

A Study on Site Selection Component of Model Logistics Park: A Case of Uttar Pradesh, India

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Abstract

Uttar Pradesh, India's 4th largest state and 3rd largest economy eyeing being a One trillion-dollar economy. Among the top 5 manufacturing states of India, home to the second-highest number of Micro, Small, and Medium Enterprises (organized and unorganized) in India. The National Highways Logistics Management Limited under the Ministry of Road Transport and Highways (MoRTH) and the National Highways Authority of India proposed Multi-Modal Logistics Parks (MMLPs) as an initiative to increase the capacity of Logistics Transport. India has substantial logistics expenses compared to developed nations; in 2015, this accounted for 13% of GDP in India vs 8%–10% in other countries. A crucial policy step to lower logistics costs and assist in resolving three of the five restricting constraints is the creation of MMLPs. This would support the Make in India Program, and the Defence Industrial Corridors would encourage domestic manufacturing of components for the defence and aerospace industries. By doing this, the country will import less goods and encourage export to other nations. The city of Khurja being a part of the eastern dedicated freight corridor would help to develop the city as well the region in terms of logistics and supply chain management. This thesis terms to recommend solutions for the upcoming development, and effect due of the EDFC and tend to support defence product management as one of the mega industries in India. This paper on Multi-Modal Logistics Parks (MMLPs) will incorporate the selection of the site of the facility and propose guidelines for site selection.

Keywords: Logistics, supply chain, site selection, urban planning

INTRODUCTION

The National Highways Logistics Management Limited under the Ministry of Road Transport and Highways (MoRTH) and the National Highways Authority of India proposed Multi-Modal Logistics Parks (MMLPs) as an initiative to increase the capacity and improve freight and logistics by lowering overall costs and time, reducing warehousing cost and vehicular pollution, introducing traceability

through information technology interventions. Officially, a MMLP facility should constitute a minimum 40.5 hectares (100 acres) of land, with capability to handle modal mix. The facility must ensure technically advanced mechanised warehouses, storage, material handling (mechanised) and inter-modal container terminals. India was able to enhance its standing in the World Bank's Logistics Performance Index (LPI), which ranks nations based on how well they handle their logistics, in 2016 the rank increased from 46th to 35th in a transition of 4 years. However, India's rating still falls short of several of its economic rivals, notably other Asian nations. Countries with best logistics performance in Asia are Singapore,

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Hong Kong, China, Japan, the Republic of Korea, and China. With the exception of the Peoples Republic of China (PRC) South Africa outpaced India in 2016 and was ranked 20th among the so-called BRICS nations (Brazil, Russia, India, the PRC, and South Africa). As a result, the country's logistics and supply chain need to be strengthened [1–3].

LOGISTICS AND LOGISTICS PARK: A SCENARIO OF UTTAR PRADESH

The process of organizing and carrying out the effective storage and transportation of products from their point of origin to their destination. While logistic parks are designated zones for commercial transportation, logistics, and distribution of commodities by land, sea, or air. The Uttar Pradesh Defence Corridor is an ambitious project that aims to lessen India's Aerospace & Defence Sector's reliance on imports Figure 1 [4].

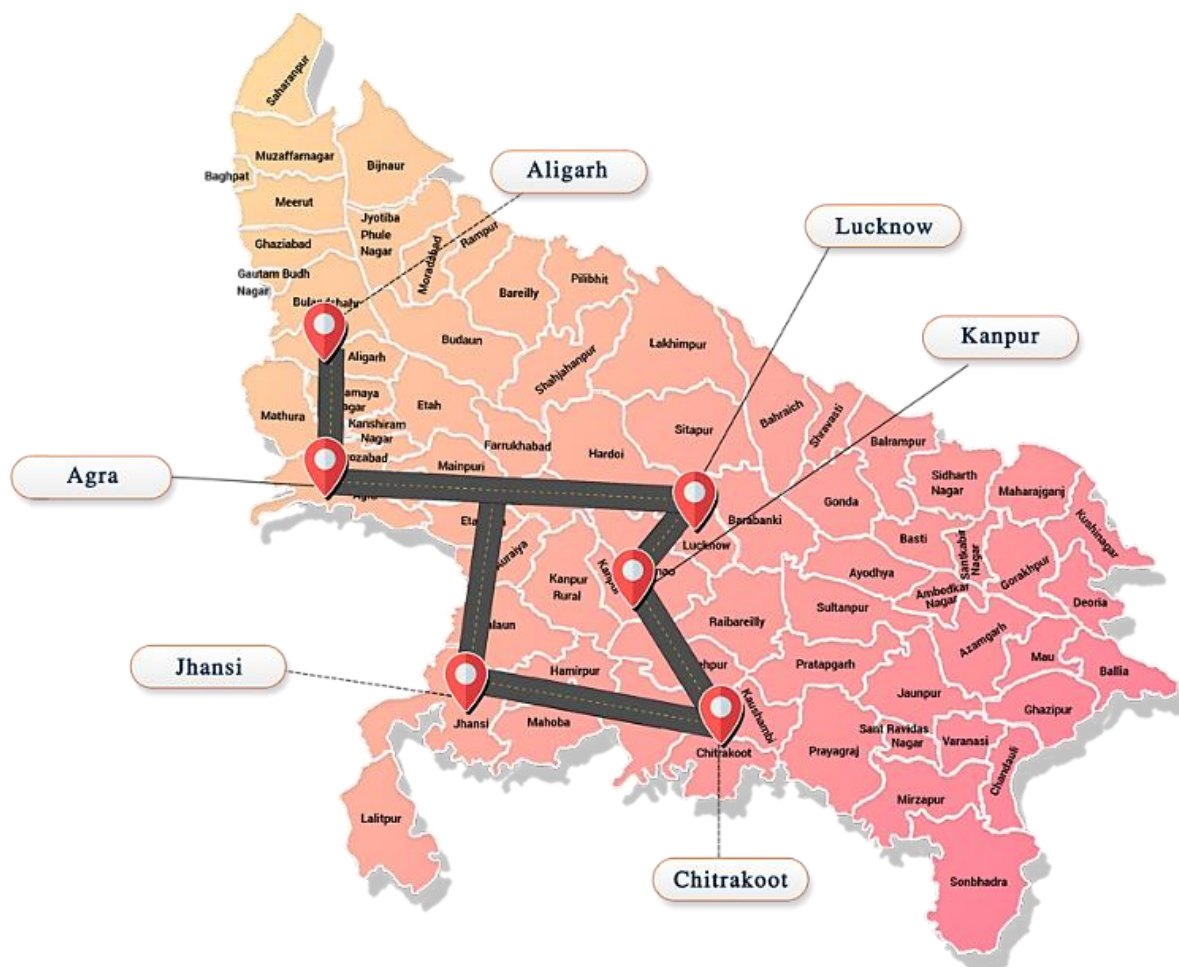


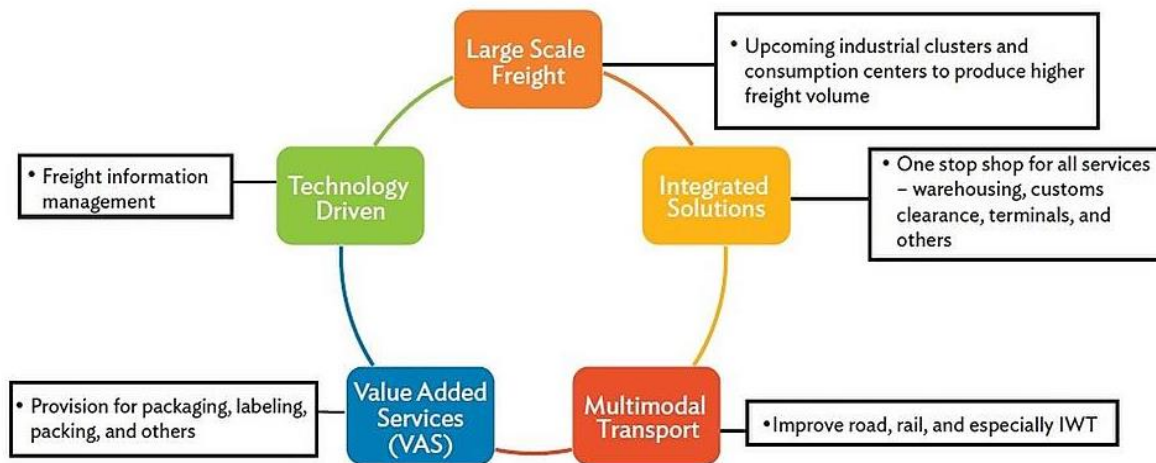
Figure 1. UPEIDA Network (Source: upeida.up.gov.in).

Aligarh, Agra, Kanpur, Chitrakoot, Jhansi, and Lucknow are the six nodes that will make up the Uttar Pradesh Defence Corridor under Uttar Pradesh Expressways Industrial Development Authority (UPEIDA) which serves as a nodal agency for the project. UPEIDA aims to make the state into one of the most technologically advanced and significant defence manufacturing centres in the country [5].

FUNCTIONS AND SERVICES OF MULTI-MODAL LOGISTICS PARK

One important policy step to lower logistics costs is the establishment of MMLPs. Specifically, MMLPs handles mix modal services, and material handling infrastructure. The Indian government approved the development of 35 MMLPs in July 2017. The land required for the projects will be provided by the state governments, and they will be funded through public-private partnerships.

MMLPs' primary duties include freight aggregation and distribution, multimodal freight transit, integrated storage and warehousing, support for information technology, and value-added services. Market services, Administrative services, Product handling Services, and Delivery Services are the major linking services in MMLPs Figure 2 [6, 7].



IWT = Inland Water Transport, MMLP = Multi-Modal Logistics Park.

Source: ADB study team analysis.

Figure 2. Framework of effective MMLP.

LOCATIONAL FEATURES OF A LOGISTICS PARK

Locational features are the most important factors in the creation a functioning of an MMLP [8]. MMLP is an area designed and constructed specifically to maximize the management of all freight movement-related activities. Some of its features are:

- i. *Location:* Location has a significant role in determining the success of a logistics park. It should be well accessible with easy options for land acquisition.
- ii. *Infrastructure:* Warehouses and intermodal terminals are the two most important infrastructures in a logistics park. Logistics parks where value-added activities, like assembling and customer service, are included, some premises will serve as offices and factories.
- iii. *Services:* Optimizing the flow of goods forwards and backward is of the highest priority now. Management of information is an even more crucial task here.
- iv. *Organizational structure:*
 - Describing the connections with roads, rails, and maritime ports.
 - Formulating a business plan for investment and development planning over its layout.
 - Management and upkeep.
 - Overseeing both the commercial/marketing and legal procedures regarding the leasing or selling activities in the park.

LOGISTICS AND SUPPLY CHAIN

An essential part of trade is the transportation and storage of products and services. For a trading activity to proceed, a product usually travels from the producer to the consumer with processing, storage, and selling activities. A critically important sector, transport in the urban domain performs two essential functions Moving Passengers and Goods movement Figure 3 [9, 10].

This includes all planning, design, management, and execution activities for a company's purchasing, manufacturing, distribution, and order fulfilment processes Figure 4 [11].

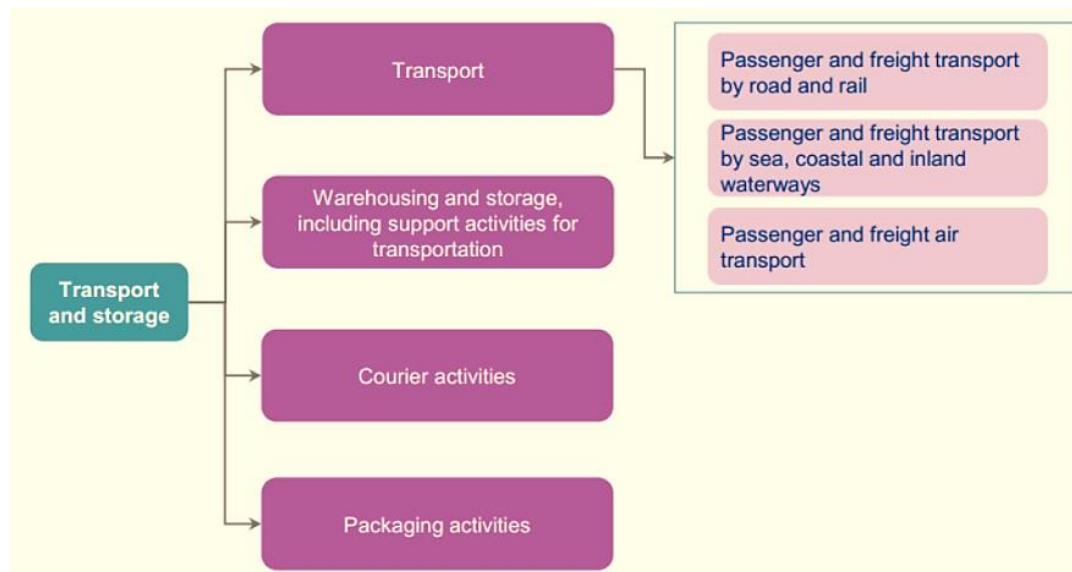
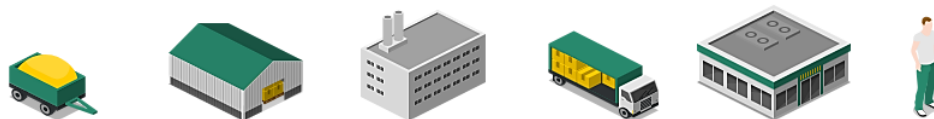


Figure 3. Transport and Storage.



Raw Materials → Supplier → Manufacturer → Distributor → Retailer → Consumer

Figure 4. The supply chain management functions.

The hinterland's contribution to the Logistics center's overall planning is significant. the region that is inland from the port and serves both as distribution point for imports and a source for exports. The types of hinterland can be defined as Cargo hinterlands, Physical hinterlands, Logistical hinterlands, and Macroeconomic hinterlands Figures 5 and 6.

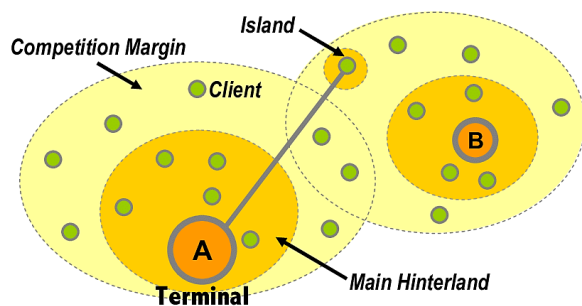


Figure 5. The Hinterland of a transport terminal.

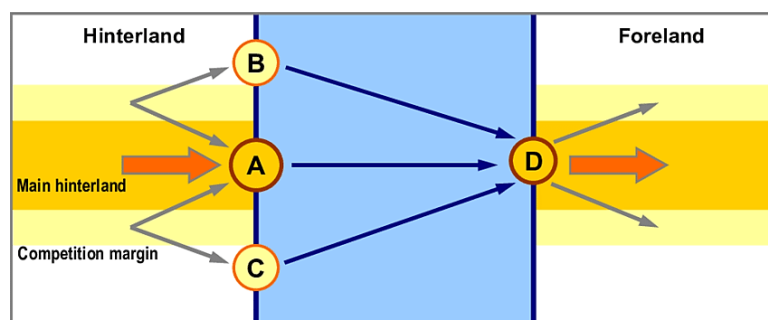


Figure 6. Port for land & Hinterland.

A MODAL APPROACH TO LOGISTICS PARK

In 2003, "the carriage of goods by at least two different modes of transport based on multimodal transport contracts from a place in one country at which the goods are taken in charge by a multimodal transport operator to a place designated for delivery situated in a different country" was defined by the United Nations Conference on Trade and National Development Figure 7.

Road	Trucking and related services like fleet management, network optimization, route planning etc,	<ul style="list-style-type: none"> Warehousing related to inland distribution whether inbound or outbound LTL transshipment centers 	Services bundled around road transportation and warehousing: <ul style="list-style-type: none"> Courier (express) Cold chain Freight forwarding Packaging Consulting
Rail	Railway cargo transportation	<ul style="list-style-type: none"> Rail-side Container Depots Inland Container Depots Multimodal warehouses 	Services bundled around rail transportation and warehousing: <ul style="list-style-type: none"> Dedicated rail container services Stuffing/de-stuffing consolidation
Water	Coastal shipping and inland water transportation	<ul style="list-style-type: none"> Container Freight Stations Inland Container Depots Port based warehousing and storage 	<ul style="list-style-type: none"> Freight forwarding Freight consolidation NVOCC Customs clearance
Air	Air cargo and passenger operations	Air cargo transshipment warehouse near airports	<ul style="list-style-type: none"> Express and courier services Freight forwarding Customs clearance

Figure 7. Transportation—a modal approach towards logistics park.

A logistics system typically consists of supply/demand management, inventory control, network design, management of incoming and outgoing transportation, fleet management, warehousing, material handling, order fulfilment, and management of third-party logistics service providers (3PL).

Value-added services in logistics also include sourcing and purchasing, scheduling and planning production, packaging and assembly, and customer service. It participates in strategic, operational, and tactical levels of planning and execution

CASE STUDY

Three cases of Logistics Park are studied:

Bremen Logistics Park, Germany

As the top three, the logistics industry in Germany has got a good performance in the year 2018, with an output value of 279 billion euros and 4.7 billion tons of goods shipped. In recent years, the employed population in the logistics industry is about 3 million, accounting for about 19% of the total employed population in Germany. The total turnover in value of the German logistics industry represents about 1/4 of the whole of Europe, which is equivalent to the sum of the logistics turnover of France and the United Kingdom.

Plaza Zaragoza, Spain

Plaza Zaragoza is located in the centre of the southeast European sector in Spain. It is a management company with the registration name Plataforma Logistica De Zaragoza S.A which is supported by regional development. The logistic park, which offers effective and high-quality multimodal transport options via motorways, high-speed rail, the imperial canal of Aragon, and the Airport of Zaragoza, is open to all businesses involved in transportation and logistical activities. The

collaborative effort between the Aragon government and industry will elevate Zaragoza to the status of one of Europe's most significant logistics hubs.

Infra-Serv Höchst

Infra-serv Höchst is an industrial park operator and leading industrial services provider for the chemical and pharmaceutical industry Table 1.

Table 1. Comparative analysis of logistic park.

	Infra serv Höchst	Gvz Bermen	Plaza Zeragoza
Total area	26,50,000 m ²	36,20,000 m ²	1,20,63,674 m ²
Parameter	8,00,000 m ²	3,62,000 m ²	Na
Environmental reserve	Na	4,60,000 m ²	23,00,000 m ²
Number of companies	28	114	68
Internal traffic area	Na	4,10,000 m ²	Na
Internal net road	(9.4 km) or 12,000 m ²	Na	16,88,914 m ²
Internal rail	12.4 km	Na	Na
Number of employees	1500	4960	6000
Trans shipment	2,00,000 ton	2,35,000 ton	50,00,000 ton
Warehousing	2,00,000 m ²		
Investment	160 million	450 million	1500 million

Based on the Case studies the following findings lead toward the impact of a logistics hub on a city

- i. Core Congestion: In the above Case studies it has been found that Cities having transport hubs located in the CBD area or within the core city cause the following problems:
 - a. Core Congestion
 - b. Lower LOS on the City Roads
 - c. Lower width roads generally 2–3 Lanes lead to lower traffic speed and congestion during peak hours.
 - d. Heavy pedestrian density in the Logistics Hub.
 - e. Lack of connectivity between Nodes of hubs such as Railway Freight and Roadway hubs.
 - f. Lack of Ramp entry on Major Corridors leads to improper mixing of Traffic.
- ii. It is observed that the cases with logistics hubs have a dependency on the tertiary sector of the economy, as a major part of the workforce is involved in service sectors.
- iii. Logistics Transport time varies from city to city, but a general time of 9 pm to 9 am is observed in the above cases that aim to reduce the usage of corridors within the city limits during Rush hours.
- iv. Peripheral highways are highly recommended for connecting the logistics hubs.

KEY TRENDS OBSERVED IN THE INDIAN LOGISTICS INDUSTRY

- i. Government programs to support exports and the manufacturing industry are likely to boost demand for logistics services. The region's freight forwarding and transportation businesses are projected to continue to be heavily reliant on trade with North America, Europe, and Asia.
- ii. The Indian logistics infrastructure is anticipated to be strengthened by significant investments made in the last five years by both the public and commercial sectors in infrastructure, technological improvements, expansion of marine and airport facilities, and a dedicated logistics corridor in the train network.
- iii. The booming e-commerce market in India has given LSPs new opportunities. Cost control for logistics and delivery is a key component of the evolving business model(s) in this sector.
- iv. Since there will no longer be a requirement for specialized warehouses for each distinct administrative district, the anticipated introduction of a uniform countrywide GST is likely to affect the distribution structure of the majority of sectors.

PHASES OF PHYSICAL INFRASTRUCTURE

- i. Phase 1 (Basic Infrastructures)
 - a. Roads and stormwater drains
 - b. A common water supply and distribution system
 - c. Preferably underground cables for power supply.
 - d. Telecommunications
 - e. Fire fighting
 - f. Sewage and Industrial waste Treatment and disposal
 - g. Recycling of waste water
 - h. Street and area illumination
 - i. Landscaping and architectural planning
 - j. Parking areas
 - k. Truck terminal includes parking, security, and facilities for repairs, maintenance, and fuel.
 - l. Bus terminal
 - m. Emergency Personnel Housing
 - n. Disaster Management Cell
- ii. Phase 2 (Connectivity infrastructure)
 - (a) The existing railway line will be broad gauged, and it will be extended to a port-based area.
 - (b) Warehousing and storage facilities.
 - (c) Industry-related shopping areas
 - (d) Industry-related services such as engineering workshops. Engineering support services.

SITE SELECTION COMPONENTS

- a. Should be connected to Major corridors, preferably on the outer limits of the city (Peri-Urban Areas)
- b. Should have access to other logistics or Freight Nodes.
- c. Access to public transport for the workforce.
- d. Roads with a minimum of 6–8 Lanes, with Access Ramps.
- e. Omnidirectional connectivity from the city.
- f. The city Should have dedicated industries and a Service sector workforce.
- g. Access to Services such as Water and Electricity.
- h. Utility services such as Refuelling Stations and Warehousing Units.
- i. The city should use Ring Roads or Propose Ring Roads to connect Freight Corridors.
- j. Transport Terminals should be avoided in the logistics hub.

CONCLUSION

A logistic hub plays a very important role in transforming transportation and cargo supplies through and from a city. The infrastructure component of a city plays a major role in transforming the logistics and supplies in a region. It can be seen that though logistics and transport hub helps a city to develop economically also impacts the lifestyle of the residents which consumes a part of the city's infrastructure. Thus, the hinterlands of a city are found to be the best area to develop hubs for logistics. The site selection criteria found in the analysis can be used to locate the site for a logistics hub incorporating two or more two modes of transport.

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