Original Article
ISSN (Online): 2582-7472

ShodhKosh: Journal of Visual and Performing Arts
February 2024 5(2), 422–430

# EVALUATING THE PERFORMANCE AND SUSTAINABILITY OF INDUSTRIAL ESTATES IN ASSAM: A COMPREHENSIVE ANALYSIS USING THE IPRS FRAMEWORK

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**DOI**
10.29121/shodhkosh.v5.i2.2024.2239

**Funding:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.



## ABSTRACT

This paper evaluates the performance of 11 industrial infrastructural establishments in the Kamrup and Kamrup Metro districts of Assam, using the Industrial Park Rating System (IPRS) framework. The study focuses on four key pillars: internal infrastructure and utilities, external infrastructure and connectivity, business support services, and environment and safety management. Primary data was collected through structured questionnaires administered to MSME owners and managers, while secondary data was gathered from government reports and industrial policies. The findings reveal that while the basic infrastructure—such as uninterrupted power supply, piped water, and street lighting—is robust, significant gaps remain in advanced utilities, such as sewage treatment plants and renewable energy systems. Furthermore, inadequate business support services, including the absence of skill development centers and online land allotment systems, create operational challenges for MSMEs. Environmental and safety measures, such as disaster management protocols and rest areas for women workers, are also lacking. These deficiencies impact the overall efficiency and sustainability of the industrial estates. The study concludes with recommendations for enhancing both infrastructural quality and support services to foster a more competitive and sustainable industrial environment in Assam, thereby boosting MSME growth and economic development in the region.

**Keywords:** Industrial Infrastructural Establishment, Operational Challenges Efficiency and sustainability, Support Service etc

## 1. INTRODUCTION

Industrial estates play a crucial role in fostering economic development by providing essential infrastructure and services to support the growth of Micro, Small, and Medium Enterprises (MSMEs). In India, MSMEs form the backbone of the economy, contributing significantly to employment generation, innovation, and regional development. Industrial estates, which include industrial areas, parks, estates, and growth centres, offer dedicated spaces equipped with the necessary infrastructure for manufacturing and service enterprises. However, the performance and efficiency of these industrial estates vary widely based on location, infrastructure quality, policy support, and other regional factors.

The state of Assam, located in the northeastern region of India, has witnessed substantial industrial growth over the past decade. In particular, the Kamrup and Kamrup Metro districts have emerged as key industrial hubs, with the highest concentration of MSMEs in the state. According to Udyog Aadhaar Registration data, Kamrup Metro alone accounts for 5,724 registered MSMEs, while Kamrup district hosts 2,166 registered MSMEs. This makes these two districts representative regions for analyzing industrial development trends in Assam. Given their industrial significance, the performance of industrial estates in these districts is of paramount importance for the overall economic development of the state.

This research paper aims to systematically evaluate the performance of 11 selected industrial infrastructural establishments in Kamrup and Kamrup Metro districts using the Infrastructure Performance Rating System (IPRS) framework. The IPRS framework offers a comprehensive evaluation methodology that assesses various dimensions of industrial estates, including infrastructure quality, operational efficiency, regulatory support, and economic outcomes. By applying this framework, the study seeks to provide an in-depth analysis of the strengths and weaknesses of the industrial estates in these regions, highlighting the areas that require improvement to enhance their contribution to MSME development.

The selected industrial establishments for this study include a diverse mix of Industrial Areas, Estates, Food Parks, and Growth Centres that cater to a wide range of sectors. This diversity allows for a comprehensive evaluation of industrial performance across different infrastructure types, offering insights into how these estates meet the specific needs of MSMEs. The findings of this study will not only inform policymakers about the current state of industrial infrastructure in Assam but also provide recommendations for enhancing the competitiveness and sustainability of MSMEs in these districts.

By focusing on the Kamrup and Kamrup Metro districts, this research offers a region-specific analysis that captures the unique industrial dynamics of Assam. Through the systematic application of the IPRS framework, this paper seeks to contribute to the broader discourse on industrial infrastructure development in India, while offering actionable insights for regional stakeholders to improve the performance and appeal of industrial estates in Assam.

## 2. OBJECTIVE OF THE STUDY

The primary objective of this study is to evaluate the performance of industrial infrastructural establishments in Assam, specifically focusing on the Kamrup and Kamrup Metro districts, using the Industrial Park Rating System (IPRS) framework. This research aims to provide a comprehensive, systematic analysis of 11 industrial estates, offering region-specific insights into their infrastructural quality, operational efficiency, and capacity to support MSMEs.

## 3. METHODOLOGY

This study employs a mixed-method approach, combining both primary and secondary data to provide a thorough evaluation of the selected industrial infrastructural establishments. The methodology is designed to ensure that the evaluation captures the full spectrum of infrastructural support, operational challenges, and opportunities for improvement within these industrial estates.

## 4. PRIMARY DATA COLLECTION

The primary data for this study was collected through structured questionnaires, administered to the owners and managers of MSMEs operating within the 11 selected industrial estates. The questionnaires were designed to gather detailed information on factors influencing MSMEs' choice of location, challenges faced in daily operations, and the benefits derived from functioning within these industrial establishments. The data collected covered key areas such as infrastructure quality, utility availability, transportation connectivity, business support services, and environmental management.

In addition to the questionnaire survey, in-depth interviews were conducted with officials from the Assam Industrial Infrastructural Development Corporation (AIIDC), Assam Small Industrial Development Corporation (ASIDC), and Assam Industrial Development Corporation (AIDC). These interviews provided valuable insights into the administrative and policy perspectives governing these industrial estates, helping to contextualize the infrastructural challenges and identify potential solutions for improvement.

## 5. SECONDARY DATA COLLECTION

Secondary data was sourced from various government reports, industrial policy documents, academic research papers, and publications from the Department for Promotion of Industry and Internal Trade (DPIIT). These sources provided historical context and policy frameworks that underpin the development and management of industrial estates

in Assam. Additionally, reports from the Department of Industrial Policy and Promotion (DIPP) were used to understand the broader industrial landscape and assess the performance of industrial estates at both state and national levels.

## 6. SAMPLING TECHNIQUE

Given the relatively small population size of MSMEs within the selected industrial estates, a complete census approach was employed. This method ensured that all MSMEs operating in the 11 industrial establishments were included in the study, allowing for a comprehensive analysis. A total of 227 MSMEs were surveyed, encompassing micro, small, and medium enterprises across various sectors.

## 7. IPRS FRAMEWORK APPLICATION

The Industrial Park Rating System (IPRS), introduced by the DIPP in 2018, was applied to evaluate the performance of the 11 selected industrial infrastructural establishments. The IPRS framework, developed in collaboration with the Asian Development Bank (ADB) and the Ministry of Electronics and Information Technology (MeitY), provides a structured methodology for assessing industrial parks based on four key pillars:

1) Internal Infrastructure and Utilities: This pillar evaluates the availability and quality of essential infrastructure such as power supply, water resources, waste management, and internal roads. A high score in this category indicates that the industrial estate provides a robust internal infrastructure capable of supporting smooth business operations.
2) External Infrastructure and Connectivity: This pillar assesses the proximity of the industrial estate to major transportation networks such as highways, railways, and airports. Additionally, it evaluates access to logistical networks that facilitate the efficient movement of goods and services.
3) Business Support Services: This pillar looks at the range of support services available to businesses within the industrial estate. These include the efficiency of land allotment processes, the presence of single-window clearance systems, workforce amenities, and other services that contribute to ease of doing business.
4) Environment and Safety Management: This pillar examines the industrial estate's adherence to environmental sustainability practices, safety standards, and industrial hygiene protocols. A well-performing estate in this category ensures minimal environmental impact while maintaining high safety and hygiene standards for workers.

By applying the IPRS framework to these industrial estates, the study not only provides a detailed evaluation of their current performance but also identifies key areas where improvements can be made. Each of the 11 industrial infrastructural establishments—including Industrial Areas, Estates, Food Parks, and Growth Centres—was rated across these four pillars, offering a holistic view of their strengths and weaknesses.

This methodology ensures a comprehensive analysis of the infrastructural capabilities of these industrial estates and their role in supporting MSMEs in Assam. By integrating both quantitative data from the MSME surveys and qualitative insights from industrial development officials, the study provides a well-rounded evaluation that can inform policy recommendations and future infrastructure development initiatives.

Table 1 - Parameters suggested by the Industrial Park Rating System ( IPRS) framework,

| Pillars | Parameters |
|---|---|
| Pillar 1: Internal Infrastructure and Utilities | 1. uninterrupted electricity/ power availability?<br>2. ICT ( Telecom; Internet Services) Infrastructure available?<br>3. Sewage treatment plant available?<br>4. Common effluent treatment plant available?<br>5. Is piped water supply available?<br>6. Water treatment plant available?<br>7. covered stormwater drainage?<br>8. operational street lighting operator available inside the park?<br>9. does the park operator adopt the use of captive renewable energy generation (solid/wind etc.)?<br>10. availability of gas pipeline? |
| Pillar 2: External Infrastructure and Connectivity: | 1. Logistic terminal in proximity of 20 KM?<br>2. Power substation availability?<br>3. solid waste disposal/ treatment site available in proximity of 10 KM?<br>4. bus stop available inside the park?<br>5. Distance from nearest railhead (KM) < 20 KM<br>6. Distance from the nearest airport (KM) < 100 KM<br>7. Distance from nearest sea port ( KM) < 200 KM<br>8. Distance from nearest major city ( KM) < 50 KM |
| Pillar 3: Business Services and Facilities: | 1. Are plots available and price details available on AIIDC/ AIDC websites?<br>2. Is the procedure for application and allotment of land implemented online?<br>3. Single window Services provided by the park?<br>4. Dormitory for labour and drivers available in the park?<br>5. Bank branch/ ATM available in the park?<br>6. Canteen/ Restaurant available in the park?<br>7. Weighbridge for cargo and freight available in proximity of 1 KM?<br>8. Designated truck parking available within the park<br>9. Skill development centre within the park? |
| Pillar 4: Environment and Safety Management | 1. Are Fire hydrants/ fire trucks/ firefighting systems available in the park?<br>2. Disaster management plan/ protocols established for park safety?<br>3. Air Quality monitoring station available in the park?<br>4. Is Functional CCTV and another security system available for the park premises?<br>5. Rest area for women workers available in the park or its vicinity?<br>6. PHE/ CSC/ ESI Dispensary/25-bed hospital inside the park? |

## 8. RESULTS AND DISCUSSION

This section presents the findings from the evaluation of the 11 industrial infrastructural establishments in Kamrup and Kamrup Metro districts of Assam using the IPRS framework. The discussion highlights the strengths and areas of improvement across four key pillars: Internal Infrastructure and Utilities, External Infrastructure and Connectivity, Business Support Services, and Environment and Safety Management.

### A. Internal Infrastructure and Utilities

The results from the assessment of internal infrastructure and utilities demonstrate a strong foundation in terms of basic services provided to MSMEs. All the industrial estates, such as Bamunimaidam, Kalapahar, Bonda, Rani, and Rangia, benefit from reliable power supply, piped water supply, and operational street lighting. These basic utilities ensure that industrial activities can function smoothly, minimizing operational disruptions

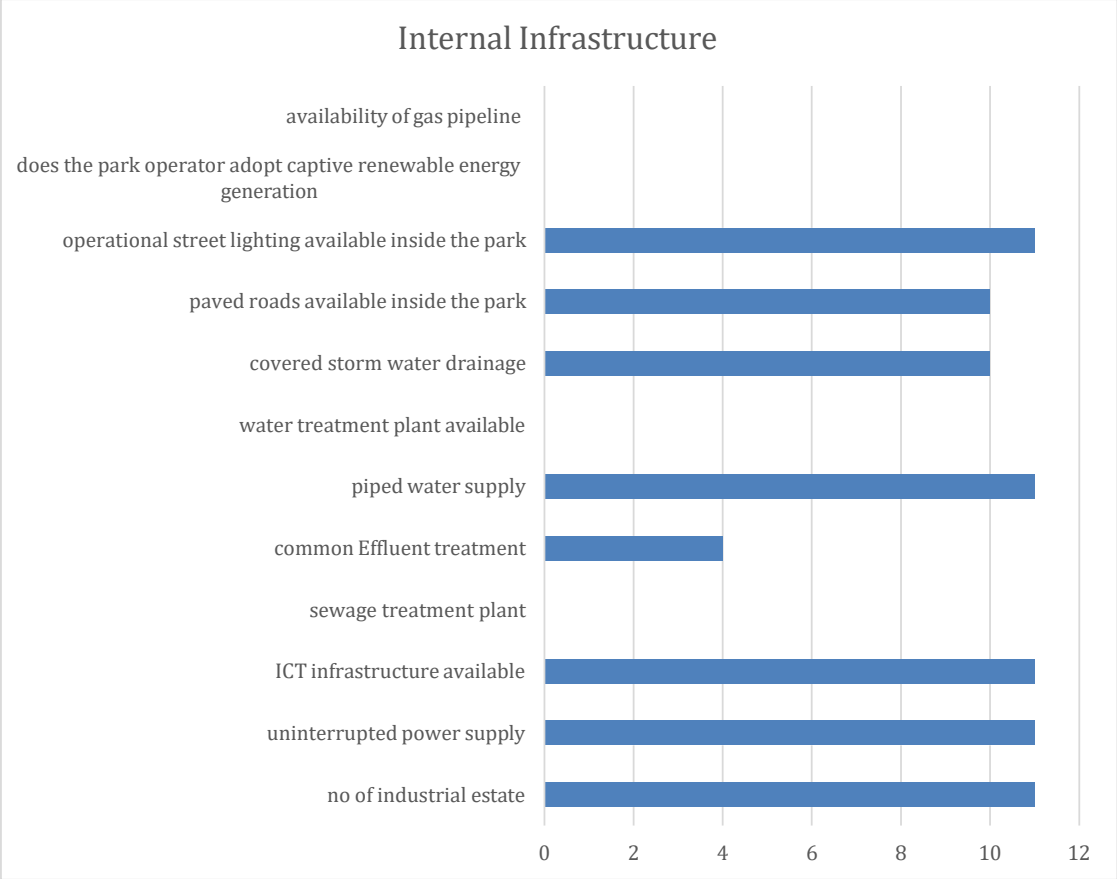



**Diagram 1:** Internal Infrastructure

**Source:** Field Survey

However, the study identifies significant gaps in more advanced infrastructure elements critical for sustainable industrial operations. None of the industrial estates, except for the Industrial Growth Centre and IIDC Rangia, have common effluent treatment plants or sewage treatment facilities. These are crucial for managing industrial waste and preventing environmental damage. MSMEs are currently forced to implement their own water treatment and effluent management systems, which increases their operational costs and complicates compliance with environmental regulations. There is also an absence of covered drainage systems in some areas, such as Mini Industrial Estate, Kalapahar, and Industrial Area, Bonda, leading to waterlogging during the rainy season.

Moreover, the lack of captive renewable energy generation systems and gas pipeline infrastructure in all the estates suggests an untapped opportunity for sustainable energy practices. Investments in renewable energy sources and gas pipeline facilities could significantly reduce energy costs for MSMEs and improve their environmental performance.

The findings suggest that while the fundamental infrastructure is strong, there is a critical need to focus on advanced utilities, particularly sustainability-oriented infrastructure such as sewage treatment plants, effluent treatment, and renewable energy systems.

### B. External Infrastructure and Connectivity

In terms of external infrastructure and connectivity, the industrial estates are generally well- positioned geographically, with close proximity to major cities, airports, and railheads, facilitating access to raw materials and markets. For instance, Bamunimaidam and Kalapahar are located less than 10 km from key railheads and about 25 km from the Guwahati International Airport, offering efficient logistical connectivity for business operations .

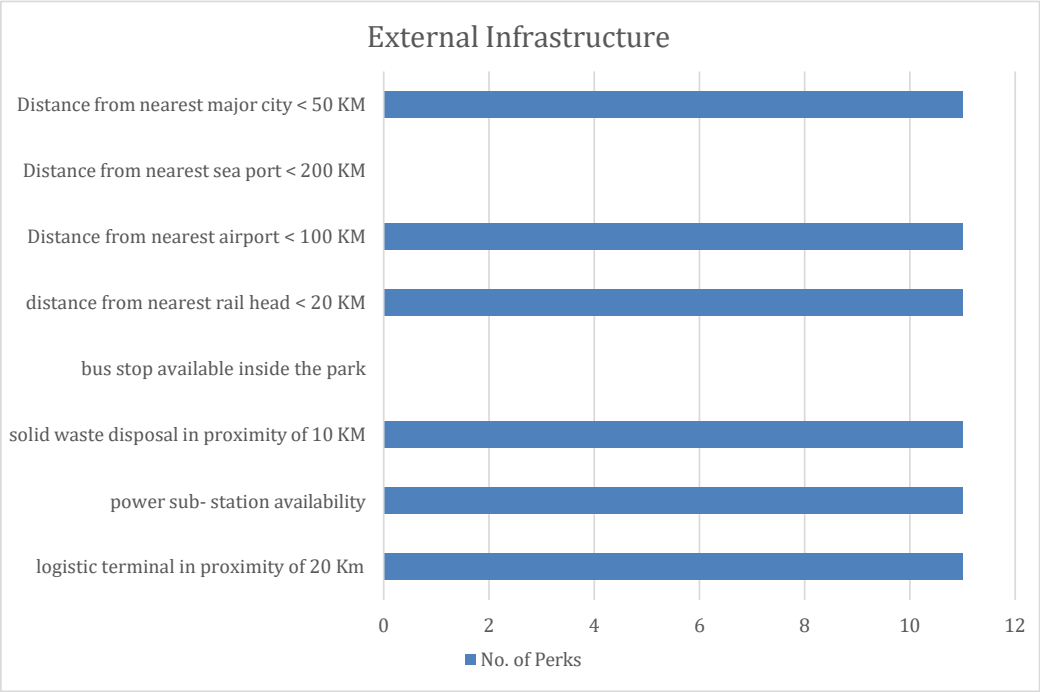


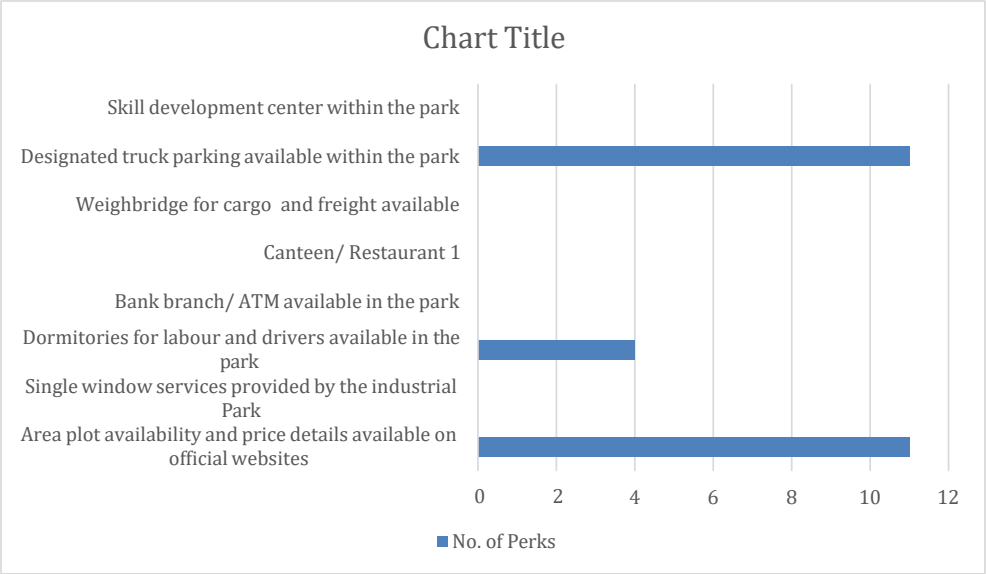

**Diagram 2:** External Infrastructure

**Source:** Field Survey

Despite these advantages, some logistical challenges remain. There is logistics terminal within a 20 km radius of most estates but not well managed which hampers the smooth flow of materials and goods. Additionally, none of the estates have a dedicated bus stop within their premises, making commuting difficult for employees who rely on public transport. While most estates are within close proximity to public transportation, the absence of direct access within the premises creates inefficiencies and safety concerns, especially during early and late shifts.

The study highlights the need for logistical hubs and terminals closer to the industrial areas and the provision of dedicated bus stops within the estates to ease employee mobility and enhance overall operational efficiency.

### C. Business Support Services Diagram 3: Business Support Services




**Source**: Field Survey

The assessment of business support services revealed that the industrial estates in Assam generally lack critical support infrastructure that could improve the ease of doing business. Facilities such as dormitories, truck parking zones, skill development centres, and single-window services are either entirely missing or inadequate across all industrial estates except for a few, such as the Industrial Area Rani and EPIP Amingaon.

The absence of online land allotment systems and single-window services in particular creates administrative hurdles for MSMEs, increasing the time and complexity of obtaining necessary licenses and permits. The unavailability of banking and ATM facilities within the estates further complicates financial transactions for businesses and workers.

Moreover, designated truck parking zones, though present, are insufficient in certain areas like Mini Industrial Estate and Kalapahar. The lack of skill development centres also limits the opportunities for continuous workforce training, which is crucial for maintaining competitiveness in an evolving industrial landscape.

Addressing these gaps by enhancing business support services could significantly improve the competitiveness and attractiveness of these industrial estates, making them more conducive to MSME growth.

### D. Environment and Safety Management

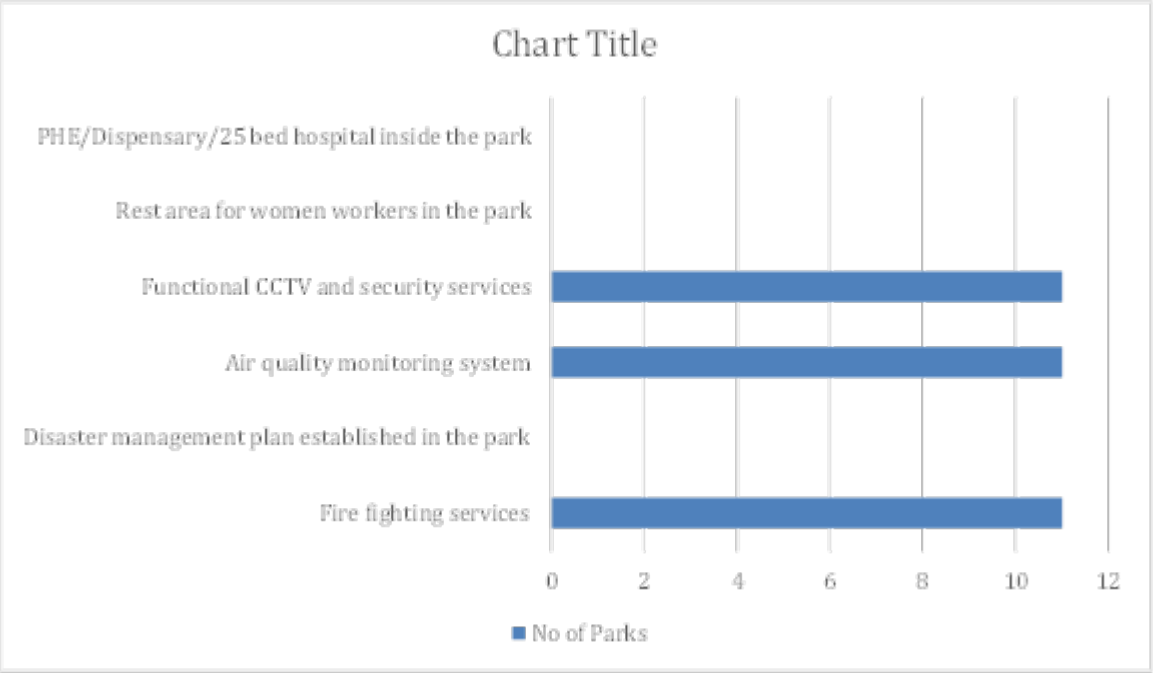



**Diagram 4**: Environment and Safety Management

Source: Field Survey

The industrial estates under study exhibited varying levels of adherence to environmental and safety standards. Firefighting services, air quality monitoring, and security systems, such as CCTV installations, are available across most estates, ensuring a basic level of safety However, the absence of a systematic disaster management framework and a lack of air quality monitoring stations are notable weaknesses. MSMEs are required to implement their own disaster management protocols, which can vary in quality and effectiveness, potentially exposing businesses to significant risks during emergencies.

Additionally, the estates do not provide designated rest areas for women workers, which is a significant oversight considering the growing female workforce in industrial areas. Furthermore, there are no healthcare facilities or ESI dispensaries available within the estates. Workers are dependent on external healthcare facilities, which can delay access to urgent medical care. This deficiency in health and safety infrastructure negatively impacts the well-being and productivity of the workforce.

To improve safety and environmental management, it is imperative to establish centralized disaster management systems, air quality monitoring stations, and dedicated healthcare facilities. Providing rest areas for women and improving workplace health standards will further enhance worker welfare and safety.

## 9. CONCLUSION

The results of this study reveal that while the industrial estates in Kamrup and Kamrup Metro districts provide strong basic infrastructure, significant improvements are needed in terms of advanced utilities, logistical support, business services, and environmental management. Addressing these gaps will not only reduce operational inefficiencies but also enhance the sustainability and competitiveness of MSMEs in these regions.

The findings underscore the importance of a more integrated approach to industrial infrastructure development—one that prioritizes not just the foundational needs but also long-term sustainability, logistical efficiency, and workforce welfare. The recommendations derived from this analysis can serve as a guide for policymakers, facilitating organizations, and industrial development authorities to create a more conducive industrial environment that fosters sustainable economic growth.

The implications of these results highlight the critical need for focused improvements in both advanced infrastructure and business support services within Assam's industrial estates. While basic utilities like power and water supply are robust, the lack of sustainability measures, such as effluent treatment plants and renewable energy systems, along with inadequate logistical and administrative support, poses challenges for MSMEs. Enhancing these areas could significantly reduce operational costs, improve regulatory compliance, and boost the overall competitiveness of MSMEs. Furthermore, addressing gaps in environmental management and workforce welfare will not only improve industrial efficiency but also create a safer and more inclusive working environment, fostering long-term industrial growth and sustainability.

## CONFLICT OF INTERESTS

None.

## ACKNOWLEDGMENTS

None.

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