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Implementation of Metro Rail Project in Pune City

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Abstract: ***In India, around 26 metro rail projects are in various phases of planning, construction, and operation. A number of new metro rail phases are being planned and will be operational in the near future. Various studies have revealed delays in metro rail project planning and execution in India and around the world. This research will attempt to comprehend a wide range of subjects. There are numerous alternatives for dealing with problems or impediments that the metro rail corporation encounters when constructing metro rail projects. Variables that may impede project execution, such as government funding capability, financial arrangements, and so on. To name a few, competing technologies, a workable operating plan, and stakeholder issues. The factors that determine metro rail operations The Pune Metro Rail Project will be utilized to examine potential projects. The scope of the study will be limited to mobilization. The study approach is centered on formal contacts with participants from the planning phase to the commissioning phase. The study's conclusions are crucial in various ways for Pune Metro Rail Corporation decision makers and project execution group. Developing procedural routines to help metro rail projects be completed more quickly and effectively.***

Keywords: Implementation of Pune Metro, Delay in the project, Infrastructure of the project, cost

I. INTRODUCTION

MAHA Metro, a Special Purpose Vehicle (SPV) of the Government of India and the Government of Maharashtra, is in charge of the Pune Metro project.

The project aims to create world-class metro stations as well as surrounding regions that showcase the region's rich cultural heritage. The inhabitants of Pune and Pimpri-Chinchwad will benefit from a modern, safe, secure, comfortable, and integrated public transportation system.

II. LITERATURE REVIEW

In Pune, Maharashtra, the Maharashtra Metro Rail Corporation Limited (Maha-Metro) and the Pune Metropolitan Region Development Authority are constructing three lines of an urban Mass Rapid Transit System (MRTS) (PMRDA). 31.254 miles In July 2009, the Delhi Metro Rail Corporation completed and filed the Detailed Project Report (DPR) for the Pune Metro Phase 1 project, which consists of two metro lines and 29 stops. It was updated to reflect current prices in January 2013, August 2014, and November 2015. The State Government approved the project in 2012, but it ran into red tape, politics, and protest from local NGOs and activists due to its largely elevated nature. The project received final approval from the Union Government's Cabinet on December 7, 2016. Furthermore, the Using a public–private partnership (PPP) approach, the Pune Metropolitan Region Development Authority is developing a third, mostly elevated line that will connect Hinjewadi and Civil Court. In September 2019, PMRDA and a partnership of TRIL Urban Transport Private Limited (a Tata Group Company) and Siemens Project Ventures GmbH signed a 35-year concession agreement to develop the line. (A Siemens Financial Services subsidiary.)

Table No. 1

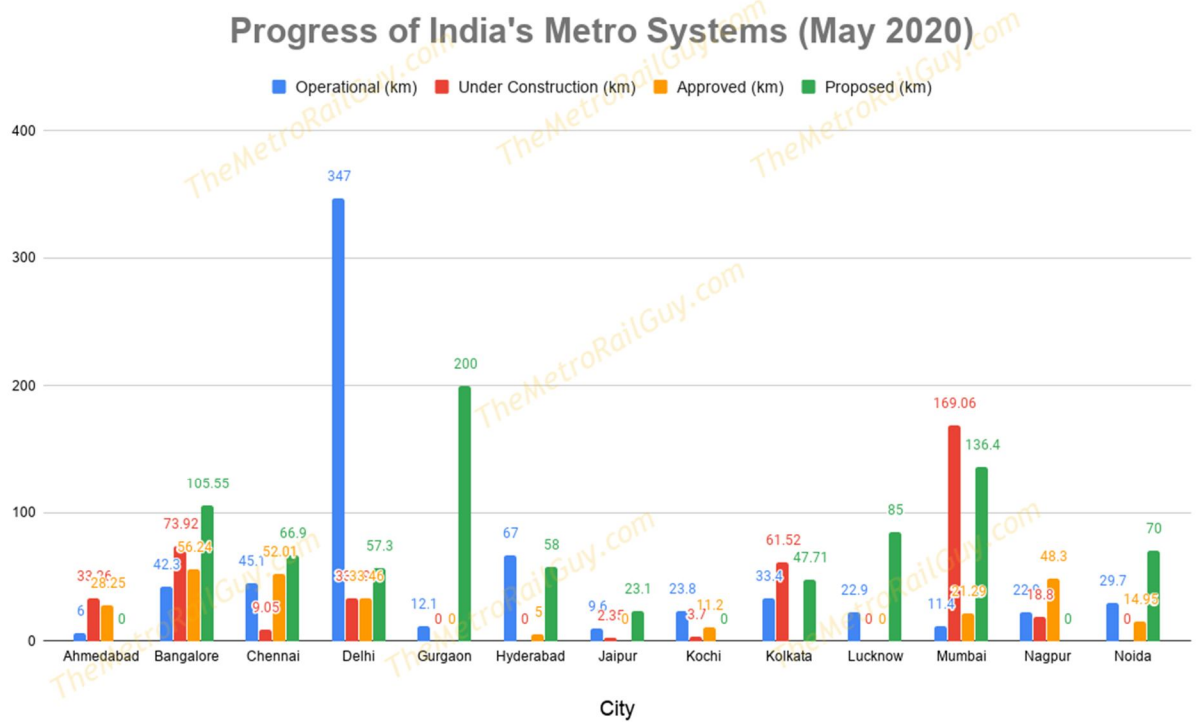
PHASES	FACTORS	END PRODUCTS
Conceptualizing	Identify the potential target beneficiaries and assess their development needs. Develop and evaluate project alternatives.	Needs assessment report and project proposal.
Planning	Develop the project scope and estimate resources required. Plan for project schedule and organization setup.	Project documents (Budget, setup, Project scope etc.) Project agreement with resource and support commitment.

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Implementing	Setting project management team and reviewing, revising project plan. Carry out the project activities as planned and managing the relationship with the stakeholders.	Inception reports and mobilized resources. Outputs produced and delivered.
Closing/ completing	Finals testing of the project outputs and completing the final reports of the project. Bring into the public notice the project results and transforming the project team.	Report of project completion and final settlement of all pending financial dues. Transformation of project team to the ongoing operations.

Source: Khang, Do Ba, and Tun Lin Moe. "Success criteria and factors for international development Projects: A life-cycle-based framework." Project Management Journal 39.1 (2008): 72-84

The infrastructure of cities and metropolitan centers has been put under a lot of strain as a result of population increase. In fast-developing countries like India, metropolitan infrastructure is stretched to breaking point, necessitating innovative solutions. India's rapid development is not unusual; similar development has already occurred in various European, American, and Japanese countries. As a result, numerous kinds of urban mass transit are now available to address the challenge of urban transportation.
The first metro rail project in India was launched in 1984 with the Kolkata metro, which was a first of its kind in many ways. Following that, India has roughly 26 active projects (in development, operational, or proposed) as of 2020.



Current status of Metro Projects in India (Source: themetrorailguy.com)

Table no. 1.2

PARAMETERS	SCENARIO	
Cost	Is high due to fuel consumption and high fuel cost and more running time due to traffic congestion.	Will be much less as compared to cost of running individual vehicles.
Travel Time	Is excessive due to traffic congestions and traffic signs.	Will reduce the travel time by around 50%.
Pollution	Air Quality of the city is going down.	Will improve as the no. of vehicles on the road will go down.
Convenience	Not very convenient due to traffic jams, bad roads, traffic signals.	Very convenient as the mode is highly comfortable, reliable and timely.
Weather Extremities	Do effect the driver of the individual vehicles causing discomforts.	Provides a comfortable and distraction-free movement.
Road Accidents	Notably high due to higher no. of vehicles on the road.	Will drastically reduce as the congestion on the road will reduce.
Energy saving	Uses fossil fuels and has high energy consumptions.	Uses around $1/5^{th}$ of energy as compared to Road Transport.

Source: Maharashtra Metro Rail Corporation Limited.

A. Objective

In India, more than 26 metro rail projects are ongoing in various stages of design, building, and operation. It was attempted to comprehend the failures encountered by numerous metro projects, as well as the procedures and precautions taken by PMRDA and MahaMetro.

"To provide secure, stress-free, and dependable public transportation employing environmentally friendly, cutting-edge mass transit technology while providing a superior interstate travel experience at an affordable price."

The success elements from prior research projects were used as a baseline, and the current study would be evaluated.

The objective of this study is to highlight the characteristics of published research on project success.

B. Methodology

To better understand the difficulties surrounding metro projects in Maharashtra, secondary data was gathered through informal interactions with industry experts, project execution groups, and various stakeholders.

The concerns discovered from prior or current projects will be compared to success criteria, and a descriptive analysis will be performed as a result.

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III. OBSERVATIONS

A. Understanding the Project Environment

Pune (officially known as Poona until 1978) is India's seventh most populated city and the second-largest metropolis in Maharashtra, with an estimated population of 7.4 million as of 2020. It has been named "India's most livable city" multiple times. Pune, Maharashtra's cultural and historical capital, is regarded as the 'Queen of Deccan' for its beautiful beauty and abundant natural resources.

Pune is well-known throughout the world for its educational institutions, research and development centers, IT parks, and automobile sector in western Maharashtra.

The city has seen an increase in population and people travelling from other parts of the country seeking job possibilities in recent decades. However, there is a need for long-term infrastructure to make this possible. The Prime Minister of India lay the foundation stone for Lines 1, 2, and 3 in December 2019.

The Maharashtra Metro Rail Corporation Limited (MahaMetro), a 50:50 joint venture of the state and central governments, is building the first two lines, which span 31.25 kilometers. Line 3 will be built in a Public–Private Partnership between the Pune Metropolitan Region Development Authority (PMRDA) and the Joint Venture between Tata Realty and Siemens. PM lay the foundation stone for Line 3 on December 18, 2018. Line 3's construction began in January 2020.

B. Consultation with Stakeholders

Communication between project decision makers and the general public has been strong since the conceptualization phase.

This is one of the most crucial aspects that has resulted in the project's successful and quick start. Keeping the public informed and believing in the idea has had a favorable impact on the metro's success. One of the reasons the work on the site is done at all hours of the day and night is to manage the contractors and protect their interests.

C. Proficiency of the Project Team

The Delhi Metro Rail Corporation (DMRC) completed the drafting of the Detailed Project Report (DPR) on August 15, 2008, and submitted their report. In 2010, the Pune Municipal Corporation (PMC) postponed submitting the request to the Union government in order to include funding for the project in the annual budget. In June 2012, the State approved the first phase of the project, which included two lines with a total length of 31.25 kilometers. However, it was not until December 7, 2016, nearly 4.5 years later, that it got final clearance from the Central Government. The DPR has forecasted ridership and Peak Hour Peak Day Traffic (PHPDT) to 2031. DMRC has a history of SPV called Pune Metro Rail Corporation Limited (later changed to Maha Metro Rail Corp.) was formed, and this team includes specialists with past metro project experience. As the primary consultant, a consortium of four multinational corporations is contracted. To ensure the project's success, prime consultants collaborated with the client to create effective project management systems.

D. Ample Resource Support

Experts with experience in railway projects and other metro projects are a part of the planning team. Regular tracking of work by the consultants is scheduled. The use of 5-D BIM is a unique feature of Pune metro. It has helped in integrating the time and cost components and is accessible to all the parties involved in the project thus bridging the communication gap and accelerating the processes.

E. Stability of Support for Stakeholders

Staff at each crossing point to redirect and manage traffic are retired traffic cops hired specifically for the role.

Safety is prioritized, and a near-zero accident rate is attained.

Metro Information Centers have been set up throughout the city to provide information about the project.

Over the last ten years, Pune has experienced tremendous industrial growth. Rapid urbanization has put the city's transportation system under strain in recent years. A large executive summary is included.

F. Feeder Service

Approach roads to the stations, circulation facilities, pedestrian ways, and circulation areas for various modes anticipated to arrive at major stations, including feeder buses, are all part of the integration facilities at Metro stations.

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Table No. 2

PARAMETERS	VALUES
Estimated Completion Cost with taxes	INR 11,522 Crores
Fare Collection	Automatic fare collection system with combination of smart cards and computerized paper tickets
Capacity of Trains	1200+
Service Hours	19 hours/day (from 5:00 am to 00:00 midnight)
Estimated Schedule Travel Speed	31 KMPH to 33 KMPH
Estimated Requirement of Land	~44 Hectares

Source: Maharashtra Metro Rail Corporation Limited.

G. Cost

The capital costs of a Metro are Rs. 11,500 Crores, with only 2% of the population served. The capital cost of 3000 buses serving to 25% of the population is Rs. 1000 Crores.
Rs.1000 crore can develop 5 km of elevated Metro or 2.5 km of subterranean Metro, while the same amount can build 67 km of BRT.

Table No. 2.1

PARTICULARS	DESCRIPTION
Estimated Completion Cost with Taxes	INR 11,420 Crores
Total No. of Coaches	3 Coaches
Track Gauge	1.435 mm (Standard Gauge)
Project Start	December 2016
Estimated Completion	December 2022

Source: Maharashtra Metro Rail Corporation Limited.

H. Viability of the Metro Project

Metro Ridership is expected to reach 5 lakh passengers per day by 2018 and climb to over 7 lakhs per day by 2031.
PMPML - already transporting over 10-12 lakh passengers per day as of today as stated in the Pune Metro DPR:
The projected Metro has a capacity of 30,000 pphpd (persons per hour per direction) and a breakeven value of 15,000 pphpd.
However, the statistics in the DPR for most likely peak-hour traffic projections are substantially lower:
1050 to 6203 pphpd in 2018.
1358 to 8519 pphpd in 2021
Year 2031 – pphpd ranges from 1595 to 10982

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I. Other impacts of Metro

In the proposed Phase II route, two stations and 1.7 kilometers of Metro route travel through Mutha River within the flood line. • Citizens objected to this alignment and filed a complaint with the NGT (National Green Tribunal).The PMC established a TSG (Technical Support Group) under the Biodiversity Committee. Why The TSG confirmed that building the Metro on the river bed will harm the environment. Riparian zone, affecting aquatic diversity and disrupting vegetative cover many native species of flowering plants were found in their survey, with a significant percentage of them being threatened. Within the stretch, uncommon species of birds, reptiles, insects, and fish were discovered. Tree removal and loss of vegetative cover will have an impact on the ecological balance. Generating habitat damage for small animals

In November of 2015, As a result of the 34 new units, both small and large scale industries, as well as heavy and medium scale industries, traffic in the city is predicted to increase. Pune's traffic needs cannot be supplied only by a road-based system due to its dense population.

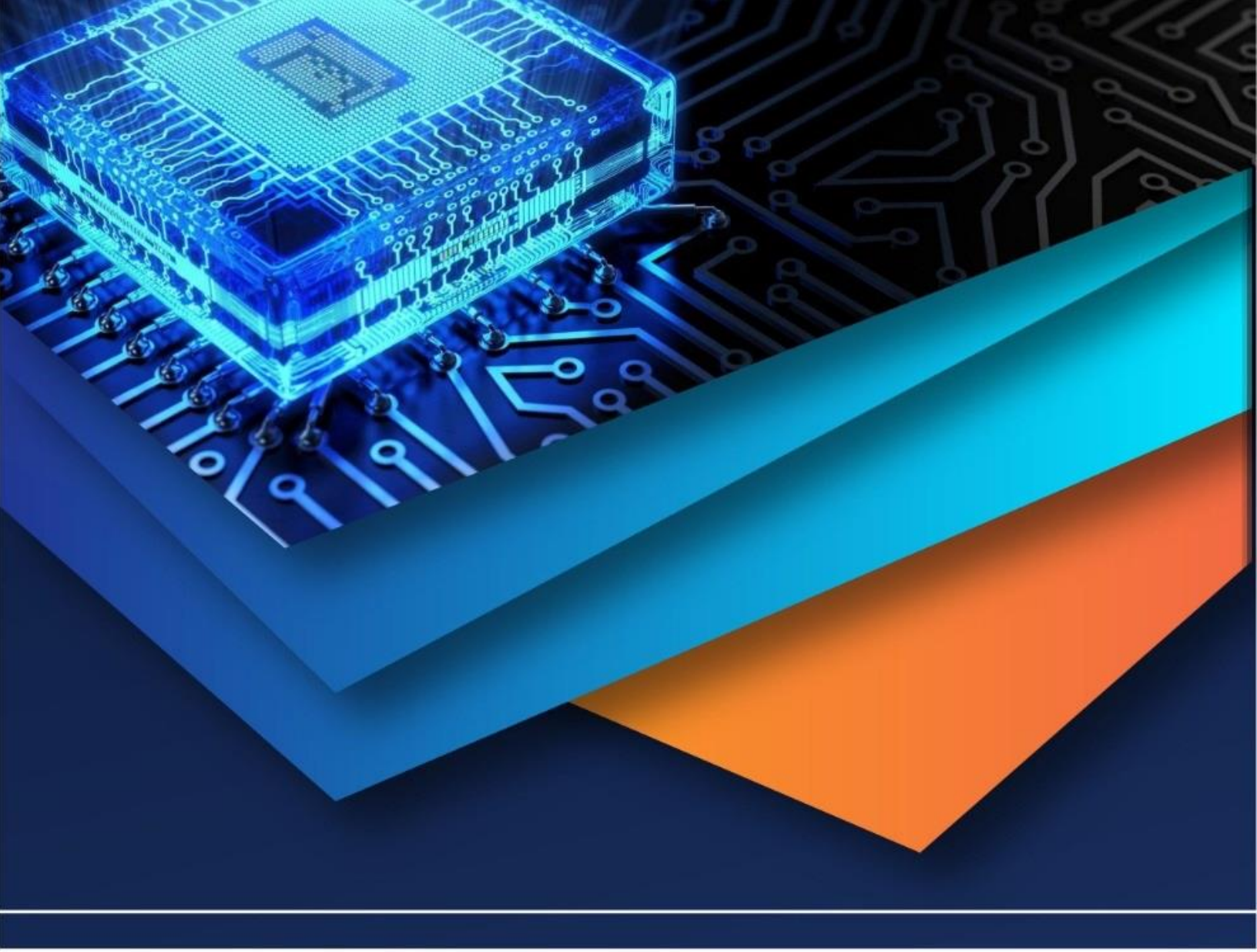
The existing road-based urban transportation system in Pune City is already overburdened, resulting in longer travel times, higher air pollution, and an increase in the number of road accidents. With the city's population expected to grow, the city's infrastructure will be strengthened.

IV. CONCLUSION

According to the findings of the study, the efforts of the Nagpur Metro Rail Corporation have a direct impact on the project's progress. Future projects in the country can be planned and implemented in such a way that the lessons learned and bottlenecks identified in prior projects are avoided. As a booming economy, India has a high demand for Mass Rapid Transit Systems. The development of such metro projects would improve infrastructure and aid in the development of the economy.

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