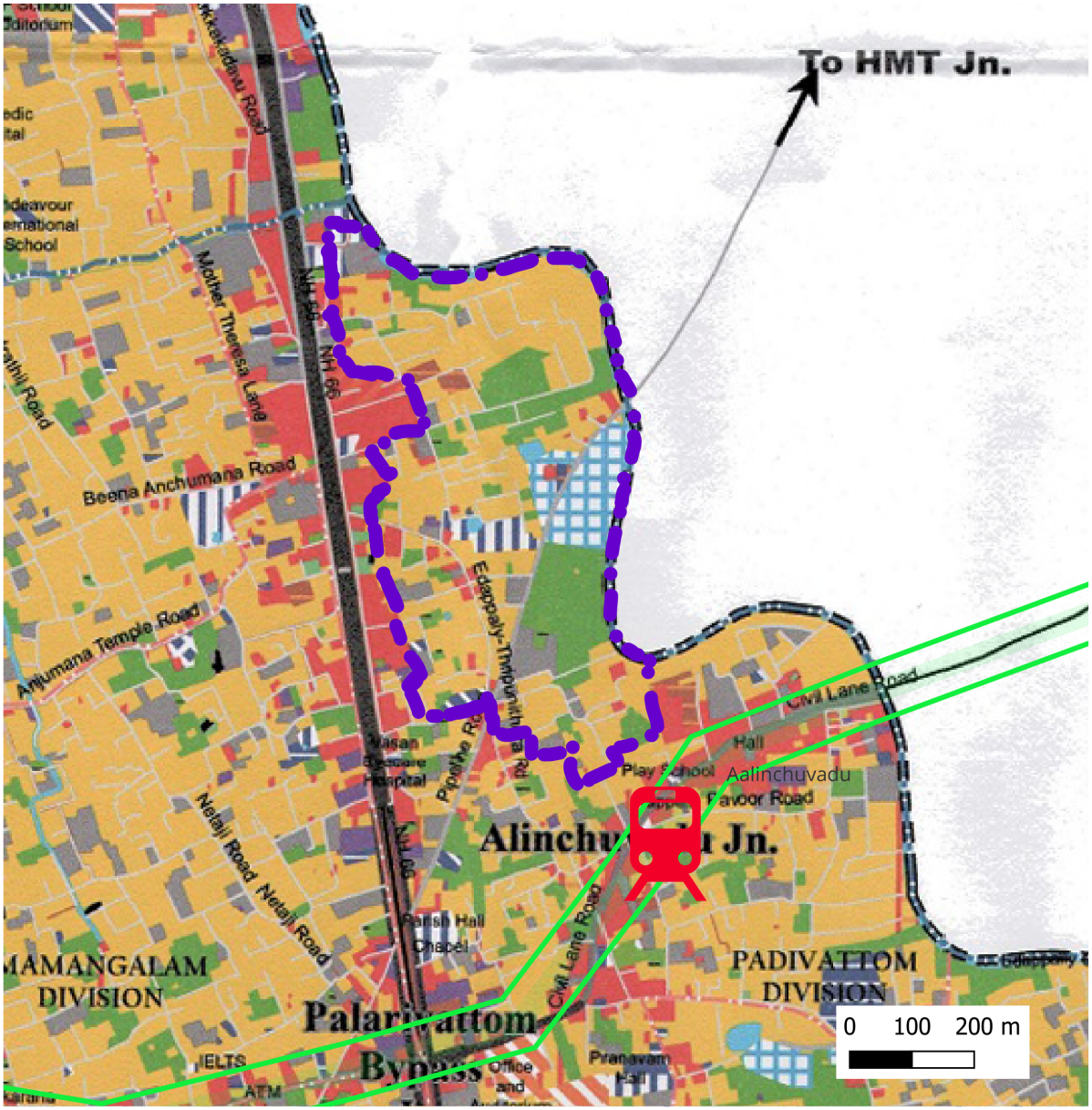
Source: Author

The metro shall be expanded from the Palarivattom metro station towards Kakkanad. The development of metro shall also act as a lead for the expansin of the proposed TOD Zone.

7.6.3 IT Industrial area in Padivattom Ward

A set of land parcels have been identified in Padivattom ward in Edapally south village for promoting and placing IT industries with an area of 25 acres. The IT industry covers IT services, IT-enabled services (ITES), e-commerce (online business), and Software and Hardware products. This project can be iniated and phased with the support of KSIDC funds.

Figure 7.4: IT Industrial area in Padivattom Ward



Source: Author

7.6.4 Industrial Training Center SIDCO land at Pachalam

The proposed site is situated in Pachalam. The aim is to enhance vocational training quality and align it with market demand to enhance the employment prospects of graduates. The key objectives of establishing industrial training centers are to offer vocational and apprenticeship training opportunities for young individuals.The industrial training centers will be equipped with modern facilities and resources to ensure a comprehensive and industry-relevant learning experience for the trainees. Collaboration with local businesses and industries will be fostered to

create a strong connection between the training centers and the real-world job market, enhancing the employability of graduates. Continuous monitoring and evaluation mechanisms will be implemented to assess the effectiveness and impact of the vocational and apprenticeship training programs, ensuring their ongoing improvement and relevance. The project's execution can be facilitated through the utilization of SIDCO funds.

Figure 7.5: Industrial Training Center SIDCO land at Pachalam

Source: Author

7.6.5 Business and Production Support Initiatives.

1. Small Business Grants: Grants and financial assistance programs to support small businesses. These grants help with business expansion, job creation, and innovation in various industries.

2. Workforce Development Programs: The city offers workforce development initiatives to enhance the skills and employability of the local workforce. Programs include job training, career counseling, and assistance with recruitment and retention.

3. Tax Credits and Incentives: Tax credits and incentives for businesses, such as the Enterprise Zone Hiring Credit, which encourages hiring from economically disadvantaged areas. Specific tax breaks for specific industries include the Green Energy Tax Credit.

4. Business Consulting and Support: The Small Business Development Center and the Office of Small Business provide consulting services, technical assistance, and guidance on regulatory compliance to help businesses thrive.

5. Research and Development Grants: Seoul provides grants and funding for research and development activities to encourage innovation and technology advancement. These grants support projects that contribute to key industries and promote collaboration between academia, industry, and government.

6. International Business Support: Resources and services to support international trade and business expansion. This includes market research, business matchmaking programs, trade missions, and assistance with export/import procedures.

CHAPTER 8 CONCLUSION

This chapter concludes by emphasizing the significance of the proposed industrial and commercial development planning for Kochi Municipal Corporation, which aims to drive economic growth, improve quality of life, and foster a vibrant business environment

In conclusion, the proposed industrial and commercial development planning for Kochi Municipal Corporation provides a comprehensive approach to promoting economic growth and improving the quality of life for its citizens. The implementation of Transit-Oriented Development (TOD) for compact urban commercial development along the metro network, boosting port-based activities, and promoting information technology industries to the periphery of Corporation Area nearer to CSEZ will encourage investment and create job opportunities.

The expansion of the metro rail to Kakkanad CSEZ area will improve commuting efficiency and connectivity within the city region, and industrial growth along the Bangalore-Kochi Industrial Corridor will further boost the local economy. Upgrading the infrastructure to enhance industrial and commercial activities, promoting micro and small technologically advanced enterprises, and enhancing ICT in the city's governance support and public participation will create an enabling environment for businesses to thrive.

Therefore, the proposed development plan is a step in the right direction towards making Kochi a hub of economic activity, promoting sustainable development and enhancing the overall quality of life for its citizens. It is crucial to ensure that the implementation of these proposals is done efficiently, transparently and with the active participation of stakeholders to ensure their success.

In order for the proposed industrial and commercial development plans for Kochi Municipal Corporation to be successful, it is essential to prioritize proper implementation and monitoring. This entails a systematic and efficient execution of the proposed strategies and initiatives. Regular monitoring and evaluation mechanisms should be put in place to assess the progress and impact of the plan. This will help identify any challenges or bottlenecks that may arise during implementation and allow for timely adjustments or corrective measures. Furthermore, active engagement and participation of relevant stakeholders, including government authorities, local

communities, and businesses, is crucial for the success of the plan. Their input, feedback, and collaboration will ensure that the development initiatives are aligned with the actual needs and aspirations of the city and its inhabitants. By fostering transparency, accountability, and effective governance throughout the implementation process, the desired outcomes of economic growth, job creation, and improved quality of life can be achieved for the citizens of Kochi.

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CHAPTER A SURVEY QUESTIONNAIRE

A.1 Enterprises Survey

A.1.1 Internal Infrastructure

1. Does your enterprise have a reliable power, gas and water supply?
   (a) Yes
   (b) No
   (c) To some extent
2. Is your enterprise have adequate Street lights?
   (a) Yes
   (b) No
   (c) To some extent
3. Is your enterprise have proper Solid Waste Management?
   (a) Onsite
   (b) Offsite (Municipal Corporation etc.)

A.1.2 External Infrastructure and Connectivity

4. How would you rate the accessibility of your business location in terms of transportation of goods and connectivity?
   a) Very Poor
   b) Poor
   c) Average
   d) Good
   e) Very Good
5. What are your commonly used modes of transportation for your enterprise?
   (a) Roadways
   (b) Railways
   (c) Waterways
   (d) Airways

A.1.3 Technological Factors

6. How would you rate your organization's current level of technological knowledge and expertise?
   (a) Very Low
   (b) Low
   (c) Moderate
   (d) High
   (e) Very High
7. How frequently do you upgrade your technological infrastructure?
   (a) Less than once a year
   (b) Once a year
   (c) Twice a year
   (d) Three times a year or more

A.1.4 Social Factors

8. How would you rate your organization's efforts towards promoting diversity and inclusion in the workplace?
   (a) Very Poor
   (b) Poor
   (c) Average
   (d) Good
   (e) Very Good
9. How often does your organization participate in community events or sponsor local charities?
   (a) Rarely or never
   (b) Occasionally
   (c) Regularly
   (d) Frequently
10. How frequently does your organization conduct employee training or awareness programs regarding social issues and causes?
    (a) Rarely or never
    (b) Occasionally
    (c) Regularly
    (d) Frequently

A.1.5 Political Factors

11. How satisfied are you with the current regulatory environment for your industry?
    (a) Very Dissatisfied
    (b) Somewhat Dissatisfied
    (c) Neutral
    (d) Somewhat Satisfied
    (e) Very Satisfied
12. How well do you think the government understands the challenges faced by your industry?
    (a) Very Poorly
    (b) Poorly
    (c) Neutral
    (d) Well
    (e) Very Well

A.1.6 Economic Factors

13. How has your enterprise utilized the funds obtained from financing?
    (a) Expansion of operations
    (b) Investment in R&D
    (c) Purchase of equipment and machinery
    (d) All of the above
    (e) Other
14. What type of financing did your enterprise utilize to fund business operations?
    (a) Loans
    (b) Grants
    (c) Both
    (d) Other
15. Did the company earn more return on Investment to the previous years?
    (a) Increased
    (b) Decreased

A.1.7 Environmental Factors

16. What percentage of your enterprise's operations are powered by renewable energy sources?
    (a) 0-25
    (b) 25-50
    (c) 50-75
    (d) More than 75
17. Which of the following do you consider as the major hazards for your business enterprise in Kochi, Kerala?
    (a) Floods
    (b) Cyclones/hurricanes
    (c) Earthquakes
    (d) Fire
    (e) Other (please specify)
18. On a scale of 1-5, how well-prepared do you feel your business enterprise is in terms of disaster management?
    (a) Not at all prepared
    (b) Slightly prepared
    (c) Moderately prepared
    (d) Very prepared
    (e) Extremely prepared

A.2 Household Survey

1. Have you or any of your family members experienced any health issues due to the nearby industries?
    (a) Yes
    (b) No
2. Does your environment somehow is polluted by the Industrial/ Commercial enterprises?
    (a) Yes
    (b) No
    (c) Not Aware.