

## USING DEEP TECH IN TRANSPORTATION AND LOGISTICS IN INDIA

Chinmay Powar<sup>1</sup>

<sup>1</sup>Student, PGDM, Institute of Management Development and Research (IMDR), Pune, India.

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### ABSTRACT

The integration of deep technology (deep tech) into India's transportation and logistics sector is transforming the industry by enhancing efficiency, reducing costs, and promoting sustainability. This paper explores the current landscape of deep tech applications in Indian logistics, examines key technologies driving this transformation, and discusses challenges and future prospects. The study aims to provide a comprehensive understanding of how deep tech is reshaping transportation and logistics in India.

**Keywords:** Deep Tech, Transportation, Logistics, India, Artificial Intelligence, Internet of Things, Blockchain, Autonomous Vehicles

### 1. INTRODUCTION

India's transportation and logistics sector is a critical component of its economy, contributing approximately 14% to the nation's GDP. Despite its significance, the sector has faced challenges such as high costs, inefficiencies, and environmental concerns. The advent of deep tech, encompassing advanced technologies like Artificial Intelligence (AI), Internet of Things (IoT), Blockchain, and Autonomous Vehicles, offers promising solutions to these challenges. This paper delves into the role of deep tech in revolutionizing India's transportation and logistics industry.

### 2. CURRENT LANDSCAPE OF DEEP TECH IN INDIAN LOGISTICS

The Indian logistics sector is witnessing a surge in deep tech adoption, driven by a growing startup ecosystem and increased investments. In 2024, Indian tech startups secured \$7.4 billion in funding, with deep tech startups accounting for \$1.6 billion, reflecting a 78% year-on-year growth. This influx of capital is fueling innovations aimed at addressing the sector's longstanding challenges.

### 3. KEY DEEP TECH INNOVATIONS TRANSFORMING THE SECTOR

#### 3.1 Artificial Intelligence (AI)

AI is central to Logistics 4.0, enabling accurate demand forecasting, optimal route planning, and efficient inventory management. These capabilities significantly reduce delays and enhance overall operational efficiency. For instance, AI-driven platforms can analyze vast datasets to predict demand fluctuations, allowing companies to adjust their supply chains proactively.

#### 3.2 Internet of Things (IoT)

IoT devices provide real-time visibility into logistics operations, crucial for a country where over 64% of goods are transported by road. Real-time tracking minimizes inefficiencies and builds consumer trust through reliable delivery timelines. Sensors installed in vehicles and cargo can monitor conditions such as temperature and humidity, ensuring the integrity of sensitive goods during transit.

#### 3.3 Blockchain

Blockchain technology enhances transparency and security in supply chains by providing immutable records of transactions. This is particularly beneficial in reducing fraud and ensuring compliance with regulatory standards. Smart contracts can automate processes like payments and customs clearance, reducing administrative burdens and expediting shipments.

#### 3.4 Autonomous Vehicles

The development of autonomous driving solutions promises to redefine goods transportation by improving safety and reducing human error. Companies are exploring AI-driven autonomous vehicles to streamline logistics operations. For example, autonomous drones are being tested for last-mile deliveries in urban areas, offering faster and more cost-effective solutions.

## 4. CASE STUDIES

### 4.1 Delhivery

Delhivery has transformed from a startup into a logistics giant by leveraging deep tech solutions. The company's growth strategy includes the adoption of AI and data analytics to optimize delivery routes and manage warehouse operations efficiently. This approach has enabled Delhivery to handle large volumes of shipments with improved accuracy and speed.

### 4.2 Blue Energy Motors

Blue Energy Motors focuses on manufacturing LNG-fueled trucks, offering a sustainable alternative to traditional diesel vehicles. The company plans to raise \$100 million to expand its production capacity, reflecting a shift towards cleaner fuel options in India's logistics sector. Their trucks emit up to 30% less CO<sub>2</sub>, contributing to the reduction of the industry's carbon footprint.

### 4.3 GreenLine Mobility Solutions

GreenLine Mobility Solutions is deploying LNG-powered trucks for Flipkart, signaling the increasing adoption of cleaner fuels in logistics. This partnership aims to reduce emissions and promote sustainable transportation practices. By integrating LNG trucks into their fleet, Flipkart is taking significant steps toward achieving its environmental sustainability goals.

## 5. CHALLENGES IN IMPLEMENTING DEEP TECH

Despite the potential benefits, several challenges hinder the widespread adoption of deep tech in India's logistics sector:

- **Infrastructure Limitations:** Inadequate infrastructure, such as limited LNG refueling stations, hampers the deployment of alternative fuel vehicles.
- **Regulatory Complexities:** Navigating the regulatory landscape for new technologies can be complex and time-consuming, delaying implementation.
- **Talent Shortages:** There is a scarcity of skilled professionals proficient in deep tech, which poses a challenge for companies looking to innovate.

## 6. FUTURE PROSPECTS

The future of deep tech in Indian logistics appears promising, driven by several factors:

- **Increased Investments:** The significant rise in funding for deep tech startups indicates strong investor confidence and a conducive environment for innovation.
- **Government Initiatives:** Policies aimed at reducing logistics costs and promoting sustainability are encouraging the adoption of advanced technologies.

## 7. REFERENCES

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