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Achieving Accessibility through Promoting Non-Motorized Transport within the Neighborhood Level of City: A Case Study of Ward 25 & 27, Bhubaneswar

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Abstract: ***This article explores the concept of enhancing accessibility within city neighborhoods by promoting the use of non-motorized transportation (NMT). Prioritizing NMT, such as cycling and walking, can create a more accessible and inclusive urban environment. The aim behind the research is to investigate the challenges faced by pedestrians and cyclists in navigating neighborhoods and proposes strategies to address these challenges. These strategies might involve improvements in infrastructure, such as dedicated lanes and safe intersections, as well as promotional initiatives to encourage residents to adopt NMT as a primary mode of transportation. By promoting NMT, this paper suggests that cities can achieve several benefits, including increased accessibility, reduced traffic congestion & enhanced public health. This study's motive is likely to contribute to the field of sustainable transportation planning by advocating for NMT as a key strategy for achieving accessibility and creating more livable cities.***

Keywords: Non-motorized transportation (NMT), Neighborhood, Pedestrian, Mobility, Accessibility, Bicycle lane, Infrastructure, Sustainability.

I. INTRODUCTION

Cities are constantly evolving, but one challenge remains persistent: ensuring accessibility for all residents. Accessibility refers to the ease with which people can reach destinations, services, and opportunities within their communities. Traditionally, car-centric transportation systems have dominated urban landscapes. Urban sprawl and car-centric infrastructure restrict accessibility within neighborhoods, leading to social isolation, environmental degradation, and health issues. This thesis explores how promoting non-motorized transport (NMT) – walking and cycling, can enhance accessibility within city neighborhoods. It examines the benefits of NMT for residents, the challenges to its widespread adoption, and proposes strategies for creating a more NMT-friendly environment. The research aims to contribute to the development of sustainable and inclusive urban communities.

Accessibility is a fundamental right, enabling individuals to access essential services, work, and social interaction within their neighborhoods. However, reliance on motorized vehicles creates barriers for those without access to cars or with limited mobility. This thesis argues that promoting NMT can significantly improve accessibility within city neighborhoods.

Benefits of non-motorized transport:

1) Increased Accessibility: NMT allows residents to reach destinations more easily and directly, particularly for short trips within neighborhoods. This promotes social interaction, economic activity, and a sense of community.
2) Improved Public Health: NMT encourages physical activity, reducing the risk of chronic diseases and promoting overall well-being. It also contributes to cleaner air by reducing car emissions.
3) Environmental Sustainability: NMT reduces reliance on fossil fuels and associated greenhouse gas emissions, promoting a more sustainable urban environment.
4) Economic Benefits: NMT infrastructure requires lower investment and maintenance costs compared to car-centric infrastructure. Additionally, it can revitalize local businesses by increasing pedestrian traffic.

II. WHY THIS STUDY IS REQUIRED

In the context of this neighbourhood in Bhubaneswar, studying the promotion of NMT is particularly relevant due to increasing traffic congestion and growing population.

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By understanding the barriers to NMT use and identifying effective strategies for promoting NMT within neighborhoods, this study can contribute to the development of a more sustainable, healthy, and equitable transportation system in Bhubaneswar.

This study aims to bridge this gap by investigating the need for promoting NMT within the neighbourhood. Through this investigation, the study will contribute to the creation of a more sustainable, healthy, and livable city for its residents.

This research will demonstrate how the expansion of health infrastructure is causing unprecedented changes in the structural and geographical aspects of cities.

The micro-level urban change proved that the expansion of health facilities has led to high rates of residential and commercial growth.

III. AIM OF THE STUDY

This thesis aims to develop strategies for promoting non-motorized transport (walking, cycling) to enhance accessibility within the city neighbourhoods.

IV. OBJECTIVES OF THE STUDY

1) To assess and study the existing level of road hierarchy in the study area.
2) To study the existing pedestrian and bicycle routes infrastructure in the study area.
3) To study topographical terrain of the study area if it is suitable for accessible NMT modes from contour analysis.
4) Propose adaptable strategy and planning measure for climate responsive development for promotion of NMT within the neighbourhood limit.

V. EXPECTED OUTCOMES

The Promotion of NMT system can create safe pedestrian and bicycle friendly environment in the specified neighbourhood ensuring increased accessibility and active lifestyle. This will lead to less traffic congestion and thus less number of traffic conflicts. Above all these it will have positive impact on the economy of the city facilitating greener environment leading to a healthier future.

VI. STUDY AREA

Bhubaneswar is the Capital city of Odisha, India, in Khordha district with an area of 186 Sqkm located in the Eastern Coastal Plains with a population of 0.88 million as per 2011 Census of India. It has major connectivity through National Highway 16 and National Highway 316 linking to Puri. In this research the study area taken is a neighborhood in Bhubaneswar City, comprising of two wards namely ward no. 25 & 27 with an area of about 1.84 Sqkm.

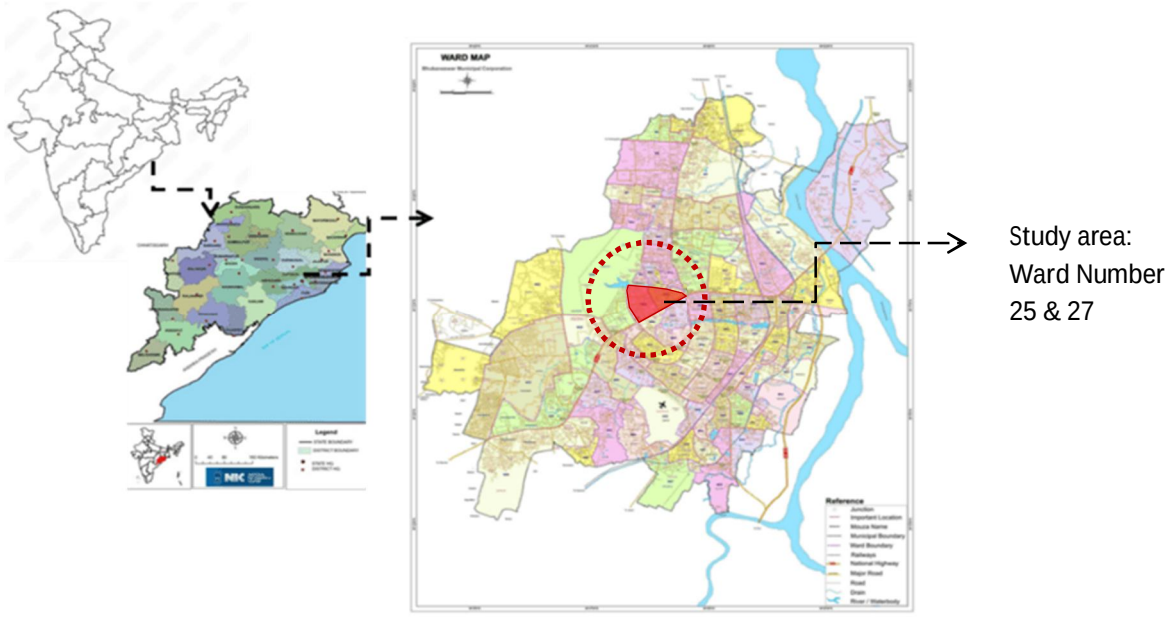

Figure 1 showing, India, Odisha, Bhubaneswar showing study area.

Figure 2 Map of ward no. 25 and 27 as a neighborhood unit

VII. DATA COLLECTION AND ANALYSIS

To conduct this research both primary and secondary data are used. The existing scenario is assessed by observation survey and questionnaire based survey methods to find out the gap in present NMT infrastructure. Major congested spots are assessed. Pedestrian count in every stretch has been conducted at different hours in a day to comprehend the pattern and major pedestrian movement routes.

Slope of the study area has been analysed to assess if the area is suitable for accessible NMT routes.

Table2:Climatological factors of the study area

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STUDY AREA CLIMATOLOGY	
Climate	Tropical climate
Avg. Annual Maximum Temp.	32 °C
Avg. Annual Minimum Temp.	27 °C
Avg. Annual rainfall	1505mm
Avg. Annual Humidity	70%

Figure 3 Road hierarchy map

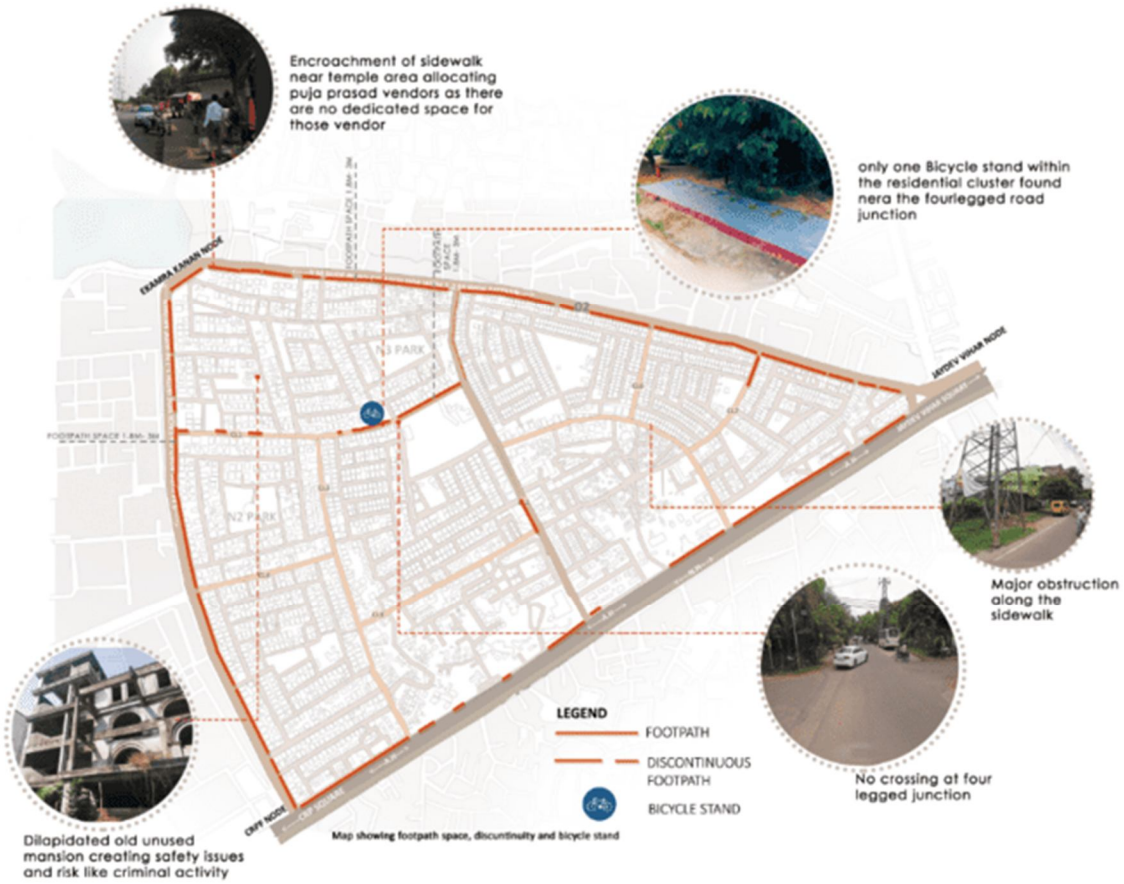

Figure 4 Existing MNT route

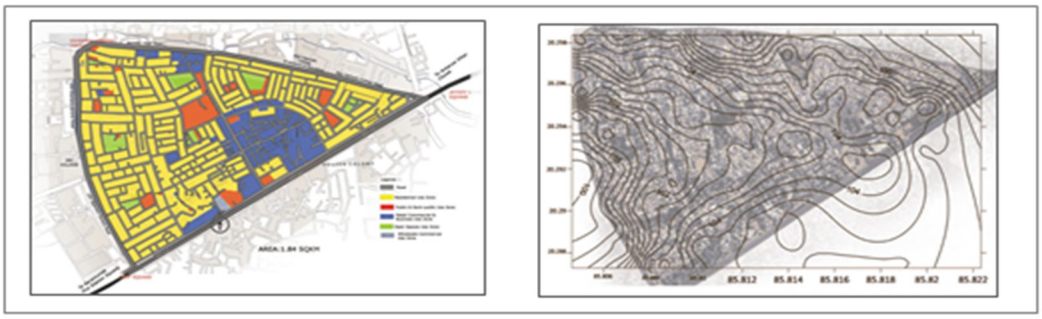

Figure 4 Existing landuse map and contour overlaping map

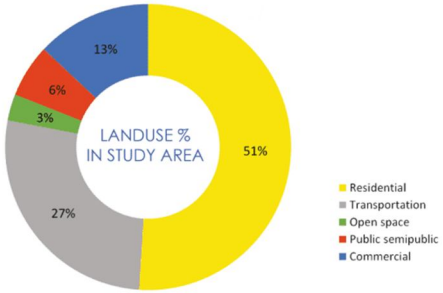

Figure 5 Chart showing percentage of landuse

VIII. ISSUES FOUND

There is a lack of required NMT infrastructure i.e. non-uniform pedestrian path and cycle lane coupled with its poor maintenance. The neighbourhood is a major commercial hotspot in the city thus attracting heavy vehicular movement causing encroachment of side walk space with parking activity leaving no space for NMT users. Absence of bicycle lane is a substantial drawback of the existing NMT scenario. Distinct issues in the neighbourhood are as follows:

1) Improper / discontinued footpath.
2) No dedicated cycle lane/ track.
3) Poor quality local roads with repetitive potholes and insufficient lighting.
4) Traffic congestion
5) Unavailability of streets hardware.
6) Absence of drinking water and toilet facilities.
7) Lack of safe crossing measure.

IX. CONCLUSION

The research on "Achieving Accessibility through Promoting Non-Motorized Transport within the Neighborhood Level of City: A Case of Ward No.25 & 27, Bhubaneswar" underscores the critical role that non-motorized transport (NMT) plays in enhancing urban accessibility, sustainability, and livability. The findings reveal that promoting NMT, such as walking and cycling, can significantly alleviate traffic congestion, reduce environmental pollution, and improve public health in urban neighborhoods.

In Bhubaneswar, the current infrastructure and urban design predominantly favor motorized transport, leading to increased vehicle emissions, road accidents, and decreased quality of life for residents. By focusing on these specific wards in Bhubaneswar, the study highlights the unique challenges and opportunities in implementing NMT strategies at the neighborhood level. The research identifies several key barriers, including inadequate pedestrian pathways, lack of dedicated cycling lanes, safety concerns, and insufficient awareness and advocacy for NMT.

The study also finds that with proper planning and community engagement, NMT can be successfully integrated into the urban fabric of Bhubaneswar. The potential benefits include enhanced accessibility to local amenities, improved social interaction among residents, and a more vibrant urban environment. The case study of the selected ward demonstrates that targeted interventions, such as upgrading sidewalks, creating safe crossings, and promoting cycling through educational campaigns, can lead to a significant shift towards non-motorized transport.

X. RECOMMENDATIONS

1) *Infrastructure Development:*

- Pedestrian Pathways: Enhance and expand pedestrian pathways ensuring they are wide, well-lit, and free of obstructions. Incorporate universal design principles to make pathways accessible for all, including people with disabilities.
- Cycling Lanes: Develop dedicated cycling lanes that are physically separated from motorized traffic to ensure the safety of cyclists. Ensure these lanes are continuous and connected throughout the neighborhood to promote regular use.
- Intermodal Connectivity: Improve connections between NMT modes and public transportation by creating secure bicycle parking at transit hubs and integrating pedestrian-friendly routes with bus stops and metro stations.

2) *Safety Measures:*

- Traffic Calming: Implement traffic calming measures such as speed bumps, raised crosswalks, and curb extensions to reduce vehicle speeds and enhance pedestrian safety.
- Lighting and Surveillance: Improve street lighting and install surveillance cameras in key areas to enhance safety and security for pedestrians and cyclists, especially during night-time.

3) *Community Engagement and Education:*

- Awareness Campaigns: Conduct awareness campaigns to educate residents about the benefits of NMT and encourage behavioral change. Use local media, social platforms, and community events to disseminate information.

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- Participation Programs: Involve local communities in planning and decision-making processes to ensure that NMT initiatives address their specific needs and preferences. Organize workshops and public forums to gather input and foster a sense of ownership.

4) Policy and Incentives:

- Supportive Policies: Advocate for policies that prioritize NMT in urban planning and development. This includes revising zoning laws to favor mixed-use developments and reducing parking requirements to discourage excessive car use.
- Incentive Programs: Introduce incentives such as subsidies for bicycle purchases, tax benefits for companies promoting NMT among employees, and rewards for frequent cyclists and walkers.

5) Monitoring and Evaluation:

- Data Collection: Establish a robust system for collecting data on NMT usage, safety incidents, and resident satisfaction. Use this data to monitor the effectiveness of implemented measures and make data-driven adjustments.
- Regular Reviews: Conduct periodic reviews of NMT initiatives to assess progress and identify areas for improvement. Engage with stakeholders regularly to ensure that the initiatives remain relevant and effective.
- By adopting these recommendations, Bhubaneswar can create a more accessible, sustainable, and livable urban environment. Promoting non-motorized transport at the neighborhood level not only improves the quality of life for residents but also contributes to broader urban development goals such as reducing carbon emissions and fostering social cohesion.

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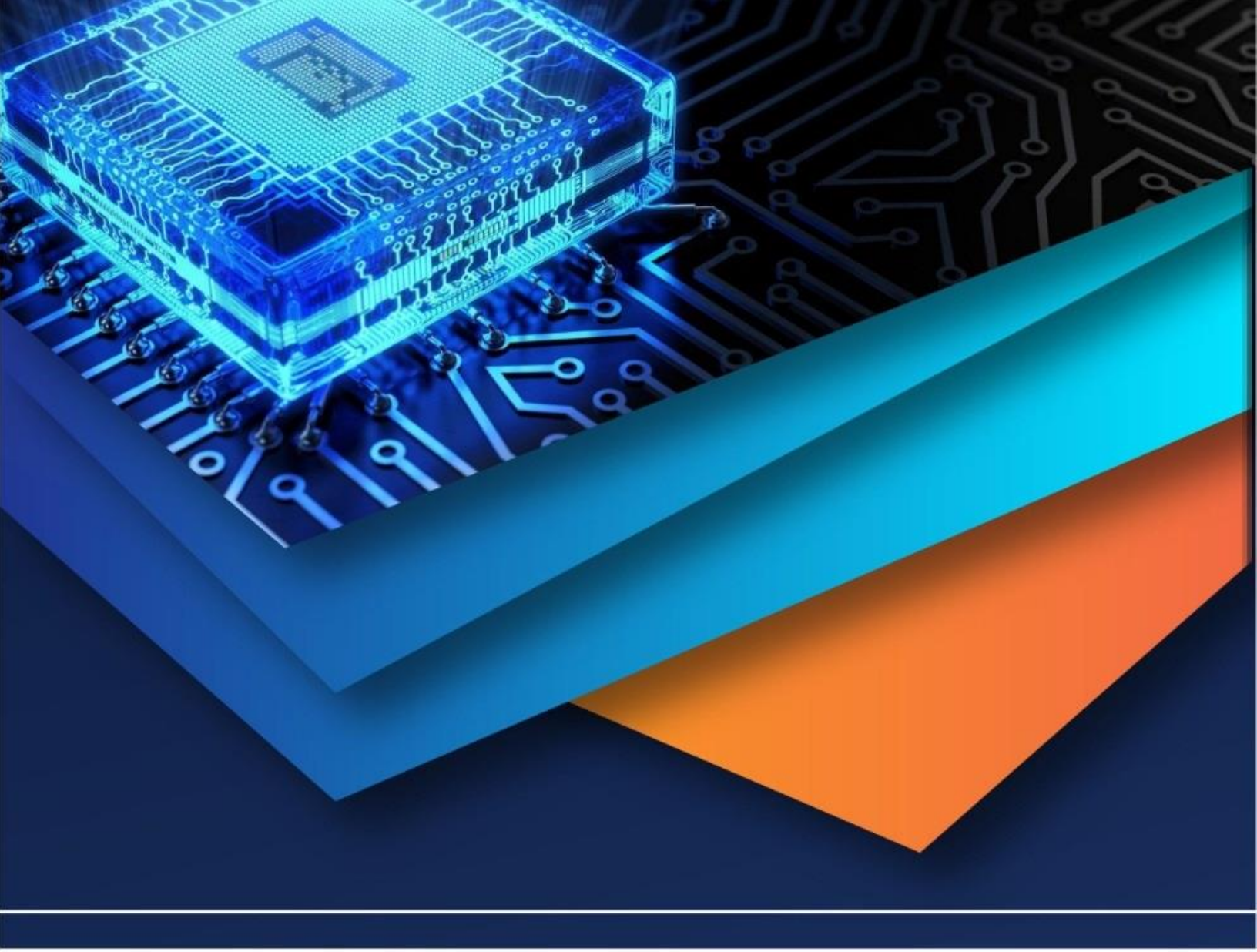

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