iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** V **Month of publication:** May 2024

DOI: https://doi.org/10.22214/ijraset.2024.61805

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue V May 2024- Available at www.ijraset.com

A Case Study of Existing National Highway no. 5 & 6

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Abstract: ***The case study of National Highways 5 and 6 provides insights into the infrastructure development, economic impact, and challenges associated with these critical transportation corridors. National Highway 5 stretches from Chennai to Kolkata, while National Highway 6 runs from Mumbai to Kolkata, serving as vital arteries connecting major cities and facilitating trade and commerce across regions. Both highways underwent significant upgrades and expansions to meet the growing demands of transportation and enhance connectivity between key economic hubs. This involved road widening, modernization of toll systems, and the implementation of safety measures to improve the overall quality of the highways. The case study may conclude by discussing future prospects for NH 5 and 6, including potential expansions, technology integration for smart transportation systems, and strategies to address emerging challenges such as climate change resilience and sustainable mobility.***
Keywords: economic impact, future prospects, climate change resilience and sustainable mobility.

I. INTRODUCTION

India's vast and diverse landscape is interconnected by a network of highways crucial for facilitating the movement of goods, people, and services across the nation. Among these, National Highways 5 (NH 5) and 6 (NH 6) emerge as lifelines, serving as vital arteries that link major metropolitan centres, industrial hubs, and port cities, thereby playing a pivotal role in the country's economic development. NH 5, spanning from Chennai on the south-eastern coast to Kolkata in the northeast, traverses through the states of Tamil Nadu, Andhra Pradesh, Odisha, and West Bengal. On the other hand, NH 6 connects the bustling financial hub of Mumbai on the western coast to the historic city of Kolkata on the eastern front, passing through the states of Maharashtra, Chhattisgarh, Odisha, Jharkhand, and West Bengal.

These highways not only connect distant regions but also intersect with other key national and state highways, forming crucial links in the broader transportation network. Over the years, NH 5 and 6 have witnessed significant transformations, evolving from narrow, congested roads to modern, multi-lane expressways, owing to extensive infrastructure development initiatives by the Indian government. The upgrading of these highways has not only enhanced connectivity but has also spurred economic growth, catalyzing industrialization, trade, and tourism along their corridors. However, alongside the benefits, the development of NH 5 and 6 has also posed challenges, ranging from traffic congestion and road safety issues to environmental concerns. Effectively addressing these challenges is imperative to ensure the sustained functionality and socio-economic benefits of these vital transportation arteries. This case study aims to delve into the multifaceted aspects of National Highways 5 and 6, exploring their historical significance, infrastructure development, economic impact, challenges, and future prospects. By analyzing these critical transportation corridors, we can gain valuable insights into the complexities of managing and optimizing India's highway infrastructure for the nation's continued growth and prosperity.

II. OBJECTIVE

Following are the objectives of this project:

1) To enhance connectivity.
2) To facilitation trade and commerce.
3) To regional development.
4) To safety enhancement.
5) To environment sustainability.

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III.NEED OF NH 5 AND 5

The need for National Highways 5 (NH 5) and 6 (NH 6) arises from several factors that underscore their importance in India's transportation infrastructure. Here are some key reasons highlighting the necessity of these highways:

1) Strategic connectivity
2) Trade and commerce
3) Regional development
4) Port connectivity
5) Reduction of travel time and costs
6) Emergency and defense considerations.

IV. NATIONAL HIGHWAY 5



Fig No. 1 NH 5

National Highway 5 (NH 5) is one of India's key arterial roads, traversing significant regions and connecting major cities and ports. Here are some key details about NH 5:

1) *Route:* NH 5 stretches from Chennai in Tamil Nadu to Kolkata in West Bengal, covering a distance of approximately 1,625 kilometres. It passes through the states of Tamil Nadu, Andhra Pradesh, Odisha, and West Bengal, serving as a crucial link between the south-eastern and eastern regions of India.
2) *Importance:* NH 5 holds strategic importance due to its connectivity to major metropolitan areas, industrial zones, and ports along the eastern coast of India. It intersects with other important national highways, including NH 16, NH 19, and NH 60, facilitating seamless transportation and trade between various regions.
3) *Economic Impact:* The highway plays a vital role in promoting economic activities such as manufacturing, agriculture, and trade. It provides access to key industrial centers, including Chennai, Visakhapatnam, and Kolkata, supporting the movement of goods and fostering industrial growth along its corridor.
4) *Infrastructure Development:* Over the years, NH 5 has undergone significant infrastructure development to meet the growing demands of traffic and enhance connectivity. This includes road widening, construction of bypasses, installation of modern toll plazas, and implementation of safety measures to improve the overall quality of the highway.
5) *Port Connectivity:* NH 5 intersects with major ports such as Chennai Port and Kolkata Port, facilitating the movement of cargo and goods to and from these ports. The efficient connectivity provided by NH 5 supports international trade and maritime activities, contributing to the economic development of coastal regions.
6) *Tourism and Cultural Significance:* The highway passes through regions rich in cultural heritage and natural beauty, attracting tourists to destinations such as Puri, known for the Jagannath Temple, and the scenic beaches of Vishakhapatnam. NH 5 plays a crucial role in promoting tourism and hospitality development in these areas.

7) *Challenges and Future Prospects:* Despite its importance, NH 5 faces challenges such as traffic congestion, maintenance issues, and environmental concerns. Future development efforts may focus on addressing these challenges through infrastructure upgrades, technology integration, and sustainable transportation solutions.

In summary, National Highway 5 serves as a vital lifeline for the economic, social, and cultural development of the regions .

V. NATIONAL HIGHWAY 6

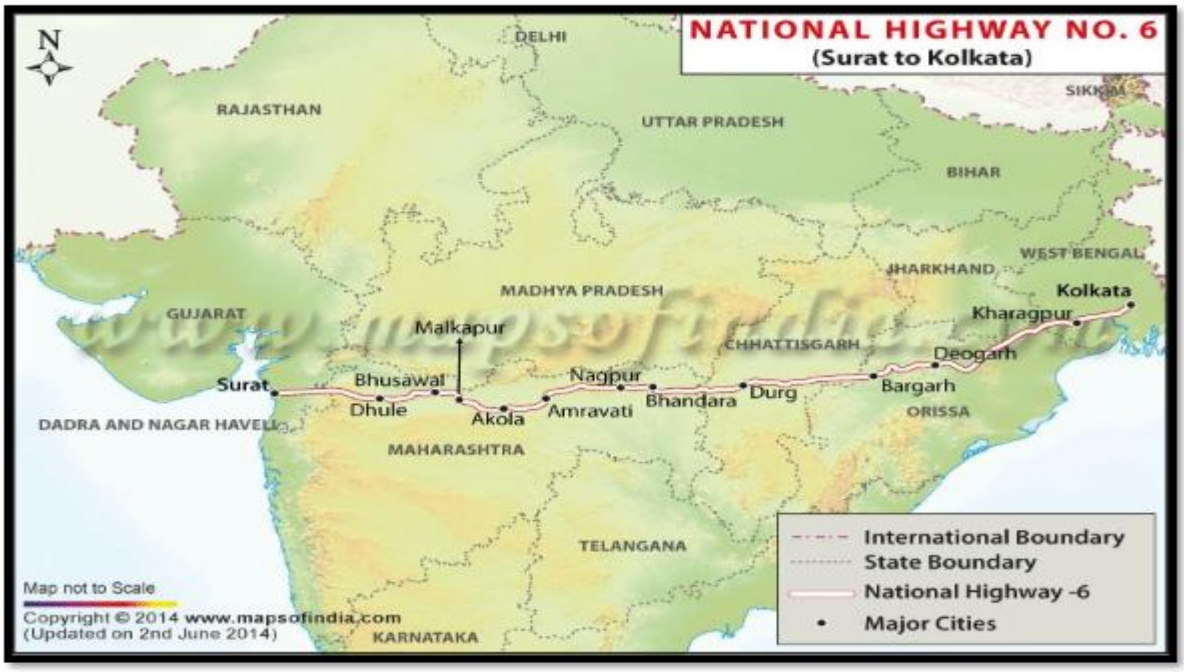


Fig No. 2 NH 6

National Highway 6 (NH 6) is a significant arterial road in India, connecting the western and eastern regions of the country. Here's an overview of NH 6:

1) *Route:* NH 6 runs from Mumbai in Maharashtra to Kolkata in West Bengal, covering a distance of approximately 1,949 kilometers. It passes through the states of Maharashtra, Chhattisgarh, Odisha, Jharkhand, and West Bengal, serving as a crucial link between the western and eastern coasts of India.
2) *Importance:* NH 6 holds strategic importance due to its role in connecting major cities, industrial centers, and ports across different states. It intersects with other key national highways, including NH 3, NH 53, and NH 16, facilitating seamless transportation and trade between various regions.
3) *Economic Impact:* The highway plays a vital role in promoting economic activities such as manufacturing, mining, agriculture, and trade. It provides access to key industrial hubs, including Mumbai, Nagpur, Raipur, and Kolkata, supporting the movement of goods and fostering industrial growth along its corridor.
4) *Infrastructure Development:* NH 6 has undergone significant infrastructure development to meet the increasing demands of traffic and enhance connectivity. This includes road widening, construction of bypasses, installation of modern toll plazas, and implementation of safety measures to improve the overall quality of the highway.
5) *Port Connectivity:* NH 6 intersects with major ports such as Mumbai Port and Kolkata Port, facilitating the movement of cargo and goods to and from these ports. The efficient connectivity provided by NH 6 supports international trade and maritime activities, contributing to the economic development of coastal regions.
6) *Natural Resources and Agriculture:* NH 6 passes through regions rich in natural resources and fertile agricultural land. The highway facilitates the transportation of minerals, raw materials, and agricultural produce, contributing to the economic development of rural areas along its route.

7) *Tourism and Cultural Significance:* NH 6 traverses regions with diverse cultural heritage and tourist attractions. It provides access to destinations such as the Ajanta and Ellora caves in Maharashtra, the tribal areas of Chhattisgarh, and the historical sites of Odisha, promoting tourism and cultural exchange.
8) *Challenges and Future Prospects:* Like any major highway, NH 6 faces challenges such as traffic congestion, maintenance issues, and environmental concerns. Future development efforts may focus on addressing these challenges through infrastructure upgrades, technology integration, and sustainable transportation solutions to ensure the efficient functioning of the highway.

In summary, National Highway 6 serves as a crucial corridor for the economic, social, and cultural integration of the regions it traverses, playing a pivotal role in India's transportation network and contributing to the country's overall growth and development.

VI. ROUTE AND CONNECTIVITY OF NH 5 AND 6

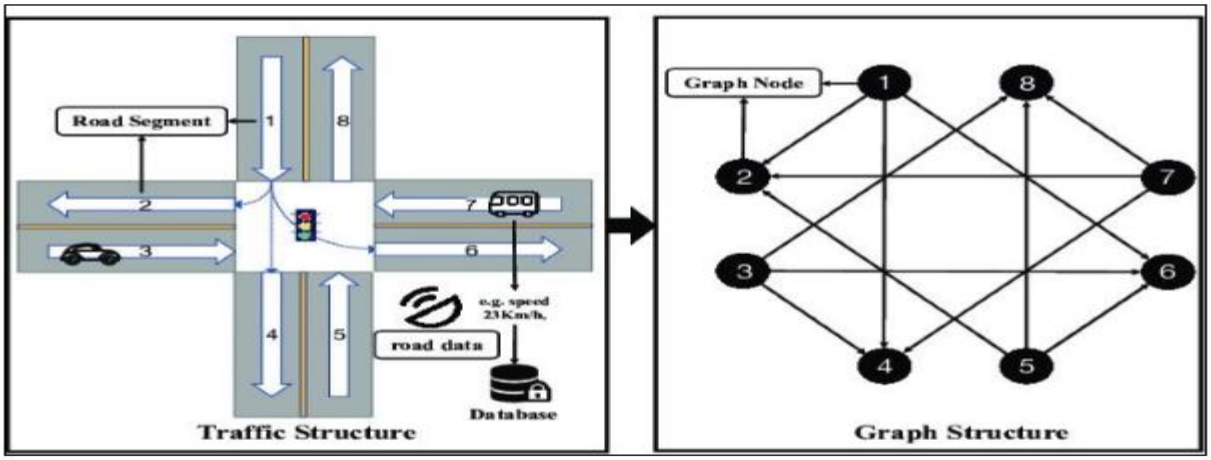


Fig No. 3 Connectivity of NH 5 and 6

The routes and connectivity of National Highways 5 (NH 5) and 6 (NH 6) play a crucial role in linking various regions, cities, and economic hubs across India. Here's an overview of their routes and connectivity:

A. *National Highway 5 (NH 5)*

1) *Route:* NH 5 runs from Chennai in Tamil Nadu to Kolkata in West Bengal, covering a distance of approximately 1,625 kilometers.
2) *States Covered:* It passes through the states of Tamil Nadu, Andhra Pradesh, Odisha, and West Bengal.
3) *Key Cities and Towns:* Chennai, Tada, Nellore, Vijayawada, Rajahmundry, Visakhapatnam, Berhampur, Bhubaneswar, Cuttack, Balasore, and Kolkata.
4) *Connectivity:* NH 5 connects several major cities, ports, and industrial centers along the southeastern and eastern coasts of India. It intersects with other important highways, such as NH 16, NH 19, and NH 60, facilitating seamless connectivity between different states and regions.

B. *National Highway 6 (NH 6)*

1) *Route:* NH 6 runs from Mumbai in Maharashtra to Kolkata in West Bengal, covering a distance of approximately 1,949 kilometers.
2) *States Covered:* It passes through the states of Maharashtra, Chhattisgarh, Odisha, Jharkhand, and West Bengal.
3) *Key Cities and Towns:* Mumbai, Thane, Nashik, Dhule, Jalgaon, Akola, Amravati, Nagpur, Raipur, Sambalpur, Jharsuguda, Rourkela, Baripada, Kharagpur, and Kolkata.
4) *Connectivity:* NH 6 serves as a vital link between the western and eastern regions of India, connecting major cities, industrial zones, and ports. It intersects with other key highways, including NH 3, NH 53, and NH 16, facilitating transportation and trade across different states and territories.

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C. Intersections and Connectivity

1) Both NH 5 and NH 6 intersect with several other national highways and state highways, enhancing their connectivity and accessibility to various regions.
2) They also intersect with major ports along the eastern and western coasts of India, such as Chennai Port, Kolkata Port, Mumbai Port, and Visakhapatnam Port, facilitating the movement of cargo and goods to and from these ports.
3) The highways provide connectivity to key industrial hubs, agricultural regions, tourist destinations, and administrative centers, contributing to economic development, regional integration, and social cohesion across the country.

Overall, NH 5 and NH 6 serve as critical transportation corridors, connecting diverse regions and fostering economic growth, trade, and development along their routes.

VII. ECONOMIC IMPACT OF NH 5 AND 6

The economic impact of National Highways 5 (NH 5) and 6 (NH 6) is profound and multifaceted, contributing significantly to various aspects of India's economy. Here are some key economic impacts of these highways:

1) *Trade Facilitation:* NH 5 and NH 6 serve as vital corridors for the movement of goods within the country and for international trade. These highways connect major industrial hubs, agricultural regions, and ports, facilitating the transportation of raw materials, finished products, and commodities. The efficient connectivity provided by NH 5 and NH 6 reduces transportation costs, enhances supply chain efficiency, and supports the growth of businesses engaged in manufacturing, agriculture, and trade.
2) *Industrial Development:* The presence of NH 5 and NH 6 has catalyzed industrial development along their corridors, attracting investment and stimulating economic activity. Industries located in proximity to these highways benefit from improved accessibility to markets, ports, and transportation networks, leading to increased production, job creation, and revenue generation. The highways facilitate the establishment of industrial clusters, logistics parks, and warehousing facilities, further enhancing the competitiveness of industries.
3) *Regional Growth and Connectivity:* NH 5 and NH 6 play a crucial role in promoting regional growth and connectivity by linking urban centers, rural areas, and remote regions. Improved connectivity fosters the integration of economies across different states and territories, reducing regional disparities and promoting balanced development. The highways facilitate the flow of labor, capital, and resources, supporting entrepreneurship, infrastructure development, and the emergence of new economic opportunities in previously underserved areas.
4) *Tourism and Hospitality:* NH 5 and NH 6 traverse regions rich in cultural heritage, natural beauty, and tourist attractions, attracting visitors and boosting tourism-related industries. The highways provide access to popular destinations such as beaches, historical sites, national parks, and pilgrimage centres, generating revenue for local communities and stimulating the hospitality sector. Tourism infrastructure development along NH 5 and NH 6, including hotels, resorts, restaurants, and recreational facilities, creates employment opportunities and contributes to the overall economy.
5) *Infrastructure Investment and Job Creation:* The construction, maintenance, and upgradation of NH 5 and NH 6 require significant infrastructure investment, generating employment opportunities and stimulating economic growth. Infrastructure projects associated with these highways, such as road widening, bridge construction, and toll plaza installation, create jobs in construction, engineering, and related industries. The multiplier effect of infrastructure investment extends to other sectors of the economy, leading to increased consumption, investment, and economic activity.
6) *Ports and Maritime Trade:* NH 5 and NH 6 intersect with major ports along the eastern and western coasts of India, including Chennai Port, Kolkata Port, Mumbai Port, and Visakhapatnam Port. The efficient connectivity provided by these highways supports maritime trade and port operations, facilitating the movement of cargo to and from ports. This enhances the competitiveness of Indian ports, strengthens supply chains, and boosts international trade, contributing to economic growth and prosperity.

Overall, the economic impact of NH 5 and NH 6 extends across various sectors of the economy, driving growth, facilitating trade, and fostering regional development. These highways play a crucial role in India's economic integration, competitiveness, and sustainable development agenda, making them indispensable components of the country's transportation infrastructure.

VIII. CHALLENGES AND ISSUES

A. National Highway 5 (NH-5)

1) *Traffic Congestion:* NH-5, particularly in urban areas like Kolkata, faces severe traffic congestion, leading to delays and increased travel time.

2) *Poor Road Conditions:* Sections of NH-5 suffer from poor road conditions, including potholes and uneven surfaces, which can cause accidents and damage vehicles.
3) *Lack of Maintenance:* Inadequate maintenance leads to further deterioration of road quality, making travel unsafe and uncomfortable for commuters.
4) *Encroachments:* Illegal encroachments along NH-5 hinder road expansion and maintenance efforts, exacerbating congestion issues.
5) *Environmental Impact:* Increased vehicular traffic on NH-5 contributes to air and noise pollution, impacting the health and well-being of nearby residents.

B. National Highway 6 (NH-6)

1) *Narrow Width:* NH-6, especially in certain stretches, suffers from narrow road width, making overtaking difficult and increasing the risk of accidents.
2) *High Accident Rate:* Due to factors like sharp curves, inadequate signage, and poor road conditions, NH-6 experiences a high rate of accidents, resulting in injuries and fatalities.
3) *Heavy Vehicle Traffic:* NH-6 serves as a crucial route for heavy vehicle transportation, leading to congestion and wear and tear on the road infrastructure.
4) *Lack of Rest Areas:* Insufficient rest areas and amenities along NH-6 make long distance travel challenging for drivers, impacting road safety and convenience.
5) *Lack of Connectivity:* Some sections of NH-6 lack proper connectivity to nearby towns and cities, hampering economic development and accessibility for residents.

Addressing these challenges requires comprehensive planning and investment in infrastructure development, maintenance, and safety measures, along with effective enforcement of regulations to ensure the smooth and safe functioning of National Highways 5 and 6.



Fig No. 4 Challenges and Issues

IX. FUTURE PROSPECTS AND RECOMMENDATION

Looking ahead, the future prospects and recommendations for National Highways 5 and 6 in India involve a combination of infrastructure development, technology integration, and policy initiatives to address existing challenges and capitalize on opportunities for improvement. Here are some future prospects and recommendations:

1) Infrastructure Development

For infrastructure development there is need to work about the following points-

- Road Widening and Expansion
- Quality Maintenance
- Bypasses and Flyovers
- Rest areas and amenities.

2) Technology Integration

- Intelligent Transportation Systems (ITS)
- Digital Connectivity
- Vehicle Tracking and Safety Measures

3) Safety and Security

- Road Safety Measures
- Emergency Response Systems
- Security Surveillance

4) Environmental Sustainability

- Green Infrastructure
- Promote Sustainable Transportation

5) Stakeholder Engagement and Governance

- Public Participation
- Effective Governance

By prioritizing these recommendations and adopting a holistic approach to infrastructure development and management, National Highways 5 and 6 can be transformed into safer, more efficient, and sustainable corridors that contribute to the socio-economic development of the regions they serve.

X. CONCLUSION

While there might not be specific case studies with conclusive findings exclusively focused on National Highways 5 and 6, we can draw conclusions based on existing data, trends, and ongoing initiatives:

1) *Infrastructure Challenges:* Both NH-5 and NH-6 face common infrastructure challenges such as traffic congestion, poor road conditions, and inadequate maintenance. These issues hinder the smooth flow of traffic and compromise road safety.
2) *Safety Concerns:* The high accident rates on NH-5 and NH-6 underscore the urgent need for improved safety measures, including better signage, speed enforcement, and road design enhancements.
3) *Environmental Impact:* Increased vehicular traffic on NH-5 and NH-6 contributes to environmental degradation, including air and noise pollution. Addressing these concerns requires a balance between infrastructure development and environmental conservation.
4) *Technological Integration:* While there have been efforts to integrate technology, such as toll collection systems and traffic monitoring, further investment in intelligent transportation systems (ITS) is necessary to enhance traffic management and traveller safety.
5) *Policy and Governance:* Effective governance, regulatory frameworks, and stakeholder engagement are critical for addressing the multifaceted challenges faced by NH-5 and NH-6. Streamlining approval processes and ensuring transparency in project execution are essential for timely infrastructure development and maintenance.

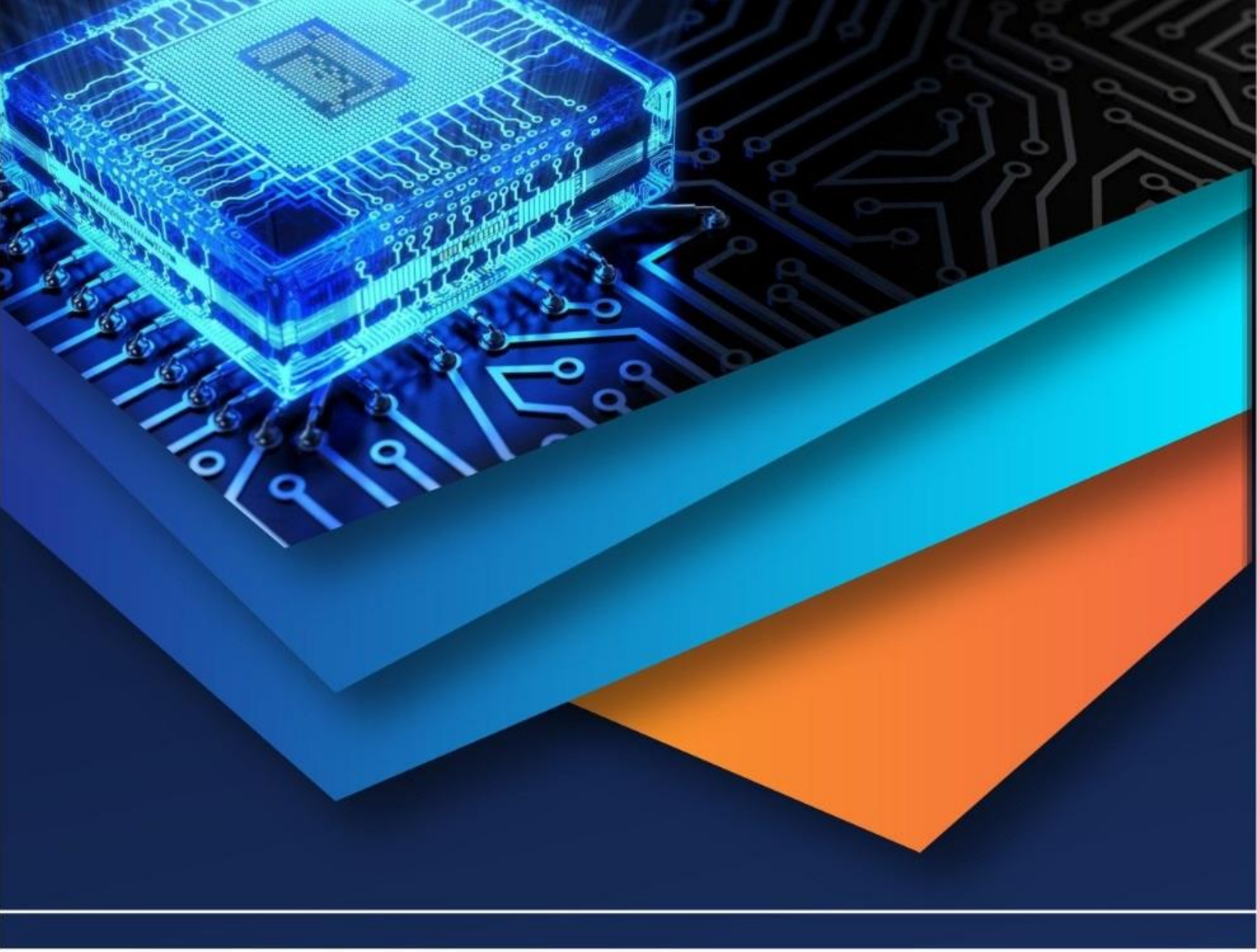
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In conclusion, addressing the challenges of National Highways 5 and 6 requires a comprehensive approach that encompasses infrastructure upgrades, safety enhancements, environmental conservation measures, technological integration, and effective governance. Collaboration between government agencies, private sector stakeholders, and local communities is key to realizing the full potential of these vital transportation corridors and ensuring safer and more sustainable mobility for all road users.

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