RESEARCH

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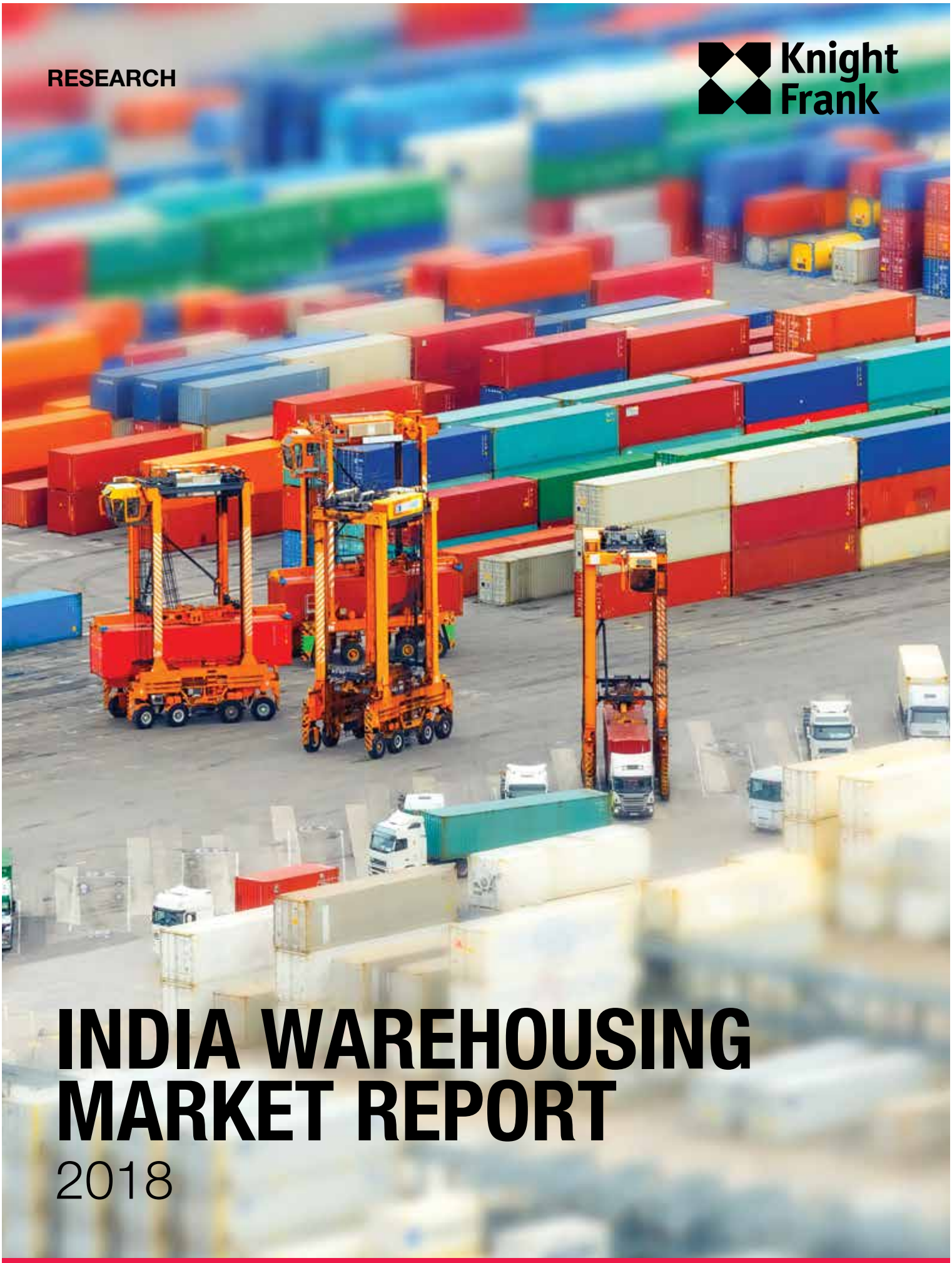

INDIA WAREHOUSING MARKET REPORT

2018

AHMEDABAD | BENGALURU | CHENNAI | HYDERABAD | KOLKATA | MUMBAI | NCR | PUNE

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THE INDIAN WAREHOUSING OPPORTUNITY

Logistics and warehousing plays an indispensable role in the transportation of goods across the country. A warehouse is a fundamental part of business infrastructure and is one of the key enablers in the global supply chain. It is the fulcrum for procurement, manufacturing and distribution services which collectively build robust economies.

Today logistics cost in India accounts for 13-17% of the Gross Domestic Product (GDP) which is nearly double (6-9%) the logistics cost to GDP ratio in developed countries such as the US, Hong Kong and France. Much of the higher cost could be attributed to absence of efficient intermodal and multimodal transport systems. Moreover, warehousing which approximately accounts for 25% of the logistics cost has also been facing major challenges. This further added to the logistics cost borne by the end users and other stakeholders.

Earlier, the incentives to enter India's warehousing sector was minimal for organised players as the occupiers themselves were content to engage with fringe partners offering low cost options with a network of small storage facilities near consumption centres. Multiple state and central level taxes made it sensible for companies to maintain smaller warehouses in each state. Further, this limited the focus on automation and higher throughput.

This attitude of occupiers of preferring to save on costs as their sole objective is changing. There has been a gradual transition in the mindset of occupiers to use the services offered by organised segments. A plethora of factors are driving this wave of change such as: requirement from compliance regulators (in case of the pharma industry), quality consistency assurance required by clients/ regulators, statutory penalties on non-complaint warehousing facilities, economies of scale being achieved through larger warehouses, safety and security of goods, efficiency in operations, quicker turnarounds, need for efficient warehousing designs and the advent of e-commerce and other multinational businesses that prefer to occupy only complaint facilities. This shift was further accentuated by the implementation of the Goods and Services Tax (GST) in India.

Logistics cost in India accounts for 13-17% of the Gross Domestic Product (GDP) which is nearly double (6-9%) the logistics cost to GDP ratio in developed countries such as the US, Hong Kong and France. Much of the higher cost could be attributed to absence of efficient intermodal and multimodal transport systems

The whiff of such a mammoth opportunity has attracted global pioneers in warehousing expertise to Indian shores. The government's thrust to the sector such as giving infrastructure status to the logistics sector, the 'Make in India' programme, development of multimodal transport networks and initiatives to set up industrial corridors like Delhi Mumbai Industrial Corridor (DMIC), Delhi-Kolkata Industrial Corridor and logistics parks have propelled the cause. Over the past few years, the government has undertaken several reforms to promote and provide an exit route to real estate investors via the Real Estate Investment Trusts (REITs). Currently the market for REITs in India is at a very nascent stage and it would take time to evolve. Once the market for REITs matures, the institutional investors would be able to get a credible exit avenue to gain from their warehousing investments by listing their warehousing assets through REITs. These initiatives would go a long way in leveraging the true potential of the sector and bring down the overall costs linked to warehousing and logistics as well give credible exit opportunities to investors.

1.0 MAKE IN INDIA

The 'Make in India' campaign has been ushered in to revitalise the potential of the country's manufacturing sector. From catering to a mere 13-17% of the GDP, the government envisions to raise the sector's share to a quarter. Twenty-five labour-intensive sectors were identified, which would be the prime beneficiaries of this initiative.

The main idea for promoting the labour-intensive manufacturing industry is to create jobs. As a part of this initiative, the government of India wants the state governments to collaborate and provide incentives to aid the manufacturing industry as well as update/remove archaic laws which have been impeding the growth of manufacturing industry in India. The government also intends to setup industrial corridors to promote the manufacturing clusters by connecting them to ports and consumption hubs via roads, railways and inland waterways. The 5 industrial corridors are – Delhi-Mumbai Industrial Corridor (DMIC), Chennai-Bengaluru Industrial Corridor (CBIC), Bengaluru-Mumbai Economic Corridor (BMEC), Vizag-Chennai Industrial Corridor (VCIC) and Amritsar-Kolkata Industrial Corridor (AKIC).

Several global agencies have lauded these measures. For instance, India jumped 30 ranks in The World Bank's Ease of Doing Business Index in 2017. Such a jump of 30 places is unprecedented and this is the highest ever jump by any country till date. The policy reforms undertaken by the government to improve the fundamentals of the Indian economy have been ratified by credit rating

SOME OF THE KEY MEASURES TO PROMOTE 'MAKE IN INDIA' ARE AS FOLLOWS:

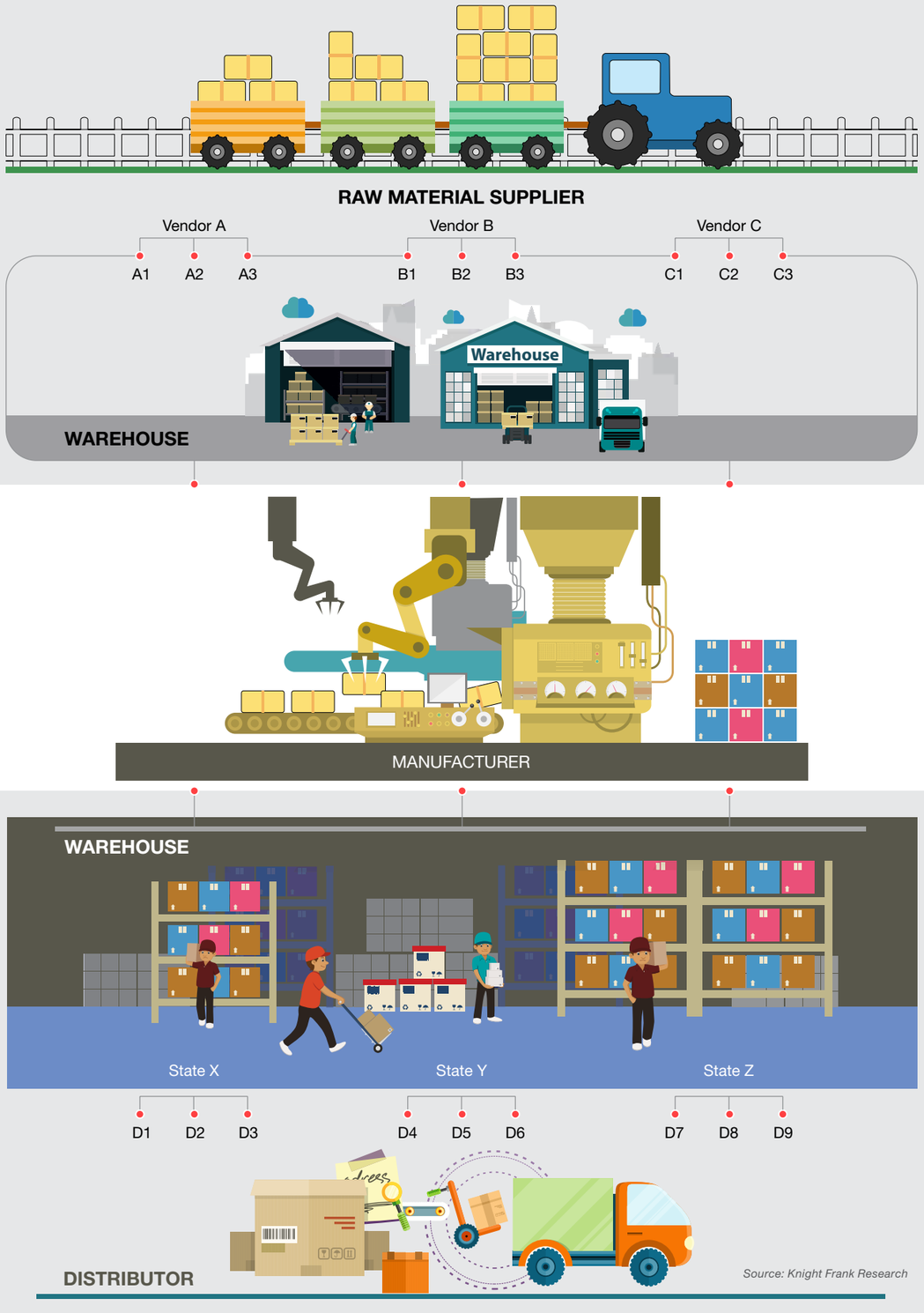
- Streamlining processes and reducing the time required for various approvals and licenses
- Implemented e-governance
- The archaic labour laws that were preventing industries from hiring large number of workers have been repealed and reframed, making them more business friendly
- The validity period for industrial licenses has been extended to 7 years from 3 years thereby reducing the need for frequent renewals
- The documents required for import and export has been reduced from 11 to 3
- For something as crucial as electricity supply, the connection that earlier had to be provided within a maximum time frame of 180 days has been reduced to a maximum of 15 days
- New laws under the Indian Bankruptcy Code have been enacted making it easier to wind up business in a timely manner in case of business failure

agencies as well. Moody's, for instance, recently upgraded India's Sovereign Ratings from Baa3 to Baa2 with a stable outlook. The euphoria of reforms amongst global business houses is also evident in the foreign inflows into India, which have surged upwards since 2014. Since 2014, when the current government assumed office the FDI inflows into India has grown at a CAGR of 17% from USD 36 bn in 2013–14 to USD 60 bn in 2016–17.

The manufacturing sector is amongst the major occupiers of warehousing space and both sectors are complementary to each other. In order to aid the manufacturing and warehousing sectors, the government has announced plans to set up multimodal logistics parks at 34 locations across India, which have the highest freight movement at an investment of INR 2 trillion.

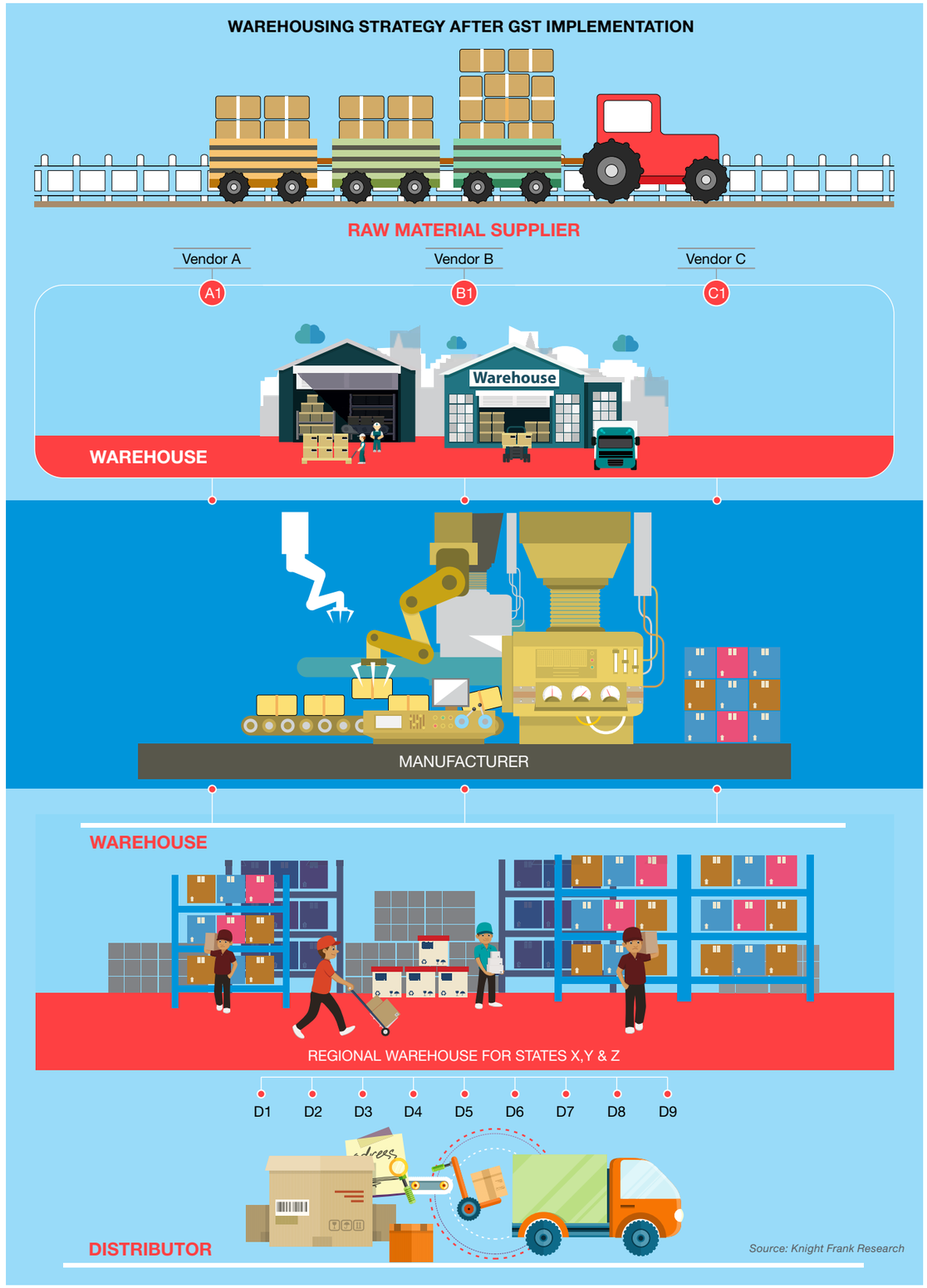
Thus, the Make in India programme, multimodal logistics parks and infrastructural push around the initiative would together lead to a spur in demand for new warehouse space development as well as increase the demand for existing warehouses. These initiatives have a long gestation period and need a lot of infrastructure development for its sustenance. Hence, it would take time for the impact of these changes to be visible. Further, the current capacity utilisation of the manufacturing industry in India is hovering around 70%. Until it reaches at least 80–85%, it is unlikely that the current set of players would invest into capacity expansion. Once that level of capacity utilisation is crossed, we would witness the inflection point for the next investment cycle.

WAREHOUSING STRATEGY BEFORE GST IMPLEMENTATION



Source: Knight Frank Research

WAREHOUSING STRATEGY AFTER GST IMPLEMENTATION



Source: Knight Frank Research

1.1 THE GOODS AND SERVICES TAX (GST)

The Goods and Services Tax, touted as the biggest tax reform in the history of independent India became a reality in 2017. This tax replaced a plethora of central level taxes (i.e. excise duty, countervailing duty and service tax) and state level taxes (Value-Added Tax, Octroi and entry tax, local body tax, luxury tax, etc.), which meant that the same product was sold at different prices in different states. The web of state and central level taxes made the inter-state trading of goods in India as cumbersome as exporting them to another country. Many businesses were of the opinion that in some segments, the exports of goods were seamless for the latter.

• Pre-GST era

Precious delivery time was often lost as trucks transporting goods were held up for days together at multiple entry barriers across states and for payment of local body/entry taxes. There were additional costs due to compliance burdens.

Moreover, each state had its own set of taxes and the companies had to tie-up with local compliance staff for getting the required permits. All these barriers ultimately led to an increase in product prices.

Further, the companies engaged multiple smaller warehouses to avoid wastage of time at the barriers on inter-state transfer of goods and also avoid inter-state sales in which taxes added to cost burden. This pattern stayed in practice although it worked against efficient model of operations.

• Post-GST era

Goods and Services Tax (GST) has been envisaged to resolve the erstwhile pre-GST pain points and streamline the supply chain. Most companies are deliberating the need to redesign their after-produce supply chain networks.

Currently, companies are enjoying the immediate benefits from removal of check points. According to our survey, this has led to average cost saving in the range of 3–7%, which varies across several industries. However, the time savings are substantial. For example, earlier the travel time between Delhi–Chennai, which used to take 5–6 days, post-GST, has come down to 3–4 days. Trucks are able to cover longer distances every day with an improved turnaround time ensuring that the transporters can carry out their business with a smaller fleet. Once the system for generating e-Way bills is implemented by all states, and the system for generating e-Way bills stabilizes, the savings due to reduction in travel and turnaround time, would be higher.

In the pre-GST era travel time between Delhi–Chennai, was around 5–6 days; post-GST, it has come down to 3–4 days. Trucks are able to cover longer distances every day with an improved turnaround time ensuring that the transporters can carry out their business with a smaller fleet.

As a consequence of faster movement of goods across the country, in the near future, companies would need to carry smaller levels of inventory to support the same level of sales. This would reduce the inventory carrying costs and working capital requirements leading to significant financial savings. The reduced inventory levels would also reduce the overall warehousing space required. Companies are now consolidating into larger warehouses to get benefits of economies of scale. Some of their earlier smaller warehouses are now becoming redundant. Going forward the companies would take up larger spaces and reduce their total number of warehouses which they use currently; this coupled with lower inventory level requirements would lead to significant savings in real estate cost.

The biggest advantage which supply chain experts attribute to the implementation of GST is the reduction in inventory. The savings due to reduction in overall inventory levels is expected to far exceed savings in real estate costs on account of consolidation of warehouses.

POST GST WAREHOUSE CONSOLIDATION LEADING TO INCREASED PROFITABILITY

Companies are constantly striving to optimise profitability by stretching margins, strengthening brand equity and expanding their product portfolios. While these factors are focused on the customer; on the manufacturers' side, reengineering internal processes to minimise costs is a major factor that not only maximises capital productivity but also dictates the organisation's survival in today's competitive environment. Inventory carrying cost is one of the primary metric which is used to gauge supply chain productivity because it is a measure of how much capital is lying idle in resources that could otherwise be employed for other productive uses. Thus, it is the primary aim of any supply chain manager to minimise the company's inventory carrying cost without compromising on sales.

Companies carry inventory to support business cycles. Inventories help manage variability of customer demand, variability of lead times and also forecasting inaccuracies.

The level of inventory being carried is linked to the desired Service Level of the company, which in turn balances the companies' cost of under-stocking to that of over-stocking. The companies would now be able to maintain pre-GST Service Levels through lower inventory levels on account of faster movement of goods and higher efficiency at the warehouse level, thereby, reducing the overall firm level inventory. The inventory carrying cost is the most significant consideration for the planning of supply chain for any organisation. The opportunity cost associated with the value of the average inventory being carried by the organisation is one of the major components of the inventory carrying cost. Organisations look at higher returns through higher inventory turnover and reduction in the average inventory value. Post GST with the removal of interstate checkpoints, reduction in cargo movement time and replacement of multiple state and central level taxes; there is a strong case for consolidation of warehouses. Warehouse consolidation results in averaging out of variability in individual demand and lead time (of individual warehouses), resulting in lowering of risk pertaining to aggregate demand variability. In fact, average inventory level is directly proportional to risk of demand variability and hence a lower risk would require lower inventory level.

Warehouse consolidation cases have witnessed up to 30% reduction in inventory levels leading to over 40% increase in inventory turnover thereby leading to increased profitability.

According to our research and primary surveys, the level of consolidation in the upcoming years would vary across industries.

- Consumer durables manufacturing companies have envisaged approximately up to 40% reduction in the overall number of warehouses in the near future. However, the number may wary depending on their scale of operations. The manufacturers would be benefitting from lower real estate costs of warehouses, however, on the flip side the inventory levels at the distributor and retailers of the products would increase to prevent stock outs. It would take some time for the retailers/distributors and manufacturers to converge upon a win-win situation.
- Fast moving consumer goods (FMCG) giants have indicated a relatively smaller extent of consolidation in warehouses compared to consumer durables. They would continue operating warehouses located close to consumption cluster, but intermediate warehouses that fall in between their factories and feeder hubs may be consolidated. As FMCG is a volume business and stock out can lead to loss in sales which would ultimately lead loss of customers, hence, they would to continue to retain the key warehouses near consumption clusters.
- Companies using temperature controlled spaces in their supply chain have indicated that they are unlikely to consolidate their warehouses in a significant manner atleast for the next 3-5 years as the supply chain of cold storage is highly capital intensive. Hence, it is not possible to redesign or shift their existing supply chain networks in a short span of time despite the evident benefits in the GST-regime. Implementation of GST has been an arduous task as witnessed even in case of developed countries and it takes a few years for the entire system to stabilize. Likewise, there are some aspects of GST on which companies need further clarification, as well as there can be few revisions made by the government to improve the system. Hence, only after companies start getting clarity on those aspects they would be able to redesign their networks and benefit from the savings. As we see most of the perceived benefits from implementation of GST would be visible in the bottom line of companies only after 2–3 years.

1.2 INFRASTRUCTURE STATUS TO WAREHOUSING AND LOGISTICS

100% foreign direct investment (FDI) in the storage and warehousing sector under the automatic route has been permitted since several years. In addition to this, the government has recently announced infrastructure status to the logistics industry. This decision will enable companies in the logistics and warehousing sector to access funds at lower cost, longer tenure and enhanced limits. Companies would now be accounting for lesser cash outflows due to debt and interest repayments in the initial years unlike earlier, as the debt financing can be taken with longer repayment tenure. It would also enable them to raise larger amounts of funds as external commercial borrowings (ECB), borrow longer tenure funds from insurance companies, pension funds, sovereign funds and also make them eligible to borrow from the India Infrastructure Financing Co. Ltd (IIFCL). Moreover, even the banks would be able to lend to this sector with lower provisioning requirements than earlier. The approval process also gets simplified. The Government of India has set out certain conditions that need to be met for a project to be classified under infrastructure status. The government has defined “logistics infrastructure” to include a multimodal logistics park comprising an Inland Container Depot (ICD) with a minimum investment of INR 50 crore and minimum area of 10 acres, cold chain facility with a minimum investment of INR 15 crore and minimum area of 20,000 sq ft and/or a warehousing facility with a minimum investment of INR 25 crore and minimum area of 100,000 sq ft. Institutional players will not invest in unorganised and small warehouses; they generally invest or set up large warehouses and huge logistics parks. Currently, the new facilities that are being built by institutional players are generally of large sizes, bigger than the minimum requirements as specified above and hence, they would stand to benefit from the infrastructure status.

ANSHUMAN SINGH

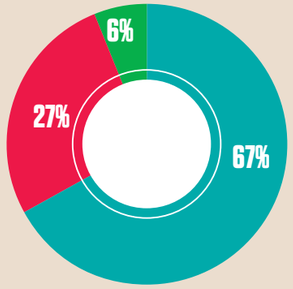
Chairman and Managing Director
Stellar Value Chain Solutions Pvt. Ltd.

Outsourcing of the logistics activity has become the next logical stage of evolution for most sectors especially as taxes have been rationalized across the country and the Input Tax Credit can be availed across product and service lines. The warehousing industry will undergo a major evolutionary leap in the next 5-8 years, much like airports where design, compliance, costs and value added services will dictate survival and growth. There will be significant consolidation of warehouses by companies in the consumption space and this will see the development of large modern technology based warehousing operations with much higher productivities and the rapid conversion of unorganised godowns to modern 3PL Logistics.

2.0 INCREASING INSTITUTIONAL INVESTOR INTEREST

Investors had started taking cognizance of the opportunities in this sector much before the government could implement the reforms such as implementation of GST and granting infrastructure status to logistics industry including warehousing. The past few years have witnessed massive participation from institutional investors. Some of them have purchased ready assets, whereas others are investing in a mix of ready and Greenfield assets. Warehousing investment accounted for around 26% of the total private equity (PE) investments into real estate during January 2014 – January 2018. Around USD 3.4 billion (INR 22,100 crore) of institutional capital has flown into this sector during this period. The actual size of capital movement would be higher, as these numbers only cover the major investments by organised players.

New developments or greenfield projects accounted for 67% of the total investments followed by 27% for acquisition of complete projects.



MIX OF NEW DEVELOPMENT AND ACQUISITION	6%
NEW DEVLOPMENT	67%
ACQUISITION	27%

Source: Knight Frank Research, Media reports, Company press release

RAJESH JAGGI

Managing Partner, Real Estate

Everstone Group*

The year 2017 was a landmark year for the warehousing and logistics space. The implementation of GST, along with government's welcome move of granting infrastructure status to the logistics sector, were major economic reforms for the country. Last year was very positive for IndoSpace as well, as we launched five new parks across Delhi-NCR, Mumbai and Bengaluru regions, along with expanding and developing our Ranjangaon park (Pune). Going forward, we feel the improving domestic economy, expanding e-commerce industry and implementation of new technology will lead a positive makeover of the warehousing industry and progress of the overall economy, as well as boost growth for leading players such as IndoSpace. With the combination of improved road connectivity, the Make in India initiative and GST, the demand for modern, large, and best-in-class warehousing facilities will only increase.

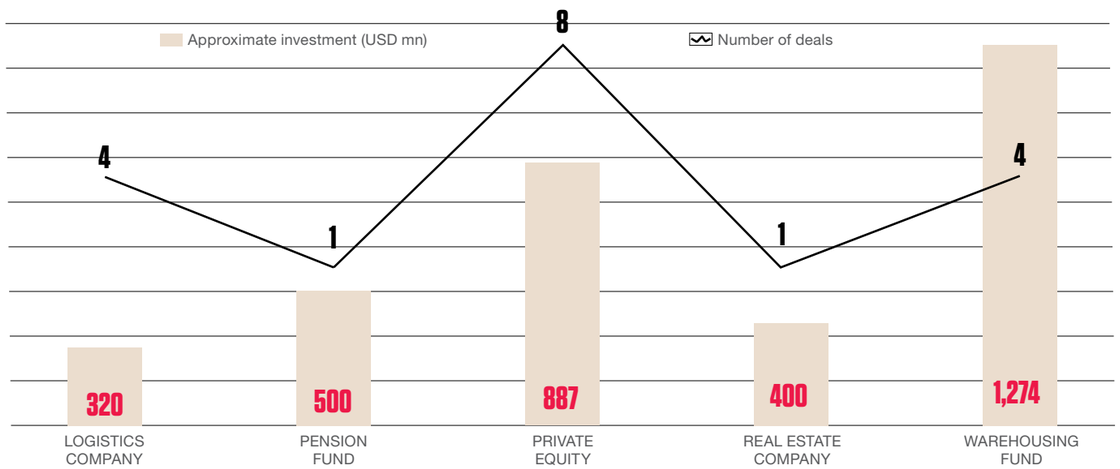
** IndoSpace is a joint venture between the Everstone Group, a leading India and Southeast Asia-focused private equity and real estate investor, and Realterm, a US-based global industrial real estate leader. IndoSpace, India's largest developer of modern industrial real estate and logistics parks has a portfolio of around 30 million square feet across 28 logistics and industrial parks across the country including developed parks, as well as parks under various stages of development.*

2.3 SOME OF THE NOTEWORTHY INVESTMENTS DURING JANUARY 2014 – JANUARY 2018 INCLUDE –

YEAR	DEAL PARTICIPANTS	DEAL SIZE (INR CR)	DEAL SIZE (USD MN)	DEVELOPMENT TYPE
Jun-17	Ascendas Firstspace JV	3,900	600	Mix
Oct-17	IndoSpace third fund – IndoSpace III	3,575	550	New
May-17	CPPIB investment in IndoSpace	3,250	500	Acquisition
Oct-17	Canada's Ivanhoé Cambridge and QuadReal Property Group investment in Logos India	2,600	400	New
Aug-17	Assetz Group tie up with Logos India	2,600	400	New
Jan-14	Allcargo Logistics*	1,000	154	New
Aug-16	Warbug Pincus investment in Stellar Value Chain Solutions	813	125	New
Jun-17	e-Shang Redwood	650 annually	100 annually	New

*Note: *- Investments for captive expansions*
Source: Knight Frank Research, Media reports, Company press release

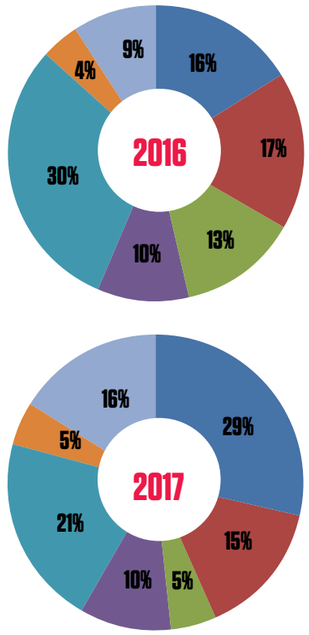
2.4 PROFILE OF INVESTORS INVESTING DURING JANUARY 2014 – JANUARY 2018



Source: Knight Frank Research

While warehousing funds comprised the largest chuck of investments during January 2014 – January 2018, private equity investors were the most active in terms of number of deals and formed the second largest source of investments. Some of the PE investors include renowned global brands such as Ascendas-Singbridge, Warbug Pincus and Brookfield Asset Management.

ALL INDIA INDUSTRY WISE SHARE OF TRANSACTIONS IN 2016 AND 2017



	2016	2017
3PL	16%	29%
ecommerce	17%	15%
FMCD	13%	5%
FMCG	10%	10%
Manufacturing	30%	21%
Others	4%	5%
Retail	9%	16%

Source: Knight Frank Research

3.0 WAREHOUSE TRANSACTION VOLUME

CITY	2016	2017	GROWTH
	(IN MN SQ FT)	(IN MN SQ FT)	YOY
Ahmedabad	1.7	3.3	86%
Kolkata	1.4	1.6	15%
Pune	2.0	2.5	22%
NCR	2.8	6.5	129%
Chennai	1.9	2.4	24%
Hyderabad	1.2	2.1	68%
Mumbai	1.6	5.2	231%
Bangalore	1.3	2.5	90%
Total	**13.9**	**25.7**	**85%**

Source: Knight Frank Research

Majority of the warehousing activities in India is largely undertaken by the unorganised segment. However, there has been a rapid growth in the transactions by organised players in the recent past in an industry which is largely unorganized. The annual leasing transactions for the warehousing industry within the organised segment in 2017 was 25.7 mn sq ft recording 85% YoY growth over the previous year. With the introduction of GST and other reforms which are bringing a paradigm shift in the industry, there is a huge potential for the annual transaction numbers for warehousing to grow exponentially. This growth would be largely led by the organized segment.

Not just the warehousing players in the organized segment, there are a number of large e-commerce companies and big box retailers looking for land to build warehouses for captive use in and around major consumption sectors. This additional space demand would further augment the potentials.

In 2016 - manufacturing, e-commerce and 3rd Party Logistics (3PL) were the top 3 occupier categories based on transaction volumes across the country. However, as per the latest trend, in 2017 the top 3 occupier segments are 3PL followed by manufacturing and retail.

Consumer durables manufacturing companies have envisaged approximately up to 40% reduction in the overall number of warehouses in the near future. However, the number may wary depending on their scale of operations.

4.0 OUTLOOK

The warehousing industry in India is largely unorganised and there are very few opportunities to buy assets from the organised segment, as such players are few in number. However, compared to other real estate assets, warehousing assets can be built in a relatively shorter time span. Hence, the risks in greenfield investments are lower. With infrastructure status, the approval and funding risk for greenfield investments have reduced further.

Earlier, due to the unorganised nature of the industry the equity IRR for a development project was low. Now with all the policy reforms that are being undertaken there is a paradigm shift in the industry structure where it is becoming favourable for organised players. On account of this structural transformation, the attractiveness of taking up a warehouse development project is evident. Our assessment, reflected in the Equity IRR of a warehouse development project, indicates how warehousing as an asset class is becoming lucrative avenue in the spectrum of commercial real estate development.

Limited warehouse supply from the organised segment, amidst the increasing demand brought by reforms in the sector has translated into heightened investor interest in the available warehouse stock. While the trend, currently, is a mix of brownfield and greenfield projects, the shrinking opportunities would make greenfield investment the only way to participate in the asset play that the sector will have on offer.

Meanwhile in light of the slump in the Indian residential market over the past few years and the track record of poor returns; investors preferred to invest in rent-yielding commercial assets. With increased investor activity in the commercial segment and the acute shortage in supply of good quality of office space, the cap rates are declining and inching below 8% from the 9–10% range witnessed a few years ago. The risk-reward ratio would start becoming unfavourable as the cap rates start to decline further below 7–7.5%. As a result, there has been a considerable shift in investors' focus towards the warehousing sector. The warehousing assets are offering a higher cap rate around 150–200 bps greater compared to what commercial assets are currently offering.

Demand for large warehousing spaces is likely to see steady increase as occupiers now to move out of their smaller warehouses and consolidate their activities in larger facilities, which are presently in short supply compared to the demand. This demand-supply gap is visible in the current premium commanded by organised players owning these assets. For example, in the Bhiwandi warehousing cluster, the rents for unorganised spaces are as low as INR 9 per sq ft, whereas organised players are commanding rents in the range of INR 14–17 per sq ft in the same region. As more and more companies streamline their logistics networks, it would be observed that unorganised players or smaller organized players would consolidate or sell their assets to larger ones. The industry is expected to witness a structural shift over the next 3–5 years.

The warehousing aspect in the logistics supply chain globally is going through a transformation. From being a mere storage space provider for goods, the segment is offering an array of value added services such as packaging, small scale manufacturing, cross docking, automation, algorithm-based demand forecasting and distribution centres. This transition would only happen if economies of scale come into play and companies are able to consolidate their spaces and move into larger warehouses. The Indian warehousing industry which was lagging behind its global counterparts due to its fragmented structure would now enter the same league.

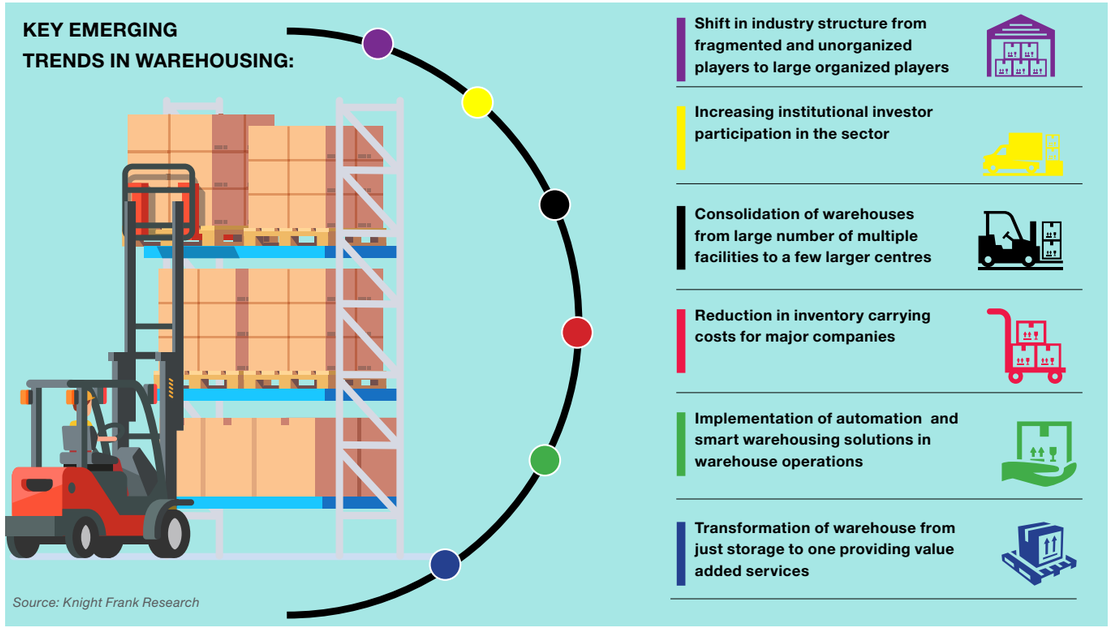
ABHIJIT MALKANI
Co-CEO
ESR Advisers India Pvt. Ltd.

"Warehouse markets have started maturing, even local developers have started providing quality specifications and infrastructure as a standard offering. Hence, the benchmark of warehousing space has moved up a notch and has been established. We are also witnessing consolidation amongst players, where smaller local developers and property owners are selling out to the larger institutional developers in the existing clusters."

EQUITY IRR FOR DEVELOPMENT PROJECTS ACROSS WAREHOUSING CLUSTERS

CITY	WAREHOUSING CLUSTER	QUOTED LAND RATE (INR MN/ ACRE)	QUOTED RENTALS (INR/SQ FT/ MONTH)	EQUITY IRR ACHIEVABLE FOR A DEVELOPMENT PROJECT
Ahmedabad	Changodar-Bagodara	4 – 35	10 – 18	18%
	Aslali-Kheda	6 – 32	10 – 20	16%
Bengaluru	Hoskote-Narsapura	7 – 15	12 – 16	18%
	Nelamangala-Dabaspete	10 – 23	10 – 16	12%
Chennai	Sriperumbudur-Oragadam cluster	10 – 40	15 – 28	22%
	NH 5 - Periyapalayam cluster	8 – 150	14 – 24	22%
Hyderabad	Jeedimetla - Medchal	15 – 50	10 – 18	12%
Mumbai	Bhiwandi	12 – 50	11 – 20	20%
	Panvel	25 – 50	17 – 25	16%
NCR	NH – 48 Cluster	10 – 25	12 – 22	26%
	Ghaziabad Cluster	10 – 40	14 – 22	22%
Pune	Chakan- Talegaon	10 – 30	16 – 28	28%
	Wagholi-Ranjangaon	10 – 35	12 – 22	22%

Source: Knight Frank Research
Note: Refer respective market chapter for details.



Source: Knight Frank Research

ALOKE BHUNIYA

CEO, Ascendas Firstspace Development Management Pvt. Ltd

The stream of policy and regulatory reforms unveiled in the recent times has accentuated the entry of international institutional players in the Indian warehousing space. With such participation of globally renowned investors and developers, the benchmark for standard of warehouse developments in the country will be higher and we will experience a paradigm shift in the industry dynamics.

In addition to the initiatives the Government of India has already taken to promote warehousing in India, there are few more areas that need to be looked into to augment the impact of reforms:

- **Creation of exclusive Warehousing Promotion Zones:**

Low investor return due to high cost of land, violation of norms, delay in necessary approvals and clearances, problems in land acquisition due to fragmentation, etc. are found to be the major deterrents in attracting large-scale investment in the warehousing sector. In order to facilitate private investments to create modern warehousing, especially on identified nodes, exclusive warehousing zones needs to be created to develop new and modern warehousing infrastructure.

- **Create logistics and warehousing policies separate from industrial promotion policies:**

State governments should frame separate policies for development of logistics and warehousing industry so that the industry can grow unhindered to realize its full potential. If they are included as a subset of the industrial policy, then it is possible that logistics and warehousing may not be given as much impetus as needed. This is likely because incentives to other industrial segments might supersede it. Some states like Maharashtra, UP, Andhra Pradesh have been proactive in framing separate policies and implementing them whereas others have still kept it under the ambit of industrial promotion policy.

- **Allocation of areas exclusively for warehousing within Industrial Parks:**

Designs of industrial parks in India often make provision of plots and other common area facilities keeping in mind the possibilities of setting up of manufacturing/industrial units. Adequate storage facilities for raw materials and finished goods are not available within the park unless manufacturers create these facilities on their own within their own premises, which are often very small and not efficient. Hence, areas exclusively for warehousing should be allocated within industrial parks.

- Effective Single Window Clearances for speeding up of approvals:

Procurement of land in a strategic location and proper approvals for setting up business/units is still a key challenge for any new entrant in the industry. An effective single window clearance would go a long way in speeding up of approvals.

- Setting up of Skill Augmentation Centres:

In the coming years, there would be greater reliance on productivity-enhancing activities and automation and technology (e.g. Internet of Things, Wearable Technologies, Deployment of drones and cloud technology, use of radio frequency and robotics, etc.) for the introduction of a programmed Warehouse Management System (WMS) in order to address customer requirements quickly. Hence, it is imperative to set up skill augmentation centres.

ANSHUL SINGHAL

Chief Executive Officer - Industrial Real Estate,
Embassy Industrial Parks Pvt. Ltd.

The growth of the industrial sector has been slated as having the most prominent impact on Indian real estate. The scope and growth for investors in this area is high compared to the traditional real estate. The major concern of the investors in the past was the tax structure & the unorganized sector. GST implementation has undoubtedly changed things for the better; we finally have a uniform national levy. One country one tax model has attracted & boosted the confidence of investors. New government initiatives like 'Make in India' provide aid for domestic production. The advent of advanced technologies in warehousing like automated storage, use of radio frequency identification (RFID) also are some of the major reasons that influence faster modernization of Logistics Parks and investor participation. When you are competing with someone, you are either fighting for same market share or same revenue. This is not the case for us currently. Embassy Industrial Parks is an early mover in this business and will enjoy the early movers' advantage for the next 3-5 years. And it is a little difficult to predict what will happen after that period. The important thing is to secure your land locations, which is what we are doing now. We have been in this business for the last 3 years securing good land positions in key micro markets at the right micro market, price, and zone.

INTERNATIONAL BENCHMARKING

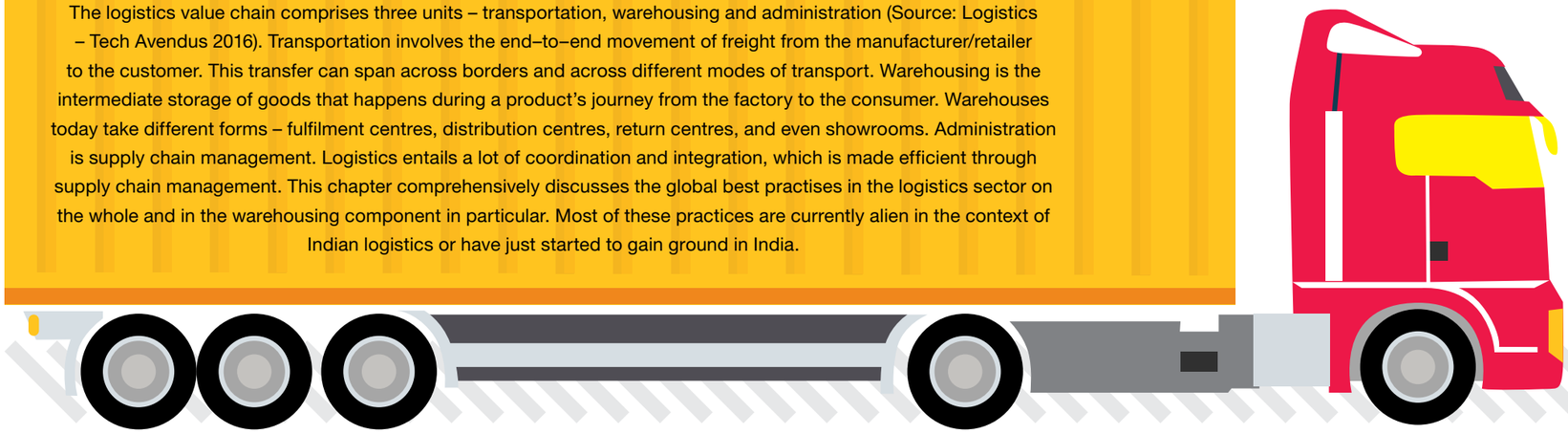
In the present era of globalisation, customer satisfaction is the norm. The booming e–commerce sector has made the act of sale and purchase very easy and quick. But this comfort to sellers and consumers comes at the cost of logistics providers. Supply chain processes are under immense pressure to efficiently and effectively meet this growing demand within a stipulated time and cost. If the right product does not reach the right customer within the prescribed time then the company loses not just business but also reputation. As a result, warehouse floors are always under high stress. In such a situation, it is better to adapt and adopt. Best practices in supply chain design and management from across the globe should be adapted with modifications suitable to Indian needs. This chapter covers a few such notable global trends that can serve as a benchmark for the Indian Logistics and Warehousing industry.

NEED FOR BENCHMARKING

With initiatives like Digital India backed by smartphone usage, Internet penetration in the country will surge in the next 5 years. This means more population will have access to e–commerce; and therefore, demand will further increase. To keep up with this rapidly growing demand, it is important that the logistics sector be organised and efficient. India's logistics sector comprises 13% of the country's GDP as majority of it is unorganised and fragmented. Whereas, in the US, logistics makes up 8% of the GDP (Source: MMLP policy document). These numbers indicate the efficiency gap in the Indian logistics industry and carve out the trajectory of growth it can take. Market inefficiencies and underdevelopment are the reasons for this underperformance. If not addressed now, India will find itself caught between rapidly growing demand for logistics on one end and a fragmented and inefficient logistics ecosystem on the other. Hence, it is important that the country emulate and adapt successful practices from different countries for its own benefit. Such benchmarking will ensure that the Indian logistics and warehousing sector adopts the right vector and conforms to international standards as the industry evolves.

WHAT IS LOGISTICS?

The logistics value chain comprises three units – transportation, warehousing and administration (Source: Logistics – Tech Avendus 2016). Transportation involves the end–to–end movement of freight from the manufacturer/retailer to the customer. This transfer can span across borders and across different modes of transport. Warehousing is the intermediate storage of goods that happens during a product's journey from the factory to the consumer. Warehouses today take different forms – fulfilment centres, distribution centres, return centres, and even showrooms. Administration is supply chain management. Logistics entails a lot of coordination and integration, which is made efficient through supply chain management. This chapter comprehensively discusses the global best practises in the logistics sector on the whole and in the warehousing component in particular. Most of these practices are currently alien in the context of Indian logistics or have just started to gain ground in India.



GLOBAL TRENDS IN LOGISTICS AND WAREHOUSING

FUNCTIONAL

- SUPERGRID
- SHARE ECONOMY
- OMNI-CHANNEL
- TEMPERATURE-CONTROLLED
- RELAY TRUCKING
- HYPERLOCAL
- ANTICIPATORY SHIPPING
- MULTI-PURPOSE NETWORKS
- BATCH SIZE 1

TECHNOLOGICAL

- SMART WAREHOUSING
- 3D PRINTING
- AUGMENTED REALITY
- BIG DATA
- ROBOTICS
- CLOUD LOGISTICS
- DIGITAL SUPPLY CHAIN
- INTERNET OF THINGS
- SELF DRIVING VEHICLES
- DRONES OR UNMANNED AERIAL VEHICLES

WAREHOUSING

- TEMPERATURE-CONTROLLED
- MULTI-STOREY

Source: Knight Frank Research

GLOBAL TRENDS IN FUNCTIONAL ASPECTS

EMERGENCE OF 3PLs/4PLs AND SUPERGRID LOGISTICS –

3PLs and 4PLs are already a norm in the developed markets and they are now moving towards supergrid logistics. The idea is to arrange global supply chain networks in a grid-like structure such that different components of logistics are integrated. Such a logistics supergrid will span across borders, sectors, companies and services by assimilating multiple supply chains, smoothly and flexibly. Cloud computing can enable the creation and operation of such supergrid.

Eg. – **Amazon** connects numerous sellers and logistics providers with buyers across the world. It does so by integrating supply chain networks world over into one supergrid to increase cost and time efficiency.

SHARE SPACE LOGISTICS/SHARE ECONOMY LOGISTICS –

The industry trend of sharing assets instead of owning them is now finding ground in the logistics sector, especially after the success of start–ups like Airbnb. Everything from warehouses to trucks to electronic enablers can be shared between two or more entities. Such sharing is highly cost effective as it saves considerable expenditure on ownership of resources and assets. Smooth and hassle-free sharing of logistics activities and resources is enabled by peer–to–peer sharing platforms.

Eg. – **PepsiCo** and **Nestle** share warehousing, co–packing and outbound distribution to retail stores of their respective fresh and frozen products. (Source: DHL Logistics Trends Radar 2016).

OMNI–CHANNEL LOGISTICS –

Customer demand has in recent times diversified into anytime, anywhere, and from any device categories. This has consequently led to the integration of online and retail i.e. offline business channels. Omni-channel logistics is nothing but the coming together of physical shopping and virtual shopping experiences for a customer. The end expectation of a customer is to have a well–informed, hassle–free, to–their–doorstep shopping experience.

Sometimes they visit the retail brick-and-mortar outlets for the experience of shopping **(showrooming)** but still purchase the product online to avoid the hassle of standing in queues **(no-line commerce)** and availing the superior discounts available through the online model. Sometimes they make purchases solely on digital platforms **(webrooming)**. Thus, flexibility and convenience of customers is leading to the growth of omni-channel logistics.

Eg. – **IKEA,** the Swedish furnishing giant has evolved its own omni-channel experience. It has converted its warehouses into showrooms that serve as experience centres for their customers. And the final orders are placed online on its app or website.

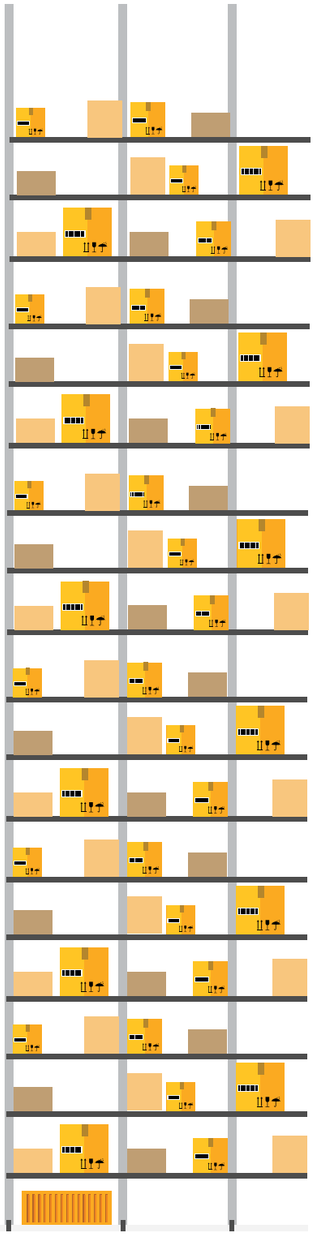
RELAY TRUCKING –

An established practice in developed markets, relay trucking facilitates optimisation by round–the–clock movement of freight trucks. Furthermore, it is driver–friendly from the employee's perspective and cost-friendly from the company's perspective. The model works as follows – a driver sets out with a designated truck load on a particular route. At the same time, another driver sets out with a different truck load on the same route from the opposite direction. They meet en–route and exchange trucks and then drive back to their respective origin destinations carrying freight designated for that location. As a result, the truck keeps moving to its destination without a halt and the drivers don't over–work or stay away from their hometowns. This helps increase time and cost efficiency.

In India, companies like **Rivigo** are introducing this global practice. However, it is at a nascent stage and has immense scope for growth, especially with the advent of Goods and Services Tax (GST).

ANTICIPATORY SHIPPING –

Anticipatory shipping is dispatching of product/s to a particular cluster based on the anticipation of its demand. This anticipation is made with the help of big data–based predictive algorithms that are built on previous demand patterns. Such analysis helps logistics providers predict demand even before an order for the product is placed.



Accordingly, they can dispatch shipments and move goods to distribution centres closer to the geographical clusters/areas likely to purchase the products. This helps them offer same–day deliveries and sometimes, one–hour deliveries. The idea is to reduce lead times and increase delivery efficiency, eventually leading to increased customer satisfaction.

Eg. – Anticipatory Shipping has been pioneered by **Amazon** in 2014. It has gained immense popularity since then and has helped introduce innovations like same–day delivery, an attraction in the growing e–tail sector.

MULTI–PURPOSE NETWORKS –

Making use of existing networks and public transport infrastructure to transfer, store and deliver goods is an idea that is slowly gaining popularity. Instead of having sector-specific logistics chains or dedicated infrastructure, companies now look to integrate their supply networks with those of others or with the public infrastructure. This helps save cost, increases capacity utilisation, increases mobility and flexibility in deliveries, and thus enhances customer satisfaction. Such multi–purpose usage is more beneficial for sectors that require specific transport and storage conditions like the cold storage goods – a single cold storage network can be utilised for frozen foods as well as pharmaceuticals. This helps reduce the cost of specificity.

Eg. – **Postbus** in Germany has successfully combined passenger and parcel transport. This facilitates urgent deliveries on the routes that its buses ply on. (Source: DHL Logistics Trends Radar 2016)

HYPERLOCAL –

The hyperlocal concept is a good enabler of the 'on–demand delivery' business model. It makes use of the existing local retail network to meet the demands of consumers. Logistics players team up with local retailers such that their inventories are integrated with the online platforms. When products from the inventory are ordered local retailers fulfil this demand on behalf of the logistics company. This also ensures faster delivery.

Eg. – **Amazon Prime Now** offers delivery in under an hour.

In India, a similar model can be seen in Future Group's **Big Basket** venture.

BATCH SIZE 1 –

Speed factories are soon replacing the common practice of offshore factories, at least in case of trendy products. Earlier, manufacturing units of all products would be set up offshore i.e. in countries like China for cheaper costs. But this also meant longer lead times. With the changing consumption scenario, companies now prefer building micro–production sites in their vicinity for products with a small shelf life. These production sites or speed factories are high–tech manufacturing facilities. Use of 3D printing technology for rapid and bulk production of in–demand goods can be observed at such factories.

Eg. – **Adidas** has a speed factory in Germany. It enables 'on–the–spot' production of their trending product thus reducing lead times and consequently the freight transportation costs. (Source: DHL Logistics Trends Radar 2016)

TEMPERATURE-CONTROLLED LOGISTICS –

Products like fresh agricultural produce, frozen foods, photographic films, chemicals and pharmaceuticals are sensitive to temperature change either due to a smaller shelf–life or due to their sensitive chemical composition. To avoid damage to such products it is necessary to maintain a fixed temperature range round the clock. Cold chain logistics does that. Temperature–controlled environments are created end–to–end, right from transportation to storage to delivery. This protects the products from any damage and keeps them fresh and intact till the last mile.

Eg. – German company ***"Die Bauerntute"*** is known for its farm–to–fork delivery model that makes use of cold chain logistics services offered by DHL. (Source: DHL Logistics Trends Radar 2016)

Furthermore, while cold chain storage and transportation is already a global norm, innovative cold chain logistics practices are soon catching up. Smart packaging solutions that report and control oxygen, humidity and/or pressure, besides temperature, allow the use of standard transport networks and last–mile delivery services instead of the expensive climate–controlled trucks and containers. Concepts like reusable thermos boxes help deliver sensitive goods like frozen foods, farm produce and pharmaceuticals without opting for temperature–controlled trucks.

Eg. – **DHL's Lifetrack** cold-chain management platform offers an end–to–end cold chain network in most developed markets like Europe. (Source: DHL Logistics Trends Radar 2016)

GLOBAL TRENDS IN TECHNOLOGICAL ASPECTS

SMART WAREHOUSING –

Like smartphones, smart warehouses are the ones that effectively perform multiple functions simultaneously with the help of technology. They are also referred to as intelligent warehouses or warehouses that think. In a smart warehouse, all gadgets and devices are fitted with sensors and are connected to each other via the Internet. This connectivity gives the gadgets the ability to coordinate their processes thereby enabling seamless operations. Internet of Things, Cloud Computing, Big Data Analytics, Robotics and Automation together enable the concept of a Smart Warehouse. They are all necessary elements of a larger integrated ecosystem.

Eg. – **Amazon** is known for pioneering the smart warehouse model and therefore this concept is at times referred to as the **Amazon Effect**. Its warehouses in the US and Europe have set the benchmark for smart warehouses.

3D PRINTING –

Also known as additive manufacturing, 3D printing is a process of making three–dimensional objects from a digital file. This technology is seeing massive use in the biomedical, aviation and automobile sectors. For instance, it can be used to print vehicle spare parts in areas where there are no service centres or dealer outlets. Though 3D printing cannot replace conventional manufacturing processes, it

can definitely facilitate faster production of in-demand goods. Logistics sector can benefit from this technology as they can save on the cost and time of manufacturing and procurement. For instance, the batch size 1 trend (discussed above) is made possible because of the mass manufacturing facilitated by 3D printing.

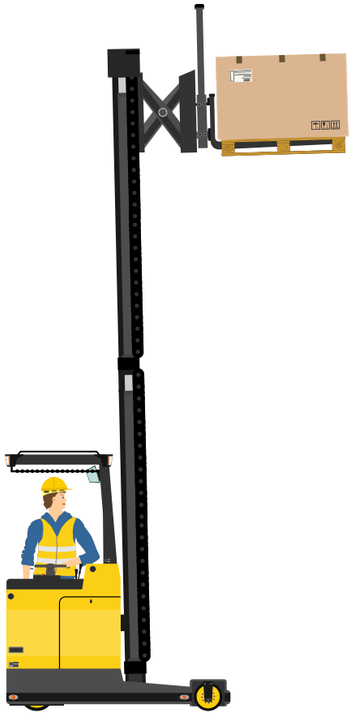
Eg. – **Fly** from **Amazon** is a mobile 3D printing delivery truck that 3D prints a product as soon as an order is placed in its designated area. It is also able to deliver products faster and without the need to store them.

AUGMENTED REALITY –

Augmented reality is real time integration of digital information with the existing environment. This technology makes use of worker's environment and integrates it with virtual information to enhance what is seen, felt or smelt. Vision picking is the most popular application of this concept. Augmented reality smart glasses facilitate faster, hands–free operation of warehousing tasks like picking, sorting, and assembly.

In the US and Europe, smart glasses are being increasingly used in warehousing operations.

Eg. – **DHL** witnessed a 25% increase in operational efficiency after introducing the use of smart glasses for the picking task alone in their warehouses in Netherlands. (Source: DHL Logistics Trends Radar 2016)



BIG DATA –

A massive amount of data is generated in logistics at every level and every minute and this data is huge, diverse, unstructured and high in frequency. All of it can be and needs to be put to use in order to avoid losses and wastages. However, two major obstacles in this process are the unstructured nature of data and its extensively high frequency. As a result, real time analysis becomes a challenge. That is why the need for big data analytics. This technology consumes large amounts of data and helps analyse it real-time. It also helps discern or identify patterns, if any.

In India, big data is quickly gaining popularity in the logistics sector. Companies like **Wipro** have developed business intelligence tools such as **Insta Intelligence** that automate logistics processes.

ROBOTICS –

New and advanced robotics can help boost productivity of logistics operations. These robots are equipped with high–resolution cameras, pressure sensors and self–learning capabilities that can be used for assistance to and collaboration with manual labour. For instance, in warehouses, these robots can be programmed to perform tasks like picking, packing and sorting or assist in loading and unloading of goods. In developed markets like the US and Europe, they are also used for last–mile delivery activities.

Eg. – **Sawyer**, a one–armed collaborative robot has been designed for performing logistics activities. (Source: DHL Logistics Trends Radar 2016)

CLOUD LOGISTICS –

Logistics goes hand-in-hand with extensive datasets. Recording every minute detail from the start to the end is absolutely essential for monitoring and supervising the supply chain. But documenting every record for every good is extremely tedious, time and space consuming, and highly prone to errors. Use of cloud computing technology is the best solution.

Cloud logistics facilitates the creation of a limitless virtual space to save and share data. It also facilitates quick and real–time access to information from across the world. Ensuring adequate safety of sensitive data is the only challenge of cloud computing and even that is taken care of with advanced technological features.

DIGITAL SUPPLY CHAIN –

It is the digitisation of production and distribution processes, viz. procurement, manufacturing and logistics. Using Internet, a single digital interface is built to connect and integrate these functions. This helps analyse extensive information real-time to better coordinate the supply chain making it more agile.

Eg. – **Samsung** built a centralised and integrated supply chain infrastructure to be able to operate uniformly across the globe.

INTERNET OF THINGS –

A system that connects and integrates electronic devices via Internet such that they can send and receive data from each other is Internet of Things (IoT). In supply chain management and warehousing, numerous devices function individually carrying out their respective operations. If these devices communicate and coordinate their activities then all processes can be executed smoothly and seamlessly resulting in increased time efficiency. Furthermore, massive data generated by these devices can be analysed real-time to reduce losses and inefficiencies, if any. Such a sync of devices is made possible through IoT.

In India, IoT has been introduced to support online payment gateways and in sectors like telecommunication and power. The logistics sector is still to witness the IoT revolution.

SELF–DRIVING VEHICLES –

Self-driving vehicles are more flexible and more autonomous than automated forklifts and driverless trucks. These are fully driverless and make use of integrated sensors to navigate unlike other unmanned trucks that require magnetic or inductive strips. They can be used in indoor as well as outdoor logistics operations – from pallet movers in warehouses to last-mile delivery solutions.

Eg. – **Starship Technologies** has launched **Autonomous Parcel Delivery**, a self–driving robot that can deliver multiple parcels within a 5 km (3 mile) radius. (Source: DHL Logistics Trends Radar 2016). The pilot programme was launched in major European cities in 2017 in tie–up with Domino's Pizza Enterprises.

DRONES OR UNMANNED AERIAL VEHICLES –

Express deliveries and deliveries in remote areas can be executed very efficiently with the use of unmanned aerial vehicles (UAVs) or drones. These are only meant to reduce the delivery time and/or help access difficult terrains. They are not meant to replace or phase out the ground–based transportation and delivery systems. In rural regions, they can be used to access the remote and inaccessible terrains. In urban areas, they can be used for faster first and last mile delivery in areas of high congestion.

Eg. – **DHL Parcelcopter** was launched in 2013 for commercial delivery of goods in remote settings. It has been used for urgent delivery of pharmaceuticals from mainland Germany to remote islands in its neighbourhood. (Source: DHL Logistics Trends Radar 2016)

MULTI-STOREY WAREHOUSING IN INDIA – A DISTANT DREAM

As the Indian warehousing landscape readies itself to embrace the Goods and Services Tax (GST) effect, a new buzzword—multi-storey warehousing (also known as vertical warehousing)—has started catching the fancy of third-party logistics (3PL) providers, occupiers and supply chain consultants. Intrigued by the advantages of a multi-storey warehouse, such as vertical cube utilisation, improved distribution network and cost efficiencies over traditional warehouses, the evolution of such spaces in densely populated Asian cities is being termed as the 'next big disruptor'.

With the Indian e-commerce sector rapidly increasing its sales performance, shrinking delivery timelines of major online marketplaces only highlight the need to have such distribution centres and storage facilities closer to consumption hubs. As these structures easily facilitate the small packaging requirements of the e-commerce industry, they help in optimising usable floor space per square foot of land.

EAST ASIA STANDS TALL

In theory, the concept of multi-storey warehouses is borrowed from multi-storey apartments. Vertical residential development evolved fast in countries with high population density and scarce land resource. Similarly, rising consumption trends coupled with scarcity of prime industrial land parcels in markets like Hong Kong helped this warehouse model quickly become popular in these East Asian markets. The increasing share of e-commerce in the total retail pie has also provided an impetus to overall warehousing demand having a cascading effect on multi-storey warehouse developments too.

Multi-storey warehouses help in achieving operational efficiencies given the rental differential between warehouse spaces and retail premises. Accordingly, many occupiers are increasingly realising the benefits of interchanging large retail spaces with smaller stores while increasing warehouse spaces leased.

India does provide the dense demographical spread in urban centres, increasing internet and smartphone penetration, as well as high land acquisition costs leading one to believe that multi-storey warehouses can be replicated here. However, there are several challenges to encounter before such warehousing models can become a reality in India.

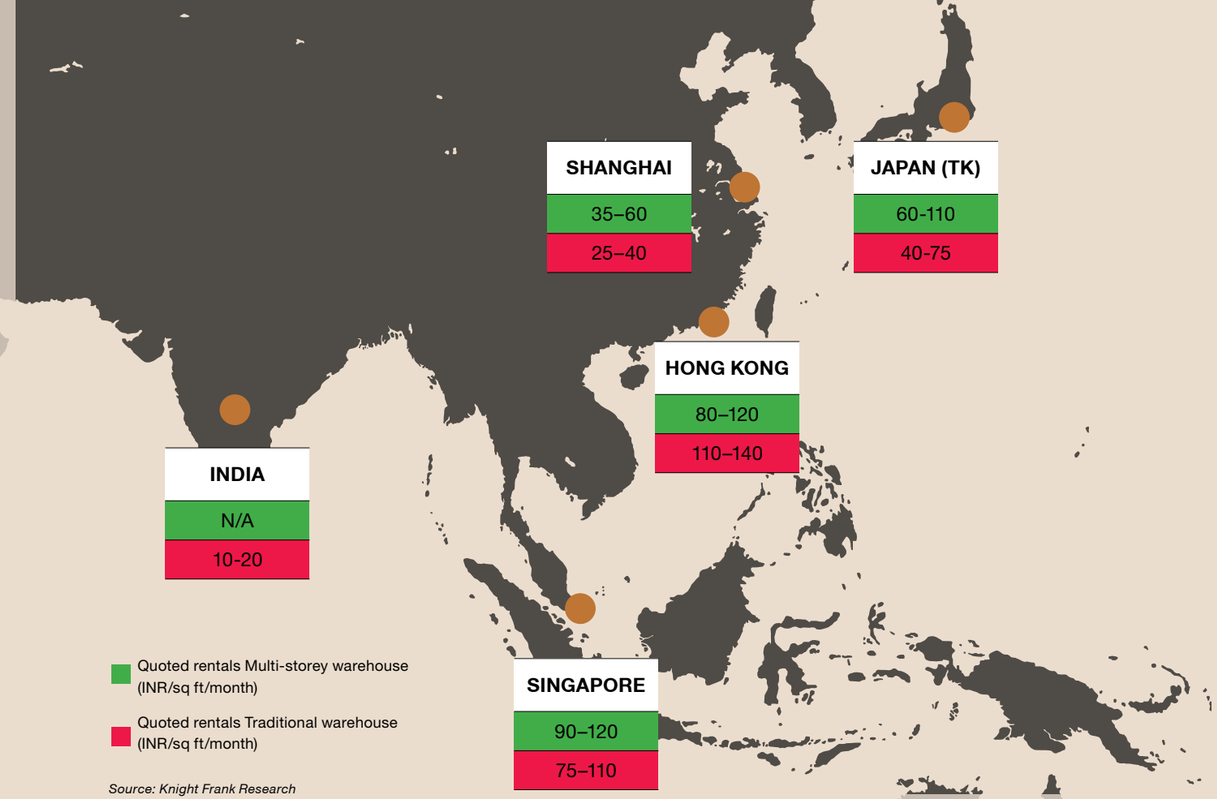
LAND: A CRITICAL CATALYST

Constructing a multi-storey warehouse development would entail cost of construction, excluding land, to shoot up by as much as three times. Hence, only in cases where land cost is extremely high and availability is sparse is where it starts to make sense to construct a multi-storey warehouse development.

Land is a critical component of any real estate project. Taking into account prevailing land costs and quoted rentals in each of the prime warehousing micro markets in the top seven cities of India, feasible investor return per annum ranges between 10%–24% for anyone looking to invest in this sector. Also, unlike residential developments, the proportion of land costs in warehouse development projects is approximately one-third of the total investment in these micro markets, which are within 3–4 hours of driving distance from consumption hubs. Hence, from a future development standpoint also, we do not think that multi-storey warehousing structures are the need of the hour as sectors such as e-commerce are well served by the current warehousing clusters. We do not foresee any significant shift from these micro markets but an expansion of modern warehousing stock in these very clusters.

KEY SPECIFICATIONS COME AT A PRICE

A multi-storey warehouse can be any structure with more than 2 floors. While a 5–6 floor warehouse is more popular in Japan and Singapore, 12-floor multi-storey warehouses are popular in Hong Kong. Access to higher floors is provided via ramp-up, cargo lifts and drive-up facilities. Provision of drive-up facilities is a key determinant for rental values as it adds up substantially to development costs. Sophisticated equipment like freight elevators, vertical transfer systems and multi-floor random transfer machines are some other features found in these facilities. Rents for traditional and multi-story warehouses across major Asian markets are in the adjoining table.



Source: Knight Frank Research

In contrast, traditional warehousing models in India are still evolving. In pre-GST era, the multiple taxation burden restricted large-scale organised warehouse developments and creation of good quality warehouse stock. Majorly, warehouse development remained unorganised with only godowns and storage areas. Such structures had no amenities, which kept rental values from strengthening for years. Even the average clear height in a good quality or modern warehouse is 9–12 metres, which is much lower than 18–30 metres found in multi-storey structures as per Asian standards. Hence, there is a vast difference in the rentals commanded in India and other countries.

The rationale of developing a multi-level warehouse in lieu of a traditional one is to bring down the share of land cost in the overall cost of the project. Accordingly, the rent expectation for a multi-level warehouse cannot be significantly higher than the traditional; otherwise, it shall render the effort worthless. As appears from the adjoining table, the multi-storey warehouse rent in most international markets is similar or approximately 10–50% higher than the traditional warehouses. In some cases it is even lower than the traditional warehouse. Another dimension of the multi-storey warehouse development is that the global markets have rent levels of almost 6–10 times of the rent prevailing in major markets in the country. Given the relatively lower rental levels in Indian warehousing hubs, which are serving the city consumption hubs very well in 3–4 hours of transit time, the market is not ready for the multi-level warehouse developments.

LONG ROAD AHEAD

As the GST implementation is underway, the first step towards a mature warehousing landscape in India is to attract organised and genuine warehousing developers who have ample experience globally to tailor such developments in the Indian context. A lot of consolidation and expansion activity is expected on behalf of occupiers post GST, but that alone does not account for a miraculous makeover. Access to long-term institutional capital will modernise warehousing, which itself is a long-drawn process. Instead of multi-storey warehouses, what is needed currently is the systematic execution of all planned warehouse developments that will enhance modern quality warehouse supply and create an ecosystem of fewer, larger and centralised warehouse hubs. Conversion of godowns and old, dilapidated storage structures can also be looked at to meet smaller occupiers' preferences. At present, India is not prepared for multi-storey warehouses, which are probably the next big phase of growth in this story. Some other evolving models, such as modular warehouses, automated warehouses and mega warehouses, are more suitable given the reconfiguration expected in supply chains.

GLOBAL TRENDS IN WAREHOUSE DEVELOPMENT ASPECTS

TEMPERATURE-CONTROLLED WAREHOUSING

Also known as cold-chain warehousing, these are warehouses equipped with temperature–controlled environments required for the storage of cool cargo products. Products like fresh agricultural produce, frozen foods, photographic films, chemicals and pharmaceuticals are sensitive to temperature change either due to a smaller shelf–life or due to their sensitive chemical composition. To avoid damage to such products it is necessary to maintain a fixed temperature range round the clock. This has led to the need of cold-chain warehouses. Such warehouses are equipped with temperature-control systems. Systems with a temperature range of 2°C–8°C and 15°C–25°C are common in pharmaceutical industries. (Source: Industry interactions)

Along with temperature, these temperature-control systems also need to maintain other product specifics and parameters like air quality levels (carbon dioxide, oxygen, humidity and others). Furthermore, such systems need to be supplemented with efficient and 24-hour monitoring equipments to ensure smooth functioning. Thus, cold chain warehouses have specific and advanced warehouse management systems that make use of technological tools like big data analytics for real time monitoring.

MULTI-STOREY WAREHOUSING

Multi-storey warehouses started coming up as a solution in land–constrained countries to increase the usable floor space per square foot of land. It is gradually gaining momentum in other countries as well. Such warehouses need sound architectural design as well as technological planning so that all supply chain processes can be carried out on all floors without any hindrance.

Multi–storey warehouses have been common in the Asian cities of Tokyo, Singapore and Hong Kong. Land is a limited resource here and therefore the need to maximise utilisation of the available space.

WHERE DOES INDIA STAND?

The Indian logistics industry has grown leaps and bounds in the last 8-10 years. The global practise of 3PLs (third party logistics) and 4PLs (fourth party logistics) has gained considerable popularity in the country. Enormous growth in the e-commerce segment is fueling development in logistics and warehousing sector further. However, India still has a wide gap to cover in terms of increase in efficiency and effectiveness of supply chain processes. Adapting and adopting international best practices is one way to bridge this gap. Policies like Goods and Services Tax (GST) are welcome measures that are expected to supplement this process of growth. However, India still has a long way to go before it reaches the standards of its global compatriots and this can only be achieved with active and coordinated participation from government and private players.

WAREHOUSING

The warehousing market in India is highly fragmented as majority of the warehouses measure less than 10,000 square feet. Further, almost 90% of the warehousing space is controlled by unorganised players and comprises small-size warehouses with limited mechanisation.

The present warehousing market in India can be categorised into three – lower stratum, middle stratum and higher stratum. The lower stratum is just godowns of the past converted into warehouses. These are old buildings, mostly Reinforced Cement Concrete (RCC) structures and their only utility is storage. The middle stratum warehouses comprise similar structures as in the lower stratum, but these are built with pre–engineered slabs and are known as pre–engineered building (PEB) structures. Their planning and functioning is very basic, like that of the lower strata, but their buildings are in a comparatively better condition. Higher stratum warehouses are the modern and massive structures that perform a lot of supply chain functions along with storage.

Another practise in Indian warehousing market is the lack of attention to warehouse designing. This ignorance stems from lack of awareness and/or lack of willingness on the part of landowners and developers to cater to the requirements of end users. Most warehouses are built keeping in mind the developer's perspective and not that of the end user. Hence, the focus is to save cost which results in the construction of a very basic structure for a warehouse. Such warehouses do not adhere to market standards and therefore, end users are frequently plagued with issues like lack of basic amenities and sub–standard infrastructure with lower longevity. This approach needs to change.

The concept of Built–to–Suit (BTS) is still a far–fetched idea in India but practices like warehouse designing and end user centric warehouses need to definitely be focused on.

(Compiled from: Industry interactions)

LOGISTICS

India's freight modal mix is highly skewed towards roads with 60% of the total freight movement in the country happening by road. This is mainly because of the poor railway and waterway infrastructure. Earlier, maximum freight movement used to happen via the railway network. However, lack of last–mile connectivity and technical inefficiencies in operations gradually reduced the reliance on railway freight movement. Waterways, on the other hand, were never a focus of policy development and hence could not be exploited for freight movement. Consequently, more than 50% of the long–haul freight movement takes place by road.

Two issues arise owing to the heavy dependence on roadways for logistics. First, for long–haul freight routes, road is approximately 25–30 % costlier than railway. Accordingly, the overall freight transport cost in India is higher than the global standards. Second, even the road infrastructure of the country is wrought with problems like single–lane access in some areas, poor traffic management, bad quality roads and, delays due to factors such as toll and octroi. As a result of these inefficiencies, truck drivers work for lesser hours, truck travel distance per day is severely curtailed and all of these cumulatively increase the freight transportation time.

(Compiled from: MMLP policy document)

These issues hamper the functioning of supply chain processes and consequently the efficiency of logistics on the whole. India needs to take active steps to cut down the wastages and inefficiencies in this sector.

WHAT IS CHANGING?

Outsourcing of the logistics activity has become the next logical stage of evolution for most sectors especially as taxes have been rationalized across the country and the Input Tax Credit can be availed across product and service lines. The warehousing industry will undergo a major evolutionary leap in the next 5-8 years, much like airports where design, compliance, costs and value added services will dictate survival and growth.

Warehouse markets have started maturing; even local developers have started providing quality specifications and infrastructure as a standard offering. Hence the benchmark of warehousing space has moved up a notch.

Going forward, there will be significant consolidation of warehouses by companies in the consumption space. This will lead to development of large modern technology based warehousing operations and rapid modernization of unorganised godowns. Consolidation amongst players is also being witnessed where small local developers and property owners are selling out to the large institutional developers in existing clusters.

Compliance will be the key from this point on and will automatically ensure the phasing out of facilities that cost less than INR 10 per square feet per month to rent out. Large–scale mechanised warehousing with high ceilings (12 metres) and workers being paid at the minimum wage of INR 15,000 per month cannot be sustained at under INR 15 per square feet and this is expected to become the new norm over the next decade.

Furthermore, the string of policy and regulatory reforms unveiled by India in recent times has accentuated the entry of international institutional players in the Indian warehousing and logistics space.

(Compiled from: Industry interactions)

GOVERNMENT POLICIES IMPACTING LOGISTICS AND WAREHOUSING

India's rank on the World Bank's Logistics Performance Index (LPI) improved from 54 in 2014 to 35 in 2016 amongst 160 countries. This leap in LPI ranking is attributed to reforms undertaken by the government like the introduction of the Single Window Interface for Trade (SWIFT) in the Customs Department. Following are a few such recent policy measures and their plausible impact on the logistics and warehousing space:

GOODS AND SERVICES TAX (GST) :

GST has consolidated the tax regime across states which will result in cost and time efficiencies across the supply chain. GST will also hasten the consolidation of warehouses thus accentuating the formalisation of the largely unorganized warehousing sector.

LOGISTICS PARKS POLICY:

Launch of multi-modal logistics parks and a possible grant of 'industry' status to the logistics sector will boost its efficiency by leaps and bounds.

MAKE IN INDIA:

The increased focus on the manufacturing sector will boost manufacturing output and spur the need for allied activities such as warehousing.

DIGITAL INDIA:

Digitisation will make technological applications and innovations in supply chain management easily available to large number of players, thus increasing the efficiency of the sector on the whole.

MULTI–MODAL LOGISTICS PARKS POLICY

The Indian government has undertaken to develop multi–modal logistics parks (MMLPs) and improve the logistics efficiency in the country. A MMLP is a multi-modal freight handling facility with a minimum area of 100 acres comprising mechanized warehouses, specialized storage solutions like cold storage, facilities for mechanized material handling and inter-modal transfers like container terminals, bulk or break-bulk cargo terminals.

A Logistics Parks Policy was launched by the government under the Ministry of Road Transport and Highways in 2015. The policy proposes to develop 35 multi–modal logistics parks across the country at an estimated investment of INR 2 lakh crores. Following locations have been identified for these MMLPs with six of them having higher priority:

35 Logistics parks identified will cater to key production and consumption centers accounting for 50% of india's road freight

6 locations- Delhi NCR, Chennai, bangalore, Vijaywada, Surat and Hyderabad- with land availability have been prioritized

SERVICES TO BE PROVIDED:

- These parks will act as **freight aggregation and distribution hubs** to bring down overall freight transportation costs.
- These parks will have road, air, railways, and waterways connectivity to facilitate smooth transition of **freight across transportation modes** and reduce lead times.
- Modern **mechanised warehousing** space.
- Services like customs clearance and warehouse management systems will be provided. This will help reduce the inventory holding costs.

EXPECTED BENEFITS:

1. Reduction in freight transfer and freight transportation costs
2. Reduction in inventory holding costs
3. Reduction in freight transportation lead time

Source: MMLP Policy document

AMAZON – SETTING HIGH STANDARDS GLOBALLY

If there is any role model to be idolised in the logistics domain then Amazon it is. What started as a simple digital platform for sale of books has now turned into a massive e-commerce giant with a global presence. Started in 1994, its 1997 initial public offering (IPO) was valued at USD 461 million. After 20 years, the company's market capitalisation stands at a stupendous USD 530 billion as on November 1, 2017. Today, Amazon facilitates the sale of a wide range of products and brands to customers in every nook and corner of the world through its online platform. Furthermore, its delivery service has set new benchmarks for the supply chain segment.

Amazon has been pioneering innovations and developments in logistics, be it warehousing or supply chain management. It began with the setting up of ***Amazon Fulfilment Centres*** and ***Delivery Centres***. These are massive brick-and-mortar facilities that can be used by online retailers to stock their products and the rest is taken care of by Amazon—from packaging to sorting to labelling. This way, the sellers can concentrate on just selling and not worry about the storage or distribution or delivery of their products. Amazon takes care of all their logistics activities.

DELIVERY:

A well-built and well-integrated distribution network is the key to Amazon's success in delivery models. Keeping customer satisfaction a priority, Amazon has successfully experimented with ***On-demand Delivery***. The company's experiments focus on delivering on time and with efficiency. Its ***Amazon Prime*** programme gives customers the benefit of ***Same Day Delivery*** and ***Same Hour Delivery.*** The ***Amazon Prime Now*** model is based on the concept of ***Hyperlocal***. It integrates the local retail network into Amazon's supply chain and is therefore able to promptly deliver to its customers anywhere. To increase its delivery efficiency, especially during peak seasons, it introduced the ***Amazon Flex model***. Anyone with a car and smartphone can join in and deliver products within an hour of the order being placed. In return, they make $18-$25 an hour and Amazon benefits from the customer satisfaction. This model is operational in major US cities. In countries where its infrastructure is not as established, Amazon has resorted to the concept of ***Multi-purpose Networks*** and innovations like ***I Have Space (IHS)*** and ***Service Partner Networks (SPN)***. These ventures allow Amazon to deliver with the same efficiency as above by outsourcing some processes of the supply chain. Besides, the company has also ventured into commercial use of drones and unmanned aerial vehicles (UAVs) with its ***Amazon Prime Air*** model. This has increased its access to the remote areas.

SUPPLY CHAIN:

Anticipatory Shipping is another commendable innovation by Amazon for which it also has a patent to its credit. The concept involves dispatch of certain products to a certain geographical cluster based on an anticipation of demand for the same. This demand prediction is made through a predictive algorithm and helps save transportation time when those orders are actually placed. This innovation has been made more successful with the use of technologies like 3D printing. ***Fly*** from Amazon is a ***Mobile 3D Printing Delivery Truck*** that 3D prints a product as soon as an order is placed in its neighbourhood. This enables faster delivery without storage.

WAREHOUSING:

In warehousing, Amazon is known for pioneering the ***Smart Warehouse*** model and therefore this concept is at times referred to as the ***Amazon Effect***. A smart warehouse is one where all gadgets and devices are connected to each other via the Internet ***(Internet of Things)***. They are also referred to as intelligent warehouses or warehouses that think. ***Robotics*** and ***automation*** are widely used in such set-ups. ***Amazon Kiva*** is a mobile robotic fulfilment system that tremendously increases efficiency in warehousing operations. Around 15,000 such robots have been deployed in Amazon's latest Fulfilment Centres across the US.

And lastly, while the world is just getting used to the idea of 3PLs and 4PLs, Amazon has again set a higher standard with ***Supergrid Logistics***, which is the integration of global supply chain networks into one Supergrid for better cost and time efficiency.

While the pros of such efforts by Amazon are innumerable, the downside to these experiments is the costs that the company has to bear, especially the heavy research and development costs. Further, the consistent effort to deliver "on-demand" comes as a further drain on the company's resources as such delivery costs cannot be transferred to customers. Besides, Amazon is facing tough competition from the Chinese e-commerce giant Alibaba that has a similar market capitalisation but has gained it in a comparatively shorter span of time than Amazon. This threatens Amazon's market share and consequently profits, which are already at competitive rates.

Irrespective, Amazon remains the torch-bearer in the contemporary logistics space and continues to redefine and push the limits of the online selling business. Amazon's recent ventures further validate the point. Taking the delivery experience a notch higher, it has very recently launched two more innovations in the US - ***Amazon Key*** and ***Cloud Cam Amazon***. Exclusively available to Amazon Prime members, packages will now be delivered inside customers' homes in their absence without compromising on security or authenticity. What more could a customer ask for!

(Compiled from: DHL Logistics Trends Radar 2016, Logistics – Tech Avendus 2016, Media reports)

SECTORAL PERSPECTIVE

CONTRACT LOGISTICS

90%

An estimated 90% of the logistics service providers in the Indian market lie in the unorganised segment

MARKET SCENARIO

The evolution of businesses along with consistent high economic growth has led to the need of the logistics industry to fulfill the growing demand for sophistication of the transport and storage functions. Logistics was and in some cases still thought of as a business process and not seen as a part of the value chain. The industry emerged out of the need to differentiate the point of deliverable as an addition to the value chain. The need to get the product to the consumer, as opposed to early business models where the consumer had to come to the business, generated a need for end-to-end logistics solutions.

In the present world, markets are getting competitive with new age e-commerce businesses more than willing to compromise profits in a bid to acquire and retain customers. The customer is truly the king today as it is not just the product quality and price that helps retain him but also the manner and timeliness of delivery. The product needs to be available at an accessible location for the consumer; with doorstep delivery fast becoming the norm rather than a value-add in today's scenario. This is often fulfilled by using a complex logistics network, which makes the product available to the consumer at an accessible place at the lowest cost. Building up a complex logistics ecosystem is a very costly affair and that is one of the main reasons why logistics is being increasingly outsourced to a 3rd party operator. The operating service is called 3rd Party Logistics Providers (PLPs) or contract logistics providers.

Logistics costs in India stand at approximately US$ 309 billion which account for roughly 13–14% of the GDP. This is higher than the global average of under 8%, as the Indian logistics sector is largely unorganised and inefficient compared to its global counterparts. These inefficiencies in the logistics chain currently cost the economy an estimated US$95 billion

According to an IIM publication, transportation cost as a percentage of total logistics cost in India is approximately 40%. Inventory handling cost is estimated to be 24% and warehousing takes up 26%. [2] India's transportation costs are very high due to inconsistent quality of roads, intra-city traffic and regulatory delays (the regulatory delays were more or less solved by the introduction of the Goods and Services Tax, more commonly known as GST, but its fruition is yet to be seen). High labour costs will cause automation to take over at least the menial jobs such as inventory handling.

An estimated 90% of the logistics service providers in the Indian market lie in the unorganised segment due to the extremely low costs that an unorganised player can offer, as he does not adhere to the compliance norms that keep costs high for his organised counterpart. This disregard for compliance and the resulting lack of a level playing field has deterred competition and led to the development of a commodity mindset with lack of differentiation. Recent years have however seen the growing acceptance of organised players in the warehousing sector and an increasing appetite for more innovative logistics models. The share of the organised sector, though increasing rapidly, is very low and the market still quite immature.

Inefficiencies in the logistics chain currently cost the economy an estimated US$95 billion.

The growing need for organised logistics to improve time, cost and quality efficiencies in India is propelling opportunities for the growth of the logistics sector. Recent policy initiatives such as the Goods and Services Tax and Make in India, along with the potential for high growth that the Indian economy has, will create demand for more and more organised players.

GST: THE GAME CHANGER

GST has simplified India's complex tax structure that was characterised by multi-point taxation and cumbersome refunds for transactions that occur inside and outside of the state. Implementation of GST could create multiple opportunities for logistics companies on account of supply chain optimisation initiatives by companies in key industries. The opportunities can be broadly classified into two categories – physical infrastructure and services and expansion of the role of logistics companies in the value chain. The GST Law on the taxation front, at national level, will result in more competent and well-networked cross-state transportation and lesser paperwork for transporters, thereby reducing the logistics costs. According

[1] *Logistics India 2016 Brochure, Assocham*

[2] *The Logistics Sector in India: Overview and Challeneges, Pankaj Chandra, IIM Working Paper series.*

1-1.5%

GST is expected to save costs to the tune of 1–1.5% of sales over 3–4 years.

to CRISIL, GST is expected to save costs to the tune of 1–1.5% of sales over 3–4 years. CRISIL also estimates that eliminating delays at check posts will yield an additional savings of 0.4–0.8% of sales. These cost savings are, however, more likely to be gradual and back ended, as corporates will have to realign their supply chain while ensuring minimum business disruption, the note added.

GST, consequently, will bolster the role of warehousing in the supply chain. The complicated tax system that the GST replaced had necessitated the need for suppliers to have warehouses in all states that they have customers in, simply to avoid taxes by treating the transfer of goods as a stock transfer and not an inter-state sale. Now, warehouses will no longer be storage spaces serving the sole purpose of a tax bypass as industries will consolidate warehousing operations purely to optimise operational and cost efficiency. This will result in the closure of a number of redundant warehouses across the country while industry players will consolidate and concentrate warehousing operations in fewer locations depending on their overall logistics strategy. This incidence of warehouse consolidation will vary across industries; for example, the FMCG industry will see comparatively little churn as its storage requirements were largely dictated by proximity to the consumption centers in the pre GST era and that will not change in future either.

In today's cost-sensitive, profit-driven environment, a lot of manufacturers and distributors are reconsidering their understanding of warehousing. Any process that doesn't conform to a fast, highly automated, capital intensive environment is being sent to the warehouse. Driving this change is a need to take links out of the supply chain and make sure that costs, space and time are optimised. As a consequence of the shift, businesses are progressively expanding their expectations from their warehousing providers, seeking ways to increase flexibility, improve inventory control, manage costs, and streamline the supply chain.

GST will also cause a shift in market composition and structure. Standalone logistics units will gradually make way for operators packaging various activities as clients look to completely outsource their logistics, thus paving the way for specialists operating on a global scale. This will also see the organised sector growing rapidly and more logistics clusters and hubs being formed.

Although there is a consensus on the long-term benefit of GST, it will be a major disrupter in the logistics industry. In the context of GST, logistics strategies will simplify connectivity and this will positively affect the transport and warehousing network. At the same time, streamlining resource networks will ensure higher penetration for remotely located last-mile consumers on account of widening the consumer base. Total logistics costs might shoot up significantly on account of increased handling capacity while per unit costs reduce. Thus reliance on contracted firms is bound to increase.

EVOLUTION OF LOGISTICS SERVICE PROVIDERS

3rd party logistics (3PL) is the most basic form of contract logistics. A 3PL firm is a company providing logistics services, usually on the basis of contract logistics. With increasing need to outsource logistics and due to the expertise the contracted firms have gained, a few more dimensions such as packaging and light manufacturing have been added to the traditional 3PL role. Increasing competition and the need to reach far-flung markets have necessitated the adoption and integration of modern logistics processes. By virtue of specialising in specific logistics' activities, 3PL firms have developed competencies in the modern management of logistics processes, along with an extensive network of information and communication.

The need for tactical/strategic consulting to reduce logistic costs or to add value to the product is increasing. Supply chains are becoming leaner to cut down on time taken to deliver products. More and more activities are being outsourced. Over time, the scope of contracted logistics has evolved from pure transport and storage to consulting services and end-to-end supply chain engineering for businesses. This is where the concept of 4th party logistics (4PL) appears. There could be a number of dimensions to this strategy such as the contracted firm owning a pre-existing supply network, which can be used across industries or the supply chain can be totally automated from inventory management to loading goods in the transporting vehicles for last-mile deliveries.

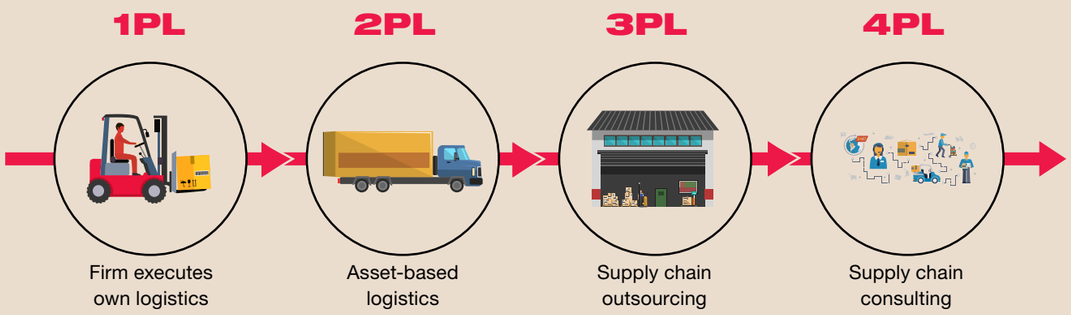
Businesses often hire multiple 3PL firms for different reasons like geographical advantage, last-mile reach, or to keep outsourcing costs in check. There exist different levels of outsourcing logistics depending on the customer needs and the relationship with the contract logistics firm:

- Transactional Outsourcing: Based on transactions, with no long-term contracts and no bonding between the 3PL and the outsourcing company.
- Tactical Outsourcing: Outsourcing on a long-term basis with negotiated contracts and integrated IT systems to facilitate free information flow and create supply chain visibility.
- Strategic Outsourcing: Based on long-term relationships with successful outcomes, 3PL companies become partners in supply chain management and establish transactional transparency.

FIGURE 1: SERVICES PROVIDED BY 3PLS & 4PLS

Source: Knight Frank Research

FIGURE 2: EVOLUTION OF LSPs



Source: Knight Frank Research

Transportation cost as a percentage of total logistics cost in India is approximately 40%. Inventory handling cost is estimated to be 24% and warehousing takes up 26%

Within the 3PL industry, logistics service providers have standardised service offerings; however, providing these services at a cheaper cost is no longer sufficient to fulfill customer's expectations. Innovation and new service development will be the pivotal factor determining the growth of 3PL services. Specialisation will be a new wave in India's logistics industry that is expected to experience a steady annual growth of approximately 8–10% till 2027 according to the Ministry of Road Transport and Highways.

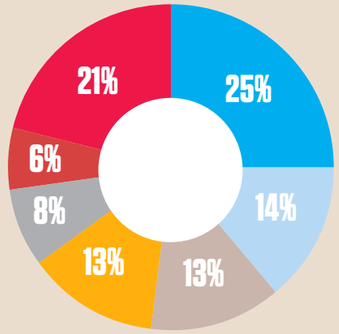
The logistics industry is becoming gradually organised as it continues to grow rapidly. Pan India players and strong regional players are the only ones that are best poised to survive the policy disruptions that India has undergone since mid-2015. This is because pan India players will be in a better position to offer better services by virtue of their scale and ability to reach most parts of the country whereas, regional players will provide access to the last-mile markets.

MARKET TRENDS

The contract logistics industry in India although unorganised and underdeveloped, has come a long way from where it was. Growth in consumption demand, coming from rising incomes and population, is driving businesses towards India. This has led to an increase in the demand for logistics services and growth in the number of organised logistics service providers.

Globally, an estimated 86% of the Fortune 500 companies outsource logistics activities to 3PLPs, most of these companies also outsource logistics functions to more than one player in the market to reduce risk, increase efficiency and build a strong network. Comparatively, at 5.7%, India's penetration is far below the fortune 500 average, according to Tata Strategic Management Group. Similarly, the fragmented nature of the Indian logistics industry has also kept the total expenditure of Indian businesses on 3PL services at an estimated 15% of their total spends on logistics in India, according to Frost and Sullivan. Current and forthcoming policy changes such as GST and Make in India and emerging customer segments like e-commerce present several unique opportunities for 3PLPs as rising demand for complete logistics management through aggregation of vendors and services gains ground in the country. Logistics companies must leverage this demand for new and differentiated services by suitably building capabilities.

TABLE 1: INDUSTRY WISE SHARE IN 3PL REVENUE



INDUSTRY	SHARE IN 3PL REVENUE
Pharmaceuticals and chemicals	25%
IT hardware	14%
Engineering	13%
Auto ancillary	13%
Textile	8%
FMCG	6%
Others	21%

Source: ICICI Direct Research

DEMAND DRIVERS

- **Rapidly growing consumption and last-mile reach:**

India is a vast country and more than half of the people who form this country's massive consumption base still live in rural areas. Catering to last-mile logistics in remote cities and villages is a critical challenge for the logistics processes of all businesses. It is impossible for most businesses to reach each and every remote location, thus a dedicated logistics industry is required to cater to the rapidly growing demand.

- **Increasing trade:**

India's trade growth is expected to be in the double digits for the next decade at least according to Maersk. The resulting increase in movement of goods that higher trade volumes bring about will prove to be a strong demand driver for logistics services in the future.

- **Technology push for logistics operations:**

New product identification technologies, big data and machine learning have totally changed how the logistics industry operates. Real time data through interlinked systems will also contribute to managing efficiency and reducing costs while maintaining or increasing productivity. Automation can also reduce the need for labour performing unproductive tasks, helping improve labour productivity in the industry. Automation, however, requires huge investment in technology, which might be unviable for a firm on its own. Thus, private entities will find a 3PL player a much more cost effective and competitive option compared to coping on its own.

LOCUS.SH (MARA LABS INC.) – INTELLIGENT ROUTING ENGINE

Locus has created routing systems so companies can determine the most promising route to deliver an order. The aim is to reach to maximum number of delivery points in the shortest time possible. Locus aims to mechanise all the human assessments involved in taking logistics decisions of sending a package. The company, which has more than 25 clients, including HUL and Lenskart, has developed a route-planning engine, its core business, apart from a 3D packing engine that provides configurations for loading cargo into containers. Locus also offers companies a weekly schedule of the most efficient routes and outlets for their sales teams.

Each schedule planned by their routing engine takes 5–10 minutes, whereas a skilled human being would take 1–4 hours to process the same data. The company says it helps its clients reduce their logistics costs by at least 25%. Locus offers solutions for both intra-city and inter-city operations. It estimates that the domestic freight industry is around $100 billion; a bulk of this is inter-city logistics.

Companies provide Locus the origin of the package, destination and expected time of delivery. Locus sources all the possible routes from Google Maps or sifts through data on past deliveries. This data is then processed, factoring in the soft threshold, weather information, traffic, historical data on time taken to cover the distance, etc. to arrive at a few best routes. If the client is new, logistics solutions take about three months.

RIVIGO LOGISTICS – RELAY TRUCKING

Rivigo was an aspirational brain child of its founders. It is a specialised LSP providing trucking services. At first it would look like a normal transport operator's business. But the main difference is that no Rivigo driver stays with a truck from end to end. They pass them on like relay batons after every 250 or 300 km. They drive the truck to the Rivigo pit stops where the truck driver hands the truck over to another truck driver who continues the journey forward. This way the truck drivers, who are so central to the system at Rivigo that they are known as pilots, return back home every day. Also, the truck is kept moving for more than 20 hours a day. This system of operation is called Relay trucking and is at a very nascent stage in India, whereas it is more widely practiced abroad. It enables all stakeholders, including the 'Pilots' to be satisfied with the job and reduces the attrition rate, in an industry where labour turnover is high, while fulfilling the high intensity of trucking needed for express logistics.

- **Policy initiatives:**

Policy initiatives such as GST and Make in India will simplify logistics activities and also streamline 3PL operations to an extent that it would be unviable for most firms to replicate the reach and efficiency levels of dedicated 3PL logistics aggregators.

- **Infrastructure development:**

The Government of India has taken a lot of initiative in the infrastructure department, which includes the Bharatmala and Sagarmala Projects to improve connectivity between major metro cities as well as ports, the dedicated freight corridor plan to boost freight movements using railroads and multi-modal logistics parks in various parts of the country to help create an effective logistics landscape in the country.

EMERGING TRENDS

- **Digital sharing:**

For many years, businesses ran on a linear logic where manufacturers manufactured, distributors distributed, and customers bought products. That paradigm has started to change as a new breed of digital companies sits on top of vast supply systems and like the cab service Uber, owns only the mobile user interface that connects the manufacturer, distributor and consumer, driving this significant shift in value. This phenomenon is often referred to as the Sharing Economy, a term best defined as the economic activity of digital platforms that facilitate transactions where users are given temporary access to a service provider's otherwise underutilised asset, service, or skill. Space sharing as a concept applied to logistics is new to the industry. Mostly assets like warehouses and transport vehicles are shared to fill up empty spaces. Similarly manpower and expensive machinery can be shared.

- **Omni-channel supply chain:**

The demands of the omni-channel customer are forcing retailers and manufacturers to quickly adapt and become more agile and responsive. Many retailers require a third party supplier to provide omni-channel supply chain solutions to fulfill the seamless integration of online and offline shopping channels with one single interface. Retailers can then ensure that their customers are not limited by their mode of shopping and have access to the full range of products offered under their brand. This means that there is complete visibility across channels. Integrating a multi-channel retail model with businesses is not an easy task, thus 4PLPs have often been used to facilitate it. This type of a model is more relevant to the food processing and fast moving consumer goods markets. In India, Nature's Basket, the premium grocery store has completely integrated their stores and the online ordering system to provide a seamless experience to their customers whether they walk-in or order online.

- **Cross docking:**

As industries constantly seek ways to transport products more effectively and cost-efficiently, warehousing has a solution in cross docking—an exercise in logistics of receiving supplies from an incoming semi-trailer truck or railroad car and dispatching them directly into outbound trucks, trailers, or rail cars, with little or no storage in between. This practice helps deliver the product to market quickly and economically while reducing the need for warehouse space and inventory carrying costs and shrinking delivery timelines. While this was earlier used only for consumer durable goods, low turnaround time and decreased handling costs make cross docking a viable solution for everything from perishable to high-value/high-security goods. Many businesses are identifying variations on traditional cross docking, integrating transportation strategies such as consolidation and deconsolidation to minimise costs.

- **Multi-modal logistics:**

Multi-modal logistics parks have been a successful model the world over and India is headed in the same direction as well. They leverage the use of rail, road, air and waterways (both inland and sea) for the movement of goods from manufacturing to consumption clusters, thereby optimising logistics processes through economies of scale.

The government has proposed to build 35 logistics parks all over the country, of which 6 are to be made in the Phase 1 of the project. The first 6 locations are Delhi, Chennai, Bangalore, Vijaywada, Surat, and Hyderabad. These will be joint ventures between the central government, relevant state government, infrastructure agency and investment partner that will provide services such as freight aggregation and distribution, storage and most importantly multi-modal transportation facilities.

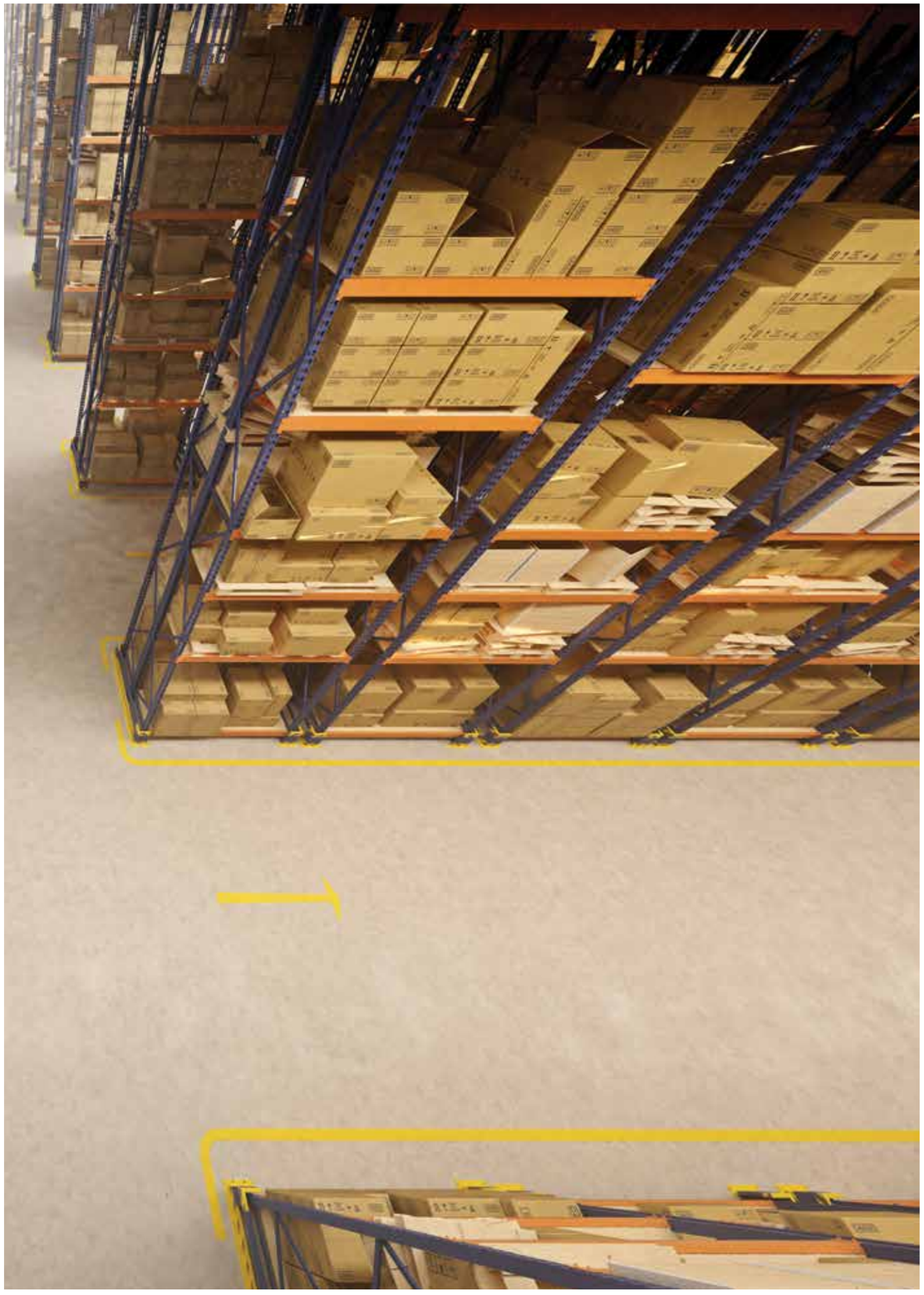
LOGISTICS HUBS

Recognising optimum locations for warehousing and other fixed facilities within the supply chain are major decisions for any business. The warehouse location is the primary factor to determine and minimise transportation costs, and where new supply routes are being introduced or an existing supply chain is being re-engineered.

Warehouses and other logistics-related services are characteristically found in clusters, usually on the outskirts of cities, with accessible highways, airports, ports, railway stations and other cargo terminals. Clustering many warehouses in one area makes transportation and logistics operations more efficient. In addition, companies that participate in logistics clusters attract government investments, educational and research institutions, and workers and suppliers. These developments, in turn, make the cluster even more attractive to companies that use or provide logistics services.

CAPRICORN LOGISTICS – CROSS DOCKING SOLUTIONS

Capricorn's cross docking solution ensures that products flow directly from inbound to outbound within the Distribution Centre, thereby saving up to 30% of costs otherwise incurred on storage and other warehousing activities. Cross docking also significantly reduces distribution cost and expedites delivery time, and is especially helpful with product consolidation as it directly helps in moving packages from one truck to another.



ASHUTOSH BAJPAI
Vice President – Operations
DHL Express (I) Pvt. Ltd.

Taking a distant and overall view of logistics industry, there is no doubt that GST will result in increase in efficiency. In terms of cost efficiency, it cannot be generalised for the industry as a whole. Various segments and sub-segments will benefit differently. A time-sensitive segment like Express Delivery will require time to assess impact due to complex procedural requirements on account of GST E-Way Bill data obligations. Trucking (FTL) and warehousing will definitely benefit in the immediate future. Advantage of scale and automation will improve quality and efficiency.

TABLE 2: MAJOR LOGISTICS HUBS FOR 3PLPS

LOGISTICS HUB	NEAREST CITIES	MAJOR INDUSTRIES	FREIGHT CONNECTIVITY
NCR	Delhi, Noida, Gurgaon, Jaipur, Amritsar, Ghaziabad Chandigarh	Food Processing, Automobile and Ancillaries, Electronics, Pharmaceuticals, Metal	**ROAD**- NH-8, KMP Expressway
			RAIL- Western Dedicated Freight Corridor (WDFC upcoming)
			AIRPORT- Indira Gandhi International, Palam
MMR	Mumbai, Thane, Navi Mumbai, Pune, Ahmednagar, Nashik	Petroleum, Textile, Chemicals, Pharmaceuticals, Engineering	**ROAD**- Old Agra Road, NH-3, Mumbai-Pune Expressway
			RAIL- WDFC (upcoming), Chatrapati Shivaji Terminal
			AIRPORTS- Chatrapati Shivaji International Airport, Navi Mumbai International Airport (upcoming) Ports- JNPT, Mumbai Port
Chennai	Puducherry, Mysuru, Kochi	Automobile, Electronics, Hardware, Engineering	**ROAD**- NH-16, Bangalore Chennai Expressway
			RAIL- ICTRIPL Terminal, Chennai
			AIRPORT- Chennai International Airport, Port- Chennai Port
Kolkata	Ranchi, Bhilai, Bhubaneshwar	Metallurgy, FMCG, Petro-chemicals, Pharmaceuticals	**ROAD**- NH-2, NH-6, NH-34
			RAIL- Dakuni (EDFC)
			AIRPORT- Netaji Subash Chadra Bose International Airport Port- Kolkatta Port
Nagpur	Aurangabad, Solapur, Indore, Bhopal, Bhilai	Steel, Pharmaceutical and Chemical, Food Processing	**ROAD**- NH-69, NH-6, NH-3
			RAIL- Nagpur Junction (major transit point),
			AIRPORT- Dr Babasaheb Ambedkar International Airport Inland Port- CONCOR
Bangalore	Mysuru, Kochi, Managalore, Madurai	Aerospace and Aviation, Automobile and Ancillaries, Metals	**ROAD**- NH-4, NH-7, NH-48
			AIRPORT- Kempegowda International Airprort
Ahmedabad	Rajkot, Vadodara, Surat, Gandhinagar	Cement, Petroleum, Automobile	**ROAD**- NH-8, NH-1,
			RAIL- WDFC (upcoming)
			AIRPORT- Sardar Vallabhai International Airport
Indore	Ujjain, Gwalior, Kota, Vadodara	Food Processing, Automobile and Ancillaries, Pharmaceutical	**ROAD**- NH-3, NH-59, NH-59A
			RAILWAY- Indore Junction
			AIRPORT- Devi Ahilyabai Holkar Airprot

Source: Knight Frank Research

RECENT INVESTMENTS

The government's emphasis on the manufacturing sector and policy initiatives such as Make in India are giving a boost to domestic production, which is creating an opportunity for the logistics industry to grow. Logistics companies are making intensive efforts to keep pace with this growth in demand by innovating logistics solutions. Most logistics companies have created their USPs in their respective niche markets. These services are providing visibility across the supply chain and transforming logistics into an organised industry.

Meanwhile, the increasing influx of international logistics service providers (LSPs) are prompting 3rd party logistics (3PLs) and domestic LSPs to expand their footprint and focus on transportation service, warehousing and freight forwarding. It will also open up prospects for partnerships, and domestic companies will have exposure to the advanced technologies introduced by global players. Logistics service providers in India will greatly benefit from the development of transportation and logistics-related infrastructure, such as dedicated freight corridors, logistics parks, free-trade warehousing zones, port modernisation, and container freight stations.

TABLE 3: RECENT MAJOR INVESTMENTS IN THE INDIAN LOGISTICS SECTOR

YEAR	COMPANY	INVESTOR	INVESTMENT VALUE (IN $ MILLION)	SERVICES	REMARKS
2019 (Est)	DHL India	_	100	Total logistics solutions	_
2017	Rivigo	Soft Bank	200	Tech-based logistics solutions	_
2017	Delhivery Pvt. Ltd. (SSN Logistics)	Fosun International	30	Transport, Warehouse, Consulting	_
2017	Adani Logistics	Adani Group	_	Logistics infrastructure development	77-acre logistics park in Ludhiana
2017	Delhivery Pvt. Ltd. (SSN Logistics)	Carlyle Group	100	Transport, Warehouse, Consulting	Tiger Global is an existing investor. Tiger and Carlyle have jointly invested the $100 million.
2017	Indospace		550	Warehousing, Logistics and industrial parks	Third round of funding.
2017	Assetz Property Group, LOGOS India	Ivanhoé Cambridge	800	Logistics joint venture	Setting up Logos India, $400 million being raised through equity.
2017	PayTM	_	35	E-commerce	To set up logistics arm
2017	Amazon	Amazon Transport Services	63	E-commerce	To widen customer base
2016	Kerry Indev Logistics Pvt. Ltd.	Kerry Logistics	156	Total logistics solutions	50% stake in Kerry-Indev
2016	Stellar Value Chain	Warbug Pincus	125	Total logistics solutions	_

Cont...

YEAR	COMPANY	INVESTOR	INVESTMENT VALUE (IN $ MILLION)	SERVICES	REMARKS
2016	NIIF	DP World	2000	Infrastructure Fund – Maritime and Inland Terminals	–
2015	Ecom Express	Warbug Pincus	133	Total logistics solutions for e-commerce	–
2015	Embassy Group	Warbug Pincus	102	Logistics infrastructure development	–

Source: Knight Frank Research

Overall, LSPs are using technologies such as Machine Learning, Big Data and cloud-based application platforms for tracking of shipments and better order fulfillment. The advancement of infrastructure and government support through policy will go a long way in modernising the logistics industry in India.

The government's emphasis on the manufacturing sector and policy initiatives such as Make in India are giving a boost to domestic production, which is creating an opportunity for the logistics industry to grow.

FACTORS IMPACTING THE LOGISTICS INDUSTRY

The logistics industry in India, as discussed, is in its nascent stages where it is bound to face mammoth challenges on its way upwards. The sector, as a whole, is not very organised and the industry is competitive, especially in the big cities, where there are numerous unorganised small truck owners and service providers providing stiff competition at razor thin margins. There exist both within-the-industry and external factors that the 3PL firms will have to engage with to promote the industry as well as individual businesses.

EXTERNAL FACTORS

Logistics is a dependent industry. Demand for logistics services varies immensely due to the fluctuations in economic activity. And thus, there a lot of external factors affecting the industry.

POLICY FACTORS

- Make in India – The current government in India is looking to stimulate and promote businesses; both domestic and international businesses have been called upon to expand their businesses. From April 2017 to September 2017 almost $25 billion has already come in as foreign direct investment (FDI) into India which is 17% more than last year for the same period.[3]
- Substantial public investments in the logistics sector have been planned in the form of multi-modal logistics parks in 35 clusters around India at an investment of $61 billion. The government is also looking to improve the infrastructure in the country. In November 2017, the government announced a massive $200 billion project to construct highways across the country. This includes the much sought-after Bharatmala project.
- Minimum Wage Code Bill, 2017 – There is a new minimum wage law, which will affect the logistics industry. It will be illegal to pay workers at warehouses and truck drivers lesser than the minimum wage requirement.
- GST – The tax reform that dissolved the state borders within India, is being looked at as the much needed push to the logistics industry.
- Ease of doing business – The Indian government is looking at increasing the ease of doing business in India, thus further liberalisation of regulations with respect to construction permits, getting electricity and access to licenses and permits can be expected.

ECONOMIC FACTORS

- According to industry experts, the share of logistics cost in GDP is set to come down by a minimum of 1–1.5% in the near to medium term. This would lead to savings of an estimated $45 billion.
- Skilled labor in logistics is a major issue in India. Industry players have been incapable of investing in manpower development due to the fragmented nature of the industry, the government has also not focused sufficiently on the same.
- Foreign investment into logistics and other related sectors is increasing rapidly. Many logistics players such as DHL and Kerry Logistics have invested heavily in India and have plans to invest further. Many 3PL-using businesses also have plans to expand their capacities and build new operating units.
- High consumption demand all over India means that the need for distribution centres and transportation is high. Changing to hub and spokes model under the newly implemented GST, would mean that the spokes will have to be closer to consumption centres and even from there last-mile reach will be an important factor.
- Infrastructure in India is a major challenge for businesses. Delays in rail freight, bumpy roads and low connectivity make India a difficult market to do business in.
- Fuel price fluctuations adversely impact the transport business.

SOCIAL FACTORS

- Land acquisition – Acquiring land is a major problem amidst the social issues related to environment, displacement of people and government bureaucracy.
- Providing jobs to locals – Displacing people from their agrarian occupations, most land acquirers have to promise employment to the local population. In the future, with automation, job losses would lead to further friction.
- Societal Red Tape – Red Tape is very prevalent even in social circles, mainly in rural areas, where the Sarpanch presides over the decision making processes.

TECHNOLOGICAL FACTORS

- Automation – Automation-driven technology for the logistics industry is fast evolving into a fully automated system. From inventory management in the warehouse through WMS to drone delivery, most processes in the logistics services can be done unmanned.
- Data Analytics – With data being used for new identification techniques, routing, space optimisation and monitoring stock data, the face of the logistics industry is changing.
- Technology life cycle – Marginalised technology life cycle means before a newly commissioned technology is delivered to the industry, another newer technology is already available in the market.
- Information flow – In today's digitised world, information is readily available. This changes how consumers make the final decision. This digital revolution has transformed the logistics industry and is constantly improving on productivity and performance metrics. App-based provision of logistics services, transparency in the market by readily making available information such as price, type of service, equipment used, quality standards, product location, etc.

[3] *FDI Fact Sheet – September 2017, DIPP*

INTERNAL FACTORS – STAKEHOLDER ANALYSIS FOR THE INDIAN LOGISTICS INDUSTRY

STAKEHOLDER	OBSERVATIONS
Occupier/User	• Large number of firms operating in the industry • Short-term or no contracts between the 3PL firms and the users • Low scope of differentiation of services
Contract logistics player	• Most firms use more than one 3PLPs to operate. Therefore, substitution is highly likely in case of an underperforming service provider.
New entrants	• There are low barriers to entry in the bottom segment of the market, but providing end-to-end pan India services requires huge capital and access to technology. • Economies of scale reaped by the large players in the market • High operating costs in terms of fuel, manpower and infrastructure maintenance • Brand identity and high switching cost in case of a new 3PLP
LSP/Asset provider	• Little or no threat of backward/forward integration by occupiers • Notable contributions to efficiency and costs to the occupiers business • Standard and undifferentiated services • Switching cost is negligible, since users usually contract more than one existing 3PLPs • Large business clients
	• Unorganised and fragmented LSP landscape • Insignificant threat of LSPs upscaling their logistics processes due to lack of capital • Threat of backward integration by 3PLPs by purchase of required assets • Availability of substitutes and low switching cost

Source: Knight Frank Research

FUTURE OUTLOOK

The 3PL industry is a complex network chain of resources that not only helps you with moving and storing goods but also optimises the use of those resources and networks. Therefore, 3PL is not an industry that is easy to be in. The pre-GST era in this industry was dominated by the unorganised and fragmented players but this is set to change. The organised players with modern resources and facilities will take over the industry. The transfer of risk from the user to the 3PLP would largely be the reason for the shift. The current slump in business is due to a downturn of industrial output, which is expected to take an upturn soon as companies become GST compliant. Businesses will also look to 3PL for the reasons mentioned, which include cost, time and reach, apart from the transfer of risk.

The new entrants in this business will either be disruptors who can leverage the use of technology and differentiate the product offering or forward integrators who do not only wish to use their supply chain but also be providers in the industry. The industry will not see many substitutes, keeping in mind governments have not been in favour of process automation. Thus, the share of organised players will see a significant and sustained rise in time to come.

MEHUL SHAH
Chief Executive Officer,
LOGOS India

TRENT ILIFFE
Joint Managing Director,
LOGOS

Warehousing and logistics is currently unorganized in India. However, this sector is more likely to become institutionalized over the next few years as it experiences a major shift to organized in line with the increased demand for institutional quality Grade-A warehousing spaces in the country. The government of India has provided infrastructure status to the logistics sector, covering cold chain and warehousing facilities and we expect this will attract more funding at competitive rates as well as more domestic and international investments of USD$2b and above over the next 5 years.

The recent initiatives by the Indian government, including the introduction of the GST and the accelerated push on infrastructure and 'Make in India' initiatives, means now is the opportune time for LOGOS India to have entered the market. The LOGOS India partnership leverages the respective strengths of LOGOS and Assetz Property Group in creating the preeminent developer and manager of logistics warehouse and light industrial real estate with a PAN India presence and we look forward to deploying more than US$500m over the next 4-5 years.

We believe the warehousing infrastructure eco-system will substantially change over the coming years from single and multiple unit warehouse parks to mega logistics parks / estates with a complete eco-system for every player's needs. This will include viz. truck parking, dormitories and amenities for staff and drivers, efficient solar power and back-up power generation and eco-friendly environment compliance. We will be building circa 20mn sq. ft. of warehousing space in 8-10 target markets across India over the next 5 years as we support our customers current and growth strategies across Asia Pacific.

LOGISTICS AND WAREHOUSING IN E-COMMERCE

INTRODUCTION

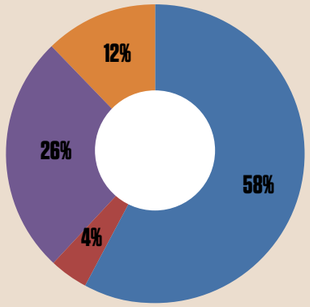
The origins of retailing via the Internet in India can be traced back to the 1990s but this phenomenon really took root when Flipkart started operations in 2007 and it has come a long way since then. The current smartphone revolution has ensured that virtually every Indian can have access to popular E-commerce applications such as Amazon, Snapdeal and Flipkart, and bridge the massive gap that other modern retail formats have struggled with, i.e 'Customer Reach'. India has the second largest Internet usage base with broadband penetration of approximately 40%. The total number of internet users in India stands at over 500 million or close to 40% of the Indian population, yet the share of E-commerce in total retail revenue is just 11% in the 7 major cities. Still a fledgling phenomenon, the share of e-tail in total retail revenue is quite low but growing at great pace.

E-commerce retail has caused a significant change in the lifestyle of Indian shoppers, from how they shop to what they shop. Strong underlying drivers such as improved access to Internet and smartphones, attention to marketing, ease of shopping for customers, modern payment options, deals and discounts and the rapidly changing lifestyle needs are fuelling the growth of the e-tail market. Projected to grow at 65% annually, the e-tail market size that stood at approximately $3 billion in 2014 is expected to be a $70 billion market by the end of 2019 .

The market is dominated by the top three players (Flipkart, Amazon and Snapdeal). They control almost 90% of the market share in the industry. These large players have diversified their product offerings and are continuously expanding it to have a greater footprint on the industry.

[1]Retail Report 2015, Knight Frank (India) Research
[2]Retail Report 2015, Knight Frank (India) Research

CHART 1: MARKET SHARE OF MAJOR E-TAILERS



Flipkart	58%
Snapdeal	4%
Amazon	26%
Others	12%

Source: RedSeer, 2017 data

E-TAIL LOGISTICS

It is the seamless, round-the-clock, interactive environment in which consumers can buy goods without actually going to a physical market that is the unique selling proposition of e-tail. This is made possible only by the efficiencies that logistics processes generate. While logistics is the key challenge in e-tailing, it is also the strategic differentiator, in terms of time and service provided, in the e-tail industry. The e-tail industry is in a constant state of flux and is in the midst of emerging global trends. The pace at which logistics processes adapt to accommodate these trends will determine the growth chart of the e-tailing industry going forward.

E-tail customers need their products to be delivered promptly and at their ease. They carry high expectations with respect to delivery and consider the promptness and accessibility of delivery almost as important as the product's price and quality. The pressure on logistics services has thus increased exponentially over the past 5 years, as the volume of packages has grown multifold in tandem with a constant reduction of package sizes. Furthermore, with a higher volume of e-tail transactions, e-businesses now, also need to manage a corresponding volume of returned, exchanged and damaged goods. The challenge in these factors is magnified, especially in a scenario where retaining the e-tail customer is largely dependent on minimum or zero delivery or return charges.

The flexibility provided by logistics to evolve with the scale of business is the driving force behind the e-tailing industry. A strong link between business and logistics is basically the key to the success of e-tail. The logistics sector specific to e-commerce retailing in India was valued at USD 0.46 billion in 2016 and is projected to witness a CAGR of 48% in the upcoming five years to reach USD 2.2 billion by 2020.[3]

ROLE OF LOGISTICS IN E-TAILING

The movement of a product from a seller to the buyer in the e-tailing scenario involves several stages. These stages or processes have ensured organised growth in the e-tail logistics segment and thus increased the flexibility and scalability of the whole system. These processes are listed and briefly discussed below:

First-mile logistics: Goods are picked up from the sellers and transported to the e-commerce retailers' mother hub or fulfillment center as per the logistics model adapted. Post the arrival at the fulfillment center, the product is checked against the transport receipt, following which, the product goes through a strict quality check, before it goes on to the shelf. Thereafter, inventory is updated through the Warehouse Management System (WMS), which reflects in the stock report generated.

At the Fulfillment Center (Mother Hub): Post first-mile logistics, the product lies on the shelf until fulfillment, which involves sorting, picking and packaging of products. Once the order is placed on the e-tailer's website, a pick list is generated and the order is picked and consequently updated in the WMS. Then, the products are packaged, categorised and moved to the mother warehouse, from where they are sorted for last-mile delivery.

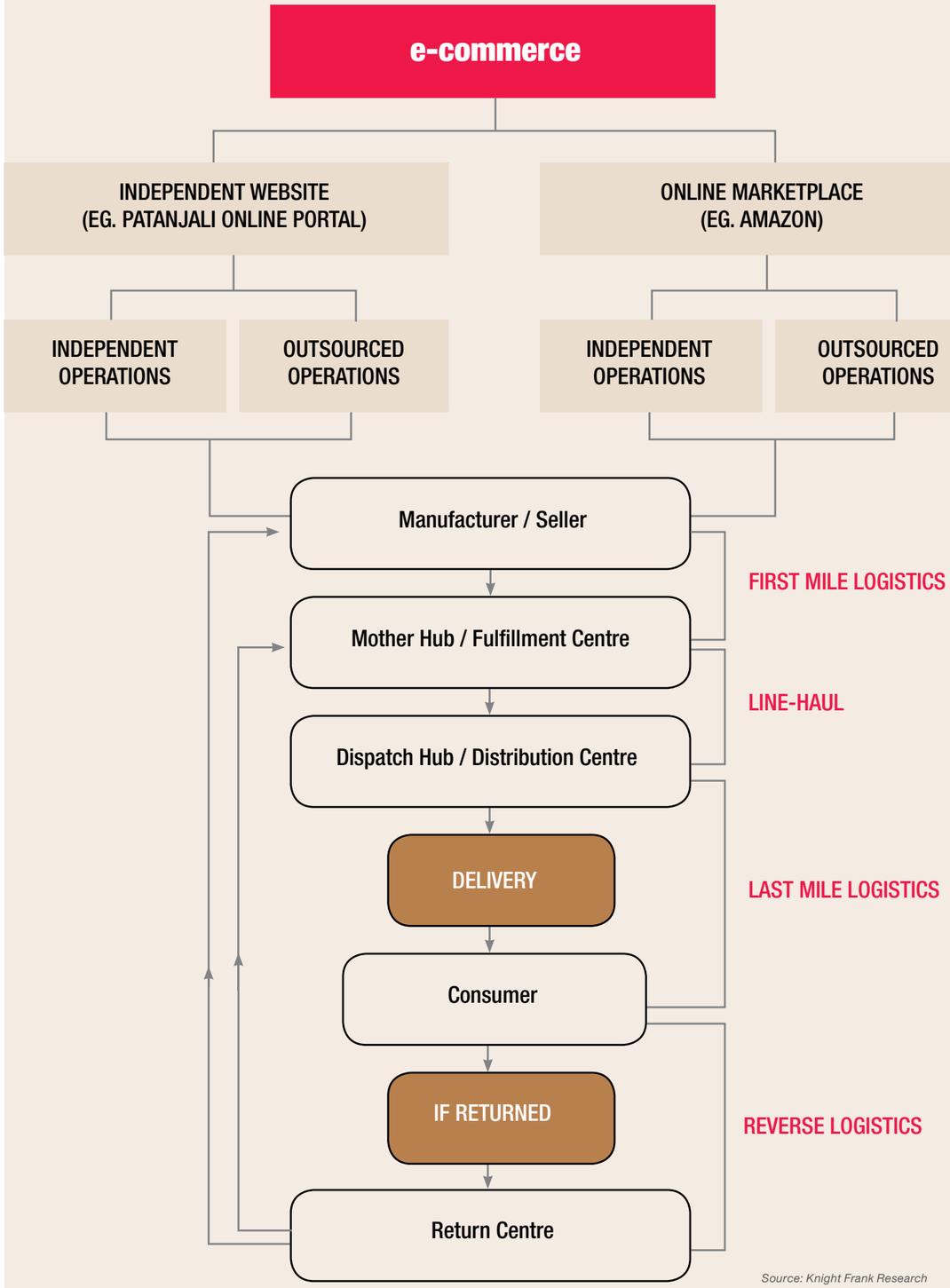
Line haul: The process involves linking the fulfillment center with the distribution/dispatch center, via road, rail or air, subject to the most efficient transit time and cost matrix.

Last-mile logistics: This phase involves the dispatch and shipping of products from the delivery/ dispatch center to the end customer, from where they are shipped out to the customers. This leg of the entire logistics chain is dependent on manpower and infrastructure in terms of the number of delivery hubs, delivery vans and bikes.

Reverse logistics: Another important aspect of E-commerce retail is product returns, which can be customer initiated or due to a logistics failure. The returned products are cycled back into the inventory, restocked and relisted or sent back to the seller due to quality issues. These involve complications such as refund, exchange and replacement that increase the overall cost of the supply chain. E-commerce retailers are endeavouring to minimise returns constantly by including as much information about the products as possible, such as detailed technical specifications in case of electronics and size and colour information in case of apparel. The e-tail consumer today also has the option to cancel his purchase even after the product has been dispatched from the dispatch center.

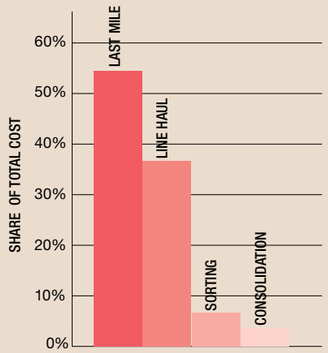
[3] *Media and Entertainment Report, FICCCI, 2016*

Figure 1: Supply Chain Operations of e-commerce companies



Source: Knight Frank Research

CHART 2: COST SHARE OF DIFFERENT ACTIVITIES IN E-COMMERCE LOGISTICS



Source: CLSA

Household consumption as a percentage of GDP in India is 79.8%, which is one of the highest in the world.

COST OF E-TAIL LOGISTICS

The cost of logistics for e-commerce retailers can be split into components of consolidation, line-haul, sorting (this comprises a major chunk of the fulfillment costs) and last-mile delivery. Return logistics is a relatively new factor that e-tailing companies have to contend with and its costs are estimated to be approximately twice those of regular delivery charges.

There are a myriad of factors that affect the logistics costs of an e-tailer. These costs vary by type and volume of delivery and the extent of technology used. Deliveries can be characterised into standard and special/slotted deliveries. Standard delivery costs are usually borne by the retailer but for special and slotted deliveries (such as one-day delivery, prime delivery) the cost is passed on to the buyer. In addition to this, there are expenses on tax and labour. Other related expenses such as misrouting, lost shipments and handling damages add up to the costs. While the expenses mentioned thus far depend on sales volumes, the e-tail logistics player also has to incur huge investments in terms of fixed costs such as warehouse development and fleet procurement.

E-TAIL LOGISTICS INDUSTRY PLAYERS

The e-tail logistics landscape is broadly made up of e-tailers who manage their own logistics arm and the new and established 3PL players who cater to the specific and extremely dynamic needs of the industry. Global e-tailers such as Amazon have their own end-to-end logistics services on a global scale, and it is no different in India where it is managed by Amazon Transport Services Pvt. Ltd. Other leading Indian e-tailers such as Flipkart, Snapdeal, Jabong and FirstCry have similarly adopted a captive asset-based logistics model and own their logistics arms, e.g. Ekart Logistics of Flipkart, Gojavas of Jabong and XpressBees of FirstCry.

Many logistics start-ups have entered into the market in the past few years offering E-commerce focused logistics solutions. Delhivery and Ecom Express are the prominent players in this segment. Even traditional 3PLs, like DHL, GATI, FedEx and Safexpress, have come up with their own E-commerce focused solutions.

INVESTMENT DRIVERS

Increasing consumption – India has the second largest population in the world growing at 1.2% per annum in 2016 with the per capita income growing at an average 7% during the last decade.[4] India's economic growth is predominantly consumption led and thus consumption growth in India (6.6% in Q1 FY18, Source: CMIE) is much higher than most economies in the world. Household consumption as a percentage of GDP in India is 79.8%, which is one of the highest in the world.[5] Indian consumers increasingly have more disposable incomes and thus, we have seen an increase in discretionary spending. Food and beverages, apparel, household goods and leisure goods are the fastest growing segments in India according to the Tata Capital report on India's consumption story. E-tail being a consumer-centric business naturally counts this massive and growing consumption base as its biggest demand driver. India being one of the major consumption economies in the world going forward an E-commerce boom is certainly on the cards.

Increasing share of younger/tech-savvy population – E-commerce websites survive on availability of Internet and the extent to which it is used in a given market. It has been observed that the younger demographic in countries across the globe have adopted the online world with much greater enthusiasm than the older section of the population. The new wave of population in India, which is much younger (more than one third of the population is less than the age of 30) and more tech-savvy than the previous generation, is similarly driving the online shopping business. This generation has very different shopping preferences than its predecessors and is adapting quickly to the constantly evolving online shopping world. The new India spends more time on the Internet due to accessibility through multiple devices and is sure to boost E-commerce activity in decades to come.

GST – Like most other industries, E-commerce is set to reap the benefits out of the change in the tax structure. E-commerce businesses are expected to consolidate their operations quicker and to a greater extent than other businesses. This will not only help reduce costs but will significantly have a positive impact on delivery timelines that are critical in the E-commerce industry. The benefits to the industry in the long term will override the initial hiccups that the industry will go through. Logistics players and captive logistics arms will undergo the inevitable consolidation and pave the way for incremental efficiencies in the E-commerce business' supply chain. Inter-state movement of goods in India in the pre-GST era was relatively expensive due to various tax and compliance issues. GST eliminates this problem, which will allow E-commerce logistics hubs to develop in more efficient locations and also in a consolidated manner. For example, most of the firms used to have warehouses in at least half of the states across India and closer to the consumption centers of Mumbai, Delhi, Bangalore and other major cities. But now they have an option to move their operations away from the metros, where the land is exceedingly expensive, and they can streamline their operations by being based either in a central location (such as Nagpur and Indore) or with lesser number of warehouses near the consumption centers itself.

Omni-channel retailing model – People do not only shop online or offline (in stores) anymore and want to keep their options open. The better-rounded product experience that a brick-and-mortar store offers is still a gap that the E-commerce websites are trying to fill. Therefore, integrating the channels of retailing is an important part of businesses today. Customers want their shopping experience to be seamless and thus creating an omni-channel retailing model is of importance globally. 3PLs and other LSPs have a critical role to play in creating the seamless experience for shoppers as brick-and-mortar stores are in the process of evolving into experience stores that provide a look and feel of the product while the actual transaction is executed online. E.g. Amazon has a venture with clothing chain Shopper's Stop to set up Amazon Experience Centers at the brand's stores, where people can try out products from the online retailer's catalogue.

Increasing exposure to imported products – E-commerce has opened up the world to options for the Indian

GREYORANGE – WAREHOUSE AUTOMATION

Supply chains in today's world are continually under pressure for higher performance and lower costs. Companies around the world are turning towards technology to improve operational efficiencies in their warehouses, fulfillment and distribution centers. GreyOrange offers a very simple line of automated machines, which reduce human efforts in warehousing and increase efficiency.

GreyOrange Butler: This is an artificial intelligence powered goods-to-person robotic technology for management of inventory and order fulfillment. It is known to reduce order fulfillment time, inventory replenishment time and increased throughput.

GreyOrange Linear Sorter: It is a robust storage system for order profiling, routing and consolidation. It comprises next-generation Internet-of-Things sensors, pneumatic arms and advanced software for profiling and sorting orders in warehouses.

[4] *Source: MOSPI*
[5] *World Bank Database*

consumer looking to buy international products. One no more needs to travel across countries to acquire a product available in some other part of the world. It is usually just a click away. The availability and growth of cross-border logistics enables people to buy products overseas and receive delivery at the ease of their homes.

MAJOR TRENDS IN E-TAIL LOGISTICS

The e-tail industry players have been the first movers in adapting to new trends in the logistics market. They have quickly adopted new technologies, optimised their supply chain network and encouraged state-of-the-art logistics infrastructure. Following are a few examples of trending supply chain practices in the e-tail industry.

ENHANCED USE OF TECHNOLOGY

The boom in the Indian E-commerce sector can be attributed largely to the enhanced use of technology, which has helped improve E-commerce in areas across the supply chain, inventory management, improved customer experience and minimising wastages. Whether it is integration of the E-commerce players' system with that of the 3PLs via an Application Programme Interface (API) or it is the use of card on delivery system, the E-commerce industry in India is using it to take their business forward. Technology is today an inextricable part of the supply chain and it will prove to be the critical differentiator that will dictate the pace of evolution of the e-tail logistics industry.

SHIFT TOWARDS OUTSOURCED FULFILLMENT MODELS

The Indian e-tail segment is growing and evolving at an ever-increasing pace. Initially, e-tailers were dealing with moderate product volumes, limited geographic reach, and hence managing operations in-house was relatively less complex. Higher costs and limited external capabilities of 3PLs earlier also drove several e-tailers to manage their fulfillment in-house. However, with an increase in the scale of business and the emergence of high-end logistics players in the E-commerce industry, the sector seems to be undergoing a modular shift toward contracting out a range of fulfillment processes including delivery. An emergence of tech-based logistics start-ups has also enabled the e-tailers to outsource to these 'high values–low cost' logistics models.

SELLER DRIVEN LOGISTICS

There is also a growing number of cases where vendors handle packing as well as dispatch. This programme is however available to sellers who have been associated with the marketplaces for a considerable time and have been consistent in terms of sales as well as customer feedback. This is also dependent on the geographical footprint of the seller. Such a model is useful when it does not make sense for the E-commerce player to pick up a product and transport it to the mother hub and then to the buyer. For example: a particular seller is not really far away from the point of delivery, but the e-tail fulfillment process at the mother hub lies totally out of the way and constitutes an unnecessary delay. At such times, the e-tailer asks the seller to drop off the product at the point of delivery.

REVERSE LOGISTICS

– Returns management is an increasingly important part of the e-tail business, specifically for E-commerce retailers perpetually endeavouring to bridge the 'Look & Feel' gap that a brick-and-mortar store provides. The companies have a return policy of 7 to 10 days and also 30 days in certain categories. 3PLs currently do not offer real-time updates on the status of reverse shipments. However, 3PLs are addressing this issue by having dedicated returns management centers that take care of quality checks, relabeling and handover of cargo for return to warehouses of sellers. Investment is expected to ramp up, e-tail players will employ technology for their reverse logistics chain, along with a dynamic and measured policy to tackle fraud and tampering during reverse logistics. Most E-commerce firms strive to provide a hassle-free returns' system. For example: The whole process on Amazon takes about 10–15 days including the refunds and the process is largely transparent and hassle free.

FASTER DELIVERY MODELS

There is an increasing trend of same-day and 1-day deliveries in the Indian E-commerce retail market for most product categories. Additionally, international as well as domestic retailers are offering deliveries not only within a day or two but also within specific time-slots, which are 90 minutes to two hours long, for an additional charge. This model has been particularly gaining popularity for grocery products. Amazon Prime and Flipkart Assured are the most common examples of the faster delivery practice in the industry.

RECENT INVESTMENTS IN EMERGING LOCATIONS

E-commerce retail is flourishing in the urban and semi-urban cities and a huge portion (according to Flipkart, 60% of its customer base comes from non-metro cities) of the traffic on e-tail websites is coming from the tier 2 and tier 3 cities. The growth of logistics arms of e-tailers and expansion of 3PLs into E-commerce has led to a wider footprint of e-tail networks in India. As compared to the 8 tier 1 cities in India, there are as many as 3,133 tier 2 and 3 cities and more than 1,233 rural hubs. One third of India's 1.2 billion population lives within tier 1–3 cities, while only 8% of these reside in tier 1 cities. This implies that an e-tailer cannot ignore the combined volume of the more than 4,500 cities and hubs that make up the rest of India. (Source: Media reports)

With metro city markets hitting a saturation point, most E-commerce retailers believe that tier 2 and 3 cities are going to be the principal growth drivers of e-tail businesses in India. The demographic dividend is fundamentally aspirational in these cities but the reach of the retail industry is limited to the metros. Thus established players as well as the new entrants in the e-tail industry are committed towards building a well-entrenched and robust supply chain network to provide to the non-metro cities.

CHALLENGES TO E-TAIL LOGISTICS

India is arguably the most promising consumption market in the world today but reaching all of these potential consumers is its gravest challenge. Last-mile connectivity to the tier 2 and 3 cities has been a virtual roadblock in an infrastructure-starved nation such as India. Despite that, we have seen unprecedented growth in E-commerce retail over the last 5 years. This is primarily due to the resourcefulness and adaptability of the Indian logistics industry. Following are the major challenges that E-commerce logistics players need to contend with:

- **Uncertainty of demand** – Demand estimation is a perennial issue for the e-tailer and by extension, to his logistics provider. Demand is a function of several variables and this makes predicting demand a very challenging task. A massive and diverse customer base, seasonal changing patterns, paucity of historical data for new products and markets, disruption in social and behavioural norms, shifting buying criteria of customers and disruptions in demand patterns from competitors make estimating demand a very difficult task. E-tail is all about getting the right product at the right time at the right place and this uncertainty results in an invariable increase in logistics costs and delivery timelines.
- **GST compliance –** While GST will eventually streamline the supply chain by simplifying the erstwhile draconian tax regime, it does demand compliance from all businesses, which will cause teething issues in the short term. Most E-commerce companies are worried that there will be a shortage of inventory available, as suppliers are yet to get GST compliant and till such time, E-commerce firms will have to rely on inventory in their own warehouses and incur extra logistics cost for movement of goods to different demand clusters in the country.
- **Returns management –** Providing customers with seamless returns is a costly affair. It requires a logistics chain, which includes collection of products from the customer and returning it to the seller. However, processes handling reverse logistics are yet to be streamlined and the incessantly increasing volumes are perpetually increasingly logistics cost pressures to the already bleeding E-commerce player.
- **Infrastructure bottlenecks –** While the e-tail model can reach the Indian customer in the vast peripheries of the country and get him acquainted with the available products, actually delivering the product to him is quite another question. Inadequate transport infrastructure is one of the major reasons for high logistics costs in India. Connectivity beyond the metro cities in India is very limited,

INDIA POST – REACHING THE UNTAPPED MARKETS

India Post connects the farthest Indian villages to the rest of the country and in terms of reach it has the largest footprint in the world. In this dying era of letters, the Indian government's postal services have started a logistics arm providing B2B services like distribution, warehousing and return logistics to a wide array of businesses including the E-commerce industry. The logistics services for a 10x10x10 inch package weighing about 10 kilos would charge no more than INR 100 and a transit time of 5–7 days in case of regular post and 4 days in case of speed posts, according to the online India Post portal. The unparalleled reach of the colonial-era postal service, makes reaching the tier II and III cities much easier for businesses, especially in the E-commerce segment.

TABLE 1: INVESTMENT PLANS IN EMERGING LOCATIONS

COMPANY	NEW LOGISTICS CENTERS	INVESTMENT (IN $ MILLIONS)	TYPE OF CITIES
Infibeam	75	5.8	NA
Flipkart	100	500	Tier 2 cities
Amazon	7	110	Tier 2 and 3 cities
Snapdeal (Vulcan)	80	23.8	80 cities across India
Connect India	NA	5	Under-served regions

Source: Knight Frank Research
Note: Announcements made since June 2016

which puts significant limitations on the delivery capabilities of logistics services providers (LSPs).

KEY TAKEAWAYS FOR E-COMMERCE LOGISTICS

The E-commerce industry has always been the frontrunner in adapting new trends in logistics. This is because an efficient logistics system is the industry's lifeblood and critical to the survival and growth of the E-commerce player. This rule is applicable to most industries but the sheer criticality of logistics to the E-commerce industry makes the magnitude of impact much higher. Thus, we see E-commerce firms having state-of-the-art warehouses, using the most modern trucks and boasting an efficient supply chain overall. E-commerce, as an industry, has added a lot of value to logistics and has had a lasting impact on the industry and vice-a-versa.

The utility of the logistics and warehousing industry has changed. Where warehouses were just storage units, the E-commerce industry has catalysed their evolution in to effective light manufacturing units. Similarly, the role of logistics has also transformed, as businesses have realised that if logistics can bring the goods to a store near the consumption centers, then it can be used to reach the customer's home as well.

With the ever increasing demands on reach and service levels, LSPs need to progress to offer a set of services, as well as constantly evolve and upgrade to keep up with the swiftly altering dynamics of the e-tail segment. Currently, an estimated half of E-commerce shipments are meant for cities/towns outside the metropolis; with dedicated efforts being undertaken to increase customers as well as suppliers from these cities. The segment is bound to see increased presence in tier 1 and tier 2 cities going ahead, as these represent the next growth frontier for e-tailing.

The e-tail sector is also observing new types of services, such as time slot specific deliveries, same-day deliveries and even midnight deliveries, to increase consumer base. This will add more obligations on 3PLs and hence, they need to step-up their competencies to provide customers an enhanced experience. E-commerce logistics service providers need to keep pace with the changing needs of the business, by launching value added services to match growing customer expectations or expanding reach into the semi-urban/rural areas to enable new customer acquisition. The pace at which the logistics services industry adapts and innovates is bound to dictate the growth of the E-commerce sector as well.

The emerging trend of outsourcing E-commerce retail fulfillment centers to logistics providers will depend on a product-to-product basis. The scale of operations will play a pivotal role in maintaining cost efficiency, and at the same time it will address delivery-related challenges for E-commerce retailers. Henceforth, logistics providers need to expand strategically and functionally to capture opportunities emerging out of the ever evolving E-commerce landscape.

2013: ENTRY OF A DISRUPTOR IN THE E-TAIL SEGMENT

Global online retailer Amazon's entry in India since 2013 not only started stiff competition with domestic e-tailers for capturing larger market share of the evolving e-commerce pie, but also put the spotlight on the quality of available warehouses and storage facilities. Though absence of entry barriers made it easier for Amazon to foray into India, it was immediately faced with the humongous task of setting up e-tail logistics in a new territory that still boasted of yesteryear godowns. India is Amazon's fastest growing market outside the US, which required an end-to-end supply chain. Noticing a wide gap in the type of fulfilment centres envisaged for its India operations and the available properties, Amazon started investing in building capacity through warehousing and logistics operations. Size, scalability and technology brought in by Amazon translated into setting up of large-sized warehouses across different cities. From 5 million cubic feet in 2015, the total available space in Amazon warehouses has now more than doubled up to 13.5 million cubic feet.

AMAZON – DIFFERENTIATION THROUGH INTELLIGENT LOGISTICS

Amazon has a logistics footprint of over 2100 urban centers being served by 56 fulfillment centers. 15 of these Fullfillment Centres will have temperature-controlled zones, a first for Amazon in India, to store and deliver perishable products such as fruits and vegetables, dairy products, and frozen products. Logistics is the backbone and a key unique selling point for Amazon, which differentiates it from its competitors in the e-commerce industry.

The Indian market is the second largest network of Fulfillment Centers and Delivery Hubs that Amazon has created. It has a centralised shipping platform, which it calls Fulfillment by Amazon to store and distribute the products it sells. The company localised this platform by introducing Easy Ship (in this model Amazon picks up packaged goods from a seller's place of business and delivers it to consumers) and Seller Flex (here the vendor designates a section of their own warehouse for products to be sold on amazon.in and amazon coordinates the delivery logistics). Amazon Prime, best described, is a faster delivery option in addition to the Amazon Fulfilled guarantee.

Amazon has set-up a model, where Fulfillment Centers are located near major consumption hubs like Bhiwandi and Padgha near Mumbai, Kacharakanahalli and HSR Layout in Bangalore and Mahboobnagar and Gachibowli near Hyderabad. It has also located its delivery stations next to tier 2 cities like Kochi and Thiruvananthapuram. This allows them to cut the delivery time to one day for products available at the warehouses. In addition to its own logistics arm, Amazon also contracts delivery services to India Post and contract logistics players such as Blue Dart usually for tier 2 and tier 3 cities.

(Source: https://economictimes.indiatimes.com/small-biz/startups/newsbuzz/amazon-opens-15-warehouses-for-amazonnow-in-4-cities/articleshow/63085020.cms and other media reports)

WAREHOUSING IN E-COMMERCE

E-TAILER DEMAND TO SHAPE QUALITY WAREHOUSING DEVELOPMENTS

The Indian e-tail segment is expected to continue its upward growth momentum as internet and smartphone penetration increases in India. India's total internet user base is set to increase to 59% of the total population (or 829 million) by 2021 and network devices are expected to increase to 2 billion by 2021. As the e-tail segment will mature, it provides apt opportunities for developers to focus dedicatedly on building quality warehousing stock to attract e-tailer occupiers as well as e-commerce-focused logistics companies.

The smart warehousing model of developed markets, popularly referred to as the "Amazon Effect", has had a major impact on shaping up the warehousing real estate landscape in India and will continue to influence demand expectations of other competitors and new entrants. Amazon has brought international standards of warehousing demand to India and has helped identify certain specifications that developers should use as a thumb rule to target e-tailers as a target segment. With e-tailers prepared to open their war chests for supply chain optimisation, well lit, spacious, modern warehouses should increase space uptake. Top real estate developers have already started paying attention to e-tail occupier expectations in terms of specifications.

KEY TAKEAWAYS FOR WAREHOUSE DEVELOPERS

In our second report in the series of warehousing sector research – India Warehousing Market Report 2016, we had identified how the e-tail segment will lead in terms of growth for warehousing space at an annual growth rate of 19% across the 7 key Indian cities#. From 14 million sq ft in 2016, the total warehousing requirement will increase almost two-fold to 29 million sq ft in 2020. To capitalise on this growth in demand, we suggest developers adopt the following best practices and gradually shift from unorganised to organised developments.

STANDARDISE WAREHOUSE DEVELOPMENT ASPECTS –

As e-tailers continue to push the envelope to reduce the click to delivery time lag, 4 hour deliveries are soon expected to surpass 1 day delivery timelines. To fulfil the orders faster, international best practices such as Flow, Accessibility, Space and Throughput (FAST) should be adopted for warehouse design to build better quality assets with superior support infrastructure. Since e-tail occupiers prefer vertical storage density, warehouses with a higher clear height of 40–50 feet can be considered future proof as building structure is a long-term investment and cannot be changed later. Refining building dimensions as per grading should go a long way in attracting e-tail occupier demand going forward.

INVEST IN LARGE CONTIGUOUS TRACTS OF LAND –

Constructing warehouses requires land parcels of 20–25 acres as Fulfilment Centres are huge facilities with ground coverage of 50–52% ranging between 100,000–500,000 sq ft in size. With ever expanding requirements, as volume play reaches new heights and the frequency of online shopping festivals increases, unlike other traditional sectors, where a post-GST scenario may prompt consolidation to a few locations equidistant from a group of consumption hubs, the e-tail segment may not witness imminent consolidation due to their business need to maintain footprint closer to both consumers and sellers alike. Due to land aggregation challenges encountered by some foreign players for legally compliant warehouses, a long-term land acquisition strategy will prepare landlords and developers to cater to forthcoming warehousing demand due to the e-retail boom. Going forward, we expect e-tailers to scale up operations as competitive rivalry heats up. Investing in large contiguous land parcels will help developers plan for long-term supply of warehouses. Developers should also focus on joint developments with landlords or joint ventures to share development risk.

OFFER FLEXIBLE PRICING ARRANGEMENTS –

The developer community should also provide e-tail tenants flexibility in rental arrangements. Some pricing arrangements, such as below, can be adopted.

a) Pay-as-use option wherein the e-tailer can pay for the actual space utilised and pallet space usage

b) Aggregate Model wherein value added services, such as pick and pack, are provided and rents are derived on the basis of a % of product prices or actual revenue.

WAREHOUSE FACILITIES MANAGEMENT –

Unlike old warehouses where tenants had to invest in leasehold improvements, developers should focus on Warehouse Facilities Management. A much ignored field in the godown era, quality warehouses require expertise on behalf of developers to manage the support infrastructure created while tenants focus on their operations. The developer community should adopt an Own and Manage model for retention of tenants for the long term as e-tailers are placing big bets on expanding fulfilment capacity through warehousing and demand large facilities with integrated systems. Well planned warehouses with clearly defined common area maintenance scope such as offering ancillary infrastructure, access control, traffic management, parking management for idle trucks, external and internal maintenance, internal repair, reserved truck parking bays, etc. can help them build long-term relationships with tenants.

Blurred state boundaries and growth in the e-tail segment has begot the Indian warehousing sector at an inflection point. E-tail warehousing requirements are not only expanding the market in terms of space and service standards but also helping the largely fragmented Indian warehousing domain evolve from a nascent stage into a mature market through high quality specification, international best practices and rising awareness about recent tax reforms such as GST.

India Warehousing Market Report 2016, Knight Frank Research
(Mumbai, National Capital Region (NCR), Bengaluru, Chennai, Pune, Hyderabad and Ahmedabad)

AUTOMOBILE LOGISTICS

MERCEDES-BENZ INDIA

"For every luxury car sold in India, 57 luxury cars get sold in China. Globally, this is perceived as India having tremendous potential for growth in the luxury car segment. But whether this growth comes to fruition is completely dependent on government policies - how does government tax the luxury car segment or the luxury goods in general. Attitude of the Indian government and taxation policies are major factors."

ROLAND FOLGER
Managing Director & CEO, Mercedes-Benz India

Mercedes-Benz India is a wholly owned subsidiary of Daimler AG. Mercedes-Benz India is the pioneer of the luxury car market in India. The company, one of the early entrants in the Indian luxury car segment, entered India in 1994. It is headquartered in Chakan, Pune, Maharashtra.

Mercedes-Benz was the largest luxury car manufacturer in India in 2017 selling 15,330 units. MB India has in recent years gained supremacy over competition; leading the luxury car market with substantial margin and having a market share of 40% in the luxury car segment. The company achieved this feat by revamping its existing product portfolio, strengthening its network penetration, sprucing up its after-sales services and making finance easily accessible.

1.0. THE FACILITY

Mercedes-Benz India had opened this Indian headquarters and the assembly plant at Chakan near Pune on 24 February 2009; 15 years after it initially started assembling cars in India at a nearby facility leased from Tata Motors. Chakan, for a number of years, has been one of the major auto manufacturing hubs in India, with some of the major auto companies present here along with their ancillaries. It has very good connectivity with the rest of India and to Mumbai via the Mumbai–Pune Expressway. The proximity of Chakan to some of the major markets (like Mumbai, Ahmedabad, Aurangabad, Pune, Bengaluru, Surat, Ahmedabad, etc.) and to the ports, made Chakan one of the ideal locations for Mercedes-Benz to set-up its plant.

The current facility is spread across 100 acres and internally divided into 4 quadrants. The 4th quadrant is meant for future expansion.

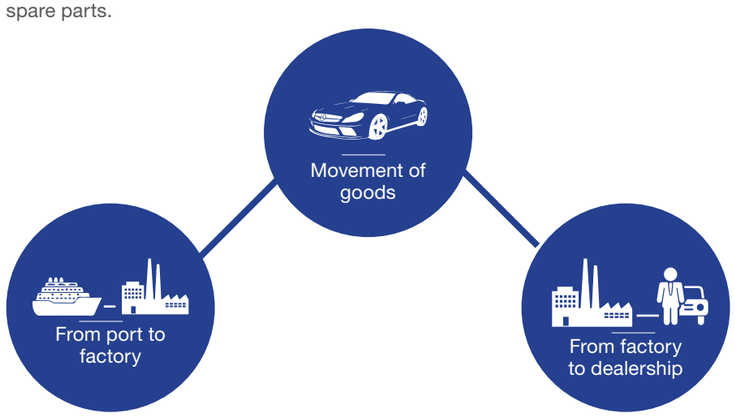
The overall MB India plant includes:

- 3 Production halls
- Warehouse and Parking building (WHP) : which includes their warehouse to store the cars and spare parts, a training academy and car modification centre
- Administrative buildings

The company locally manufacture around 90% of the cars it sells in India at this facility, known in auto parlance as Completely Knocked Down (CKD) units. Rest of the cars are imported as Completely Built Units (CBUs). Tax incentives encourage automobile companies to assemble their cars in India rather than importing them as CBUs. However, the facility has been designed keeping in mind future expansion needs.

2.0. MOVEMENT OF GOODS

The company's current supply chain caters to transportation of cars and spare parts.



2.1. FROM PORT TO FACTORY

There are 3 types of goods that are transported from the port to the factory—kits for Completely Knocked Down (CKD) units, Completely Built Units (CBUs) and the spare parts.

Mercedes- Benz locally manufactures approximately 90% of the cars it sells in India at its Pune plant.

Periodic inspection of vehicles at VPC

2.1.1. FOR COMPLETELY KNOCKED DOWN (CKD) UNITS

Mercedes-Benz locally manufactures approximately 90% of the cars it sells in India at its Pune plant. The components used for assembly are imported from factories across the globe and assembled here.

2.1.2. FOR COMPLETELY BUILT UNITS (CBUs)

For Completely Built Units or CBUs, the cars are manufactured in factories abroad and imported as a final product into the country.

The CBUs are transported from the port to the factory in specialised car carriers, since any damage can lead to huge losses. These cars are stored in the company's parking building in its Pune plant and then transferred to the dealership. Some amount of local modification can be done at the Pune plant for these models depending on customer requirements. The company also maintains a similar amount of inventory for its CBUs as it does for it CKD units. The company observes that generally such high value cars are purchased for some special occasions and in such cases the delivery date is of utmost importance. Moreover, there can also be a case where a specific model/colour may not be available in the inventory maintained at the plant's warehouse. In such cases, the company has to import the car on a priority basis, crash the logistics lead-time by paying premium freight charges

2.1.3 FOR SPARE PARTS

Mercedes-Benz India sources its spare parts used for after-sales service via imports. The company sources its spares from the global warehouse located in Singapore. The spares are shipped from Singapore to India and transferred from the ports to the major warehouse located at the plant. The spares are stored at this warehouse. The sorting of spares is done at the warehouse while stocking. The spares are then transferred to the dealership as per orders.

2.2. FROM FACTORY TO DEALERSHIPS

The movement of goods from the factory to dealerships happens in trailers and smaller trucks. The cars are transported in special car carriers while the spare parts are transported in smaller trucks.

2.2.1. FOR CKD UNITS AND CBUs

The cars are transported to dealerships in 6 car carriers. High value cars are transferred in single car trailers. Post assembly of CKD units and transfer of CBUs from the port to the plant; the cars are handed over to a special facility called Vehicle Preparation Centre (VPC). The company follows a 2-stage VPC model, one at the plant and other at the dealerships.

At VPCs, periodic checks are performed on the inventory.

2.2.2. FOR SPARE PARTS

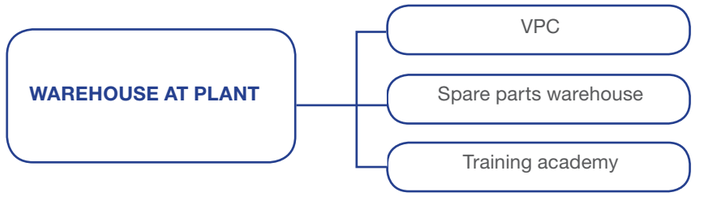
Every dealership needs to have a service centre, as per company policy. Some dealerships have more than 1 service centre. The service centres must have storage facilities to store the spares shipped from the plant within the same premises. Since the volume of cars sold is low, it does not make sense for Mercedes-Benz to have regional warehouses for storing and distribution of spare parts. Hence, only 1 major warehouse is required for storing of spare parts; which is located at the Pune plant.

The spare parts logistics is outsourced. Parts are dispatched through highly professional organizations by air mode, multimode, dedicated small trucks and also combination of small and heavy trucks via interconnected hubs of the service providers.

3.0. WAREHOUSING

The company has a huge warehouse of 16,500 square meters at its Pune plant. In addition to this, the dealers are required to have warehouses to keep inventory of finished cars and service centres need to have storage facilities at their locations for storing spares.

3.1. WAREHOUSE AT THE PLANT



It is a one-of-a-kind facility located inside a multi-purpose building. The building design was conceptualised in such a way that the same building houses the 'Mercedes-Benz Academy' for training retail employees, the'Vehicle Preparation Centre', parking facility for over 5,700 cars,an operations office and the 'Mercedes-Benz Parts Warehouse' for spare parts.

Mercedes-Benz India has a state-of-the-art warehouse in its plant, which is a perfect example of how modern day warehouses have evolved. Not just the warehouse, even the warehouse management's operations are optimised using the latest available technologies in order to reduce the cycle time of operations. This modern warehouse coupled with the efficient operations is aiding the supply chain networks to: ensure efficiency, lower turnaround time and ultimately improving customer satisfaction. The warehouse follows some of the best practices followed by Mercedes-Benz globally and in some areas it supersedes its global counterparts. Since this facility was built recently, the company was able to implement the latest warehousing solutions.

The warehouse uses many aspects of modern warehouse management technology to ensure efficiency in operations and reach their goals of zero

Multi-purpose building – Warehouse, training academy and VPC

defects. The overall automation in the warehouse is limited as manpower costs and volumes in India are low. Globally, Mercedes-Benz warehouses have a greater degree of automation.

3.1.1. VEHICLE PREPARATION CENTRE (VPC)

The VPC has the capacity to store over 5,700 cars at its full capacity. The cars are parked in 5 levels using a modern parking system. There is one entire floor reserved for parking CBUs. As soon as the cars arrive from assembly or the CBU arrives from the ports to the plant, each car is allotted a VPC card, which contains the unique parking code that signifies the location of the parking slot reserved for that particular vehicle. The vehicle is then driven through a tunnel into the building to the respective floor and then parked at the reserved parking slot. The tunnel has been constructed to enter the building instead of a direct entry from ground so that the vehicle does not get damaged due to on-ground movement of other vehicles and trailers within the premises. Despite the probability of such an event happening being low, Mercedes Benz does not want to leave it to chance and hence it built the tunnel.

The parking lot of the facility is connected via Internet of Things and it gives live status of the vehicle parked in that slot. The building has an office on the mezzanine floor where the staff can monitor the status of the vehicle on a real-time basis. Even if a vehicle has been taken out for testing, the status of the parking slot is updated with the latest information, i.e. slot occupied but vehicle taken for maintenance. The maintenance/inspection records are also available to the office staff.

Such smart parking solutions are being tested and implemented on an experimental basis in some of the parking lots in developed countries. The parking lot at the VPC has sprinklers, firefighting equipment and automatic motion detection LED lights that reduce the energy usage of the plant.

Since every Mercedes-Benz car has a unique key coming from Germany, the keys are of utmost importance and need to be stored in a safe location to prevent any loss or damage. The VPC has unique key storing machines, which have the capacity to store 500 keys each. The machines operate like a vending machine consisting of safes/lockers. All that the user has to do is enter the VPC code for that car on the machine, the respective allotted locker comes out, and the user may keep or take out the key of that particular car.

The VPC also houses – a storage facility for loose parts, paint booth, paint repair station, car modification centre and underground exhaust extraction system. The workshop consists of 9 productive bays comprising 5 scissor lifts and 4 two-post lifts and a facility to lift guard vehicles.

The logistics are outsourced to third party vendors.

Once the vehicle is ordered by the dealer, the vehicle goes from VPC to the automated car wash centre with automated conveyor belts to remove human intervention. Post wash, the vehicle is transferred to an inspection pit for final inspection. Post inspection, the vehicles are loaded onto the carriers. Mercedes uses 6 car carriers for transportation of its cars. In case of high value cars like AMG and Maybach, single car carriers are used.

The parking lot of the facility is connected via Internet of Things and it gives live status of the vehicle parked in that slot. The building has an office on the mezzanine floor where the staff can monitor the status of the vehicle on a real-time basis.

The carriers then carry the cars to the respective locations. Mercedes has outsourced the transportation operations to third party logistics players. The compliance requirement for Mercedes-Benz is very stringent; hence, it has partnered with only reputed transporters with compliant car carriers.

3.1.2. MERCEDES-BENZ PARTS WAREHOUSE

Mercedes-Benz India has built a modern warehouse in the building for storing spares, where they have adopted the latest available technologies for improving labour productivity and for efficient warehousing operations. The spare parts warehouse is built only to cater to the after-sales service requirements. During assembly of cars, the components are sourced from local vendors; but in case of spares for after-sales service, almost all the components are imported. The company imports almost 99% of the spares used for its after-sales service from its regional logistics hub (RLC) Singapore, and stores them at this warehouse.

Prior to the current facility, the company was using a smaller 4,500 square metre facility for storing spares. The current spare parts warehouse is spread over 16,500 square metres and it can accommodate 44,000 stock keeping units (SKUs). The warehouse has been built to cater to future demand.

The current size of operations in India and the cost of manpower in India do not make it feasible to implement full scale automation at this warehouse. The entire demand for spares from all of its after-sales service centres in the country is stored here. The company doesn't find it economical to have regional warehouses for storing spares unlike mass auto manufacturers. This facility's spare parts facility caters to 56 service centres located all over India.

The warehouse has in all 10 gates, 6 in-bound docks and 10 out-bound docks. The spares generally arrive in the morning and the dispatch to dealers happens in the evening. The goods are initially sorted into larger components and smaller components. The warehouse has multi-storey warehousing structures for storing smaller spares. Out of the G+2 levels of the multi-storey building, currently only the ground and 1st level are used for operations. There are 2 small lifts on the side to transfer goods from ground level to higher level. If the quantity of goods to be lifted is small, then they can be lifted using forklifts as well, which consumes lesser energy compared to lifts.

The larger components are stored in the traditional warehouse racks using forklifts. The entire warehouse has sprinklers on the roof as well as in-rack sprinklers along with Very Early Smoke Detection Apparatus (VESDA). There are air-handling units (AHU) for circulation of air within the warehouse as well as keeping the temperature inside lower. Mercedes-Benz intends to reduce the energy consumption in the warehouse; hence, the warehouse has been fitted with motion sensors enabled LED lights to reduce wastage of electricity. The company uses modern electric-operated forklifts like the Modern Material Handling Equipment (MHE), High Level Order Picker (HLOP), Low Level Order Picker (LLOP) and Reach Trucks (RT). These forklifts require much less space for movement between the racks. The company did not want the environment within the warehouse to deteriorate with fuel emissions hence electric forklifts were used. The tiles at the charging stations of these forklifts are specially designed to prevent any acid/alkalis from the batteries from seeping into the ground in case of leakages in the charging units.

Multi-storied warehousing used for storing smaller spare parts

The dealer gets live update of the inventory status of the 44,000 SKUs at the warehouse on his portal along with its price

Modern electric operated forklift are used which require lesser space to maneuver between racks

The entire warehouse is Wi-Fi enabled. Every employee is given a handheld device that is connected through the Wi-Fi network to the main warehouse management software. The handheld device consists of a barcode scanner that is designed in such a way that both the arms can be used for moving the goods while simultaneously scanning the barcode.

Employee using the handheld device which consists of a barcode scanner for updating the status of the spare part into the main system

Goods are brought from the docks to the plant and unloaded at the in-bound bays and sent for inspection. Post inspection, the goods are sorted by employees and scanned using the barcode scanner. The device first makes a record of incoming inventory into the system and the software indicates the exact location in the warehouse where that particular component needs to be stored. The employee is supposed to place the component in the respective rack and update the status on his handheld device. This device updates the inventory count in the main software. The software keeps a tab on the entire count of inventory in the warehouse along with its exact location. This warehouse software is synced with the dealers' spare parts ordering portal. The dealer gets live update of the inventory status of the 44,000 SKUs at the warehouse on his portal along with its price. The dealer can place the order for a particular spare part and he gets live updates of the status of the movement of the spare parts. Once the dealer places the order, the employee gets an alert on the device along with the location of the part in the warehouse; he/she then goes and picks the spare part, packs it, sticks the Maximum Retail Price (MRP) and updates the status on the system through the handheld device. The system prepares the invoice. Towards the second half of the day, the orders are sorted by employees and placed at their respective dispatch gates from where they are loaded on to the trucks. The entire warehousing operations are outsourced to 3rd party logistics partners. System, technology and supervision activities are still handled by Mercedes-Benz employees.

The warehouse also has a cold storage or temperature-controlled storage area. This is designed specially to store adhesives and sealants that need to be stored at a particular temperature. These products are generally delivered to the dealers within 1 day.

The company uses a mixture of road and air for transportation of it goods, 80% of the goods are transported by road and 20% by air.

3.2. WAREHOUSE AT THE DEALERSHIPS

3.2.1. FOR CARS

The mass manufacturers generally store their cars at open empty plots. However, for Mercedes-Benz, the safety of their cars is of utmost importance. Since each car caters to the premium segment, the customers' expectation of quality of product is high. The dealers need to have a specially designed warehouse for storing cars. The facility needs to have a proper enclosed structure with a roof or ceiling, floorings, pest control measures, security deployment, an accessories-fitting centre and dealer-level VPCs. The vehicles are tested on a periodic basis to check the functioning of primarily the battery along with other components at the VPC.

As per company norms, the dealer should have his warehouse closer to his dealership outlets. The company does not intend its vehicle to be driven several kilometres before handing over to the customer. Mercedes-Benz requires cars to be transported in flatbed trailers, if the distance between the dealership outlet and dealer's warehouse is more than 3 kms., which adds to the cost. Hence, dealers prefer to have a warehouse within city limits rather than keeping a warehouse away from the city where land cost is low and having to employ trailers for movement.

The company uses a mixture of road and air for transportation of it goods, 80% of the goods are transported by road and 20% by air.

3.2.2. FOR SPARES

As per company requirements, the service centres need to have storage facilities in the same premises for storing of spares instead of a warehouse located at outskirts of the city. The company does not encourage dealers to expand capacity at their service centres beyond a particular limit by employing automation. Instead, it encourages dealers to open additional service centres in neighbouring locations to cater to the demand.

The sealants and adhesives are also stored in temperature-controlled set-ups at the service centres.

Total warehousing space requirements

	At Plant	At Dealership
For storing cars	1,20,000 Sq.mt.	13.75 sq. mt./car. Total based on sales volume planning
For VPCs		
For spares	16,500 Sq.mt.	20 sq. mt./bay. Total depends on size of the workshop

Source: Mercedes-Benz India

Image Source: 123rf.com

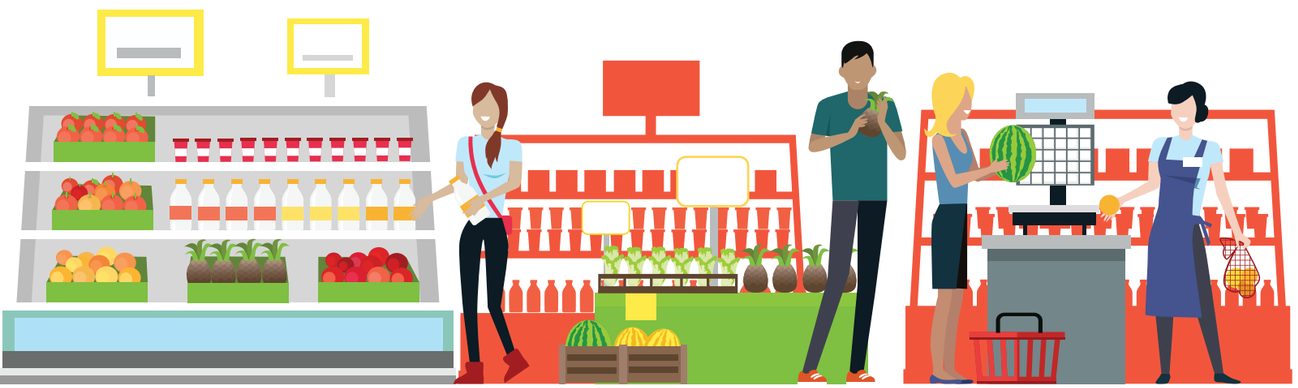
4.0 POST-GST SCENARIO

The company currently does not envisage any major change in its operations post GST. They are of the opinion that it would take atleast 3 years to realize benefits from GST. However, some short-term benefits have started coming in. The time required for transportation of goods has come down due to the elimination of border check posts. The goods are moving faster and it has marginally reduced the logistics costs. Earlier, in the pre GST era, transfer of cars from the dealership of state X to the dealership of State Y was unfeasible because of the tax incidence, Post GST, this is possible (excluding transfer from or to Maharashtra).

Currently Mercedes-Benz does not have a regional warehouse to store its spare parts, unlike mass manufacturers. Post GST, the company believes that the case of having a regional warehouse for spares is further weakened, since tax advantages are eliminated and logistics time have come down.

Knight frank believes that post GST there will not be any shift in manufacturing clusters for auto manufactures and auto ancillaries. Auto manufacturers prefer putting up plants as close as possible to demand centres, wherever they can get land at low rates. For auto ancillaries, post GST due to availability of nation-wide input tax credit, there was a case to have a single large plant that is located at the central location; this will achieve large scale saving through economies of scale and have individual warehouses at each cluster for storing inventory to cater to that cluster's demand. But Mercedes believes that such a move may not happen since most of the auto ancillaries enter into agreements by negotiating a price and working backwards while setting their plant; hence, it makes sense for them to remain as close to manufacturers as possible.

FAST MOVING CONSUMER GOODS (FMCG) INDUSTRY



MARKET SCENARIO

The FMCG sector in India is among the largest contributors to the economy and can be broadly classified into Personal Care, Household care, Food & Beverages and Others, with household care and personal care products accounting for 50% of FMCG sales in India. Increasing awareness, greater visibility and new-age consumer habits are the major demand drivers for the sector. The urban market, which accounts for a market share of approximately 60%, is the foremost contributor to the overall revenue generated by the FMCG sector in India. In 2016–17, the urban market size on the basis of revenue was approximately US$ 30 billion and is estimated to grow at a healthy 9–9.5% annually. The rural market that houses a much larger population currently compared to its urban counterpart constitutes a lower US$ 20 billion market as its growth has been severely constrained by last mile connectivity issues. However, rapid transport infrastructure development and greater internet penetration in recent years have caused the rural market for FMCG products to grow at a faster pace in comparison with urban markets.[1]

The major players in the Indian FMCG industry are ITC, HUL, Patanjali, Marico, Procter & Gamble and Godrej. Other players include Amul, Nestle, Britannia, Dabur, Himalaya and CavinKare. The industry is visibly dominated by conglomerates with a substantial personal care and household product range, but at the same time food processing has picked up pace and is on the course of becoming a major driver of growth. Even the recent growth in online retail has been a boon to the FMCG industry as online marketplaces such as Grofers, Amazon and Big Basket have greatly enhanced the organised industry's reach and visibility.

The Indian consumption patterns are slowly evolving as the demand for packaged products gradually increases. Urban Indians have increasingly started shopping at super markets instead of the traditional (Kirana) stores. This, coupled with the large size of the market and high consumption growth has attracted global MNCs to set up manufacturing facilities for packaged products in India. Given that Indian per capita consumption is lower than that in most markets and that the potential for long-term demand and growth are significant in this emerging market that has a population of over 1.3 billion people, the FMCG market presents a vast opportunity for MNCs, whose growth in the developed markets has stagnated.

INDUSTRY OPERATIONS

FMCG products cater to the daily needs of the masses and characteristically entail high volumes and low margins. Their distribution channels are broad and complex, hence, the scope and role of supply chain is a critical factor in an FMCG company's profitability. Supply management has evolved through various phases in the FMCG industry starting from traditional store keeping, purchasing, materials management and integrated materials management to supply chain management.

The scale and complexity of the market makes it necessary for firms to take a differentiated approach while applying supply chain strategies in the Indian scenario. Some companies such as Hindustan Unilever Ltd are primarily marketing companies that largely outsource manufacturing and distribution activities, whereas companies such as Marico, P&G and Pidilite mostly own the manufacturing and marketing operations but outsource their logistics activities. There are also players such as Patanjali in the market that largely control the complete supply chain of their products including retail. Logistics operations, in the FMCG industry, are usually operated on the hub-and-spoke model where distribution hubs in major cities and towns serve the wholesalers and retailers. Though most FMCG products are available at multi-brand retail stores, some FMCG companies have set up single brand retail shops such as Raymond, Haldiram and The Body Shop. Most of the FMCG companies and retailers are pursuing the option of pushing sales through online channels, more commonly known as e-commerce websites. Even e-commerce websites can be broken down into multi-brand platforms such as Myntra or Jabong and single brand retail channels that only sell the company's product.

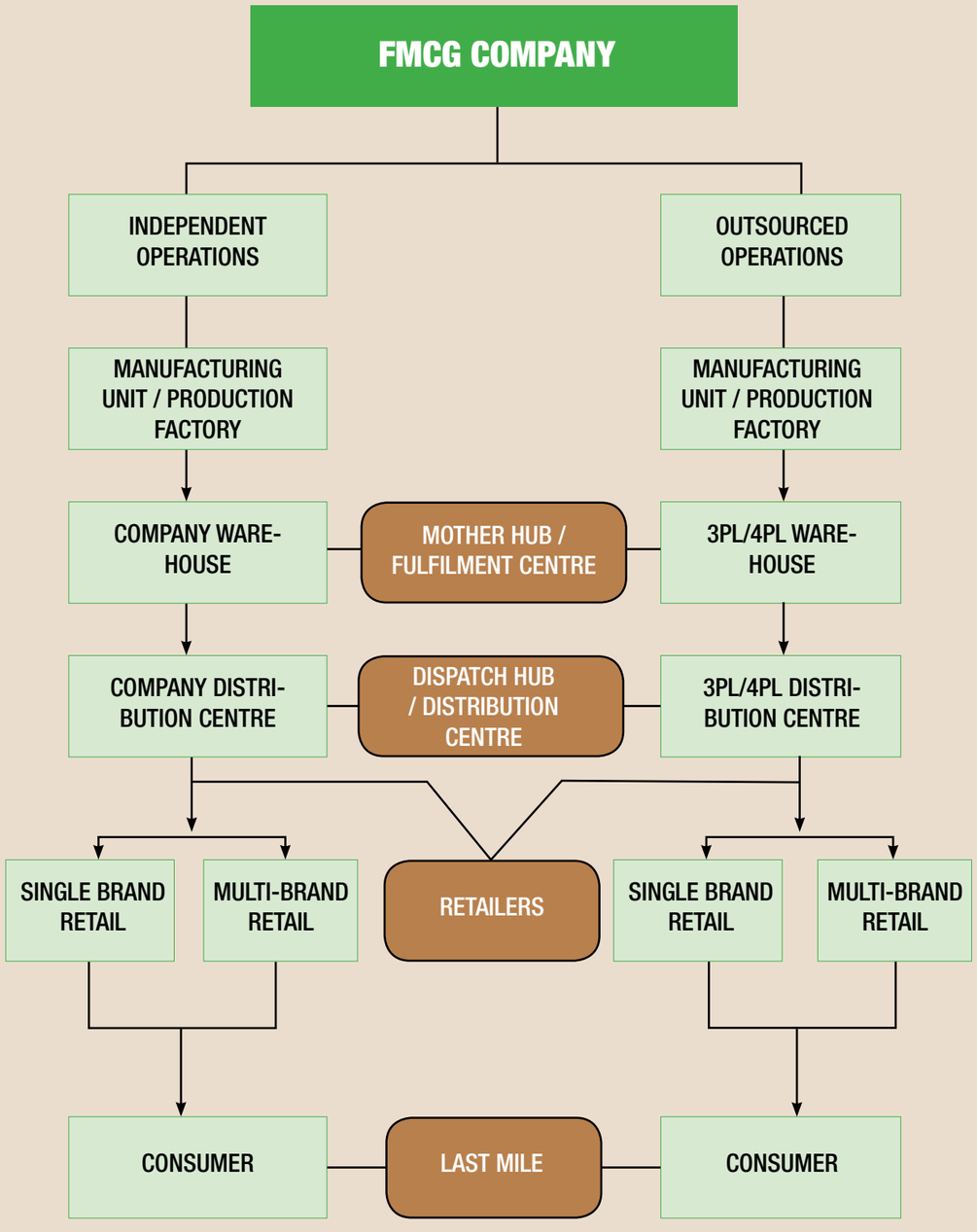
FMCG OPERATING MODELS

Company (Examples)	Owned Processes	Outsourced Processes
HUL	Marketing	Manufacturing, Distribution
Marico, P&G, Pidilite	Manufacturing, Marketing	Distribution
Patanjali	Manufacturing, Marketing, Distribution	

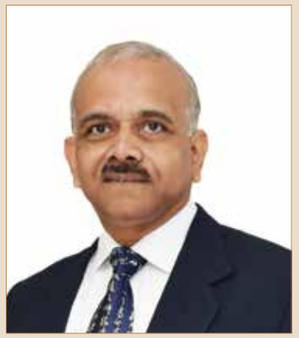
Source: Knight Frank Research
Note: The tabulated information should be read as that which is a mostly owned or outsourced process and not in absolutes.

[1] *NSSO, Assocham*

FIGURE 1: SUPPLY CHAIN OPERATIONS OF FMCG COMPANIES FOR RETAIL



Source: Knight Frank Research



DR.RAKESH KUMAR SINHA

Global Head – Supply Chain, Manufacturing & IT
Godrej Consumer Products Ltd.

New warehousing needs are arising in smaller towns. Many of those towns have potential to become major transportation hubs post-GST. But we find that infrastructure there is still under-developed. We are finding it difficult to put up warehouses there, even though we want to, purely from the infrastructure view. I understand other FMCG companies are in a similar position. Many such companies are in fact looking for new hubs, for warehousing as well as transportation.

LOGISTICS CHALLENGES IN THE FMCG INDUSTRY

The traditional supply chain model has evolved to suit the present day needs of low cost, higher penetration, reach and quick responsiveness. Although, most FMCG businesses have decentralised operations further to counter the challenges of scale and reach in the vast Indian market, there are companies such as Patanjali and ITC that have integrated activities forward and backward within their supply chain to have a greater control on the uncertainty of demand and supply.

The FMCG industry in India is a large-scale business and needs the logistics industry to develop rapidly. Government initiatives to push the organised logistics industry have come in very recently and most of the impact on costs and efficiency are still unrealised. Even the GST Act, which encourages businesses to consolidate operations, is impacting the market at a slow pace. Cost reductions have not yet been realised beyond 7–8% of the total logistics cost largely due to infrastructure bottlenecks, according to our interactions with various FMCG industry stakeholders. Our interactions further indicate that the incidence of consolidation in warehouses will be markedly lower for the FMCG industry compared to other industries as FMCG players will have to continue to operate close to consumption centers as they did in the pre-GST era and this is unlikely to leave much room for consolidation at the aggregate level.

The Indian Supply chain has evolved and grown at a fast pace, but having to make do with inadequate infrastructure, make it prone to wastages and inflated costs. Inadequate road and rail infrastructure such as the dearth of dedicated freight corridors and lack of logistics players with good quality warehousing and transport facilities are the main challenges on the supply side. While primary transport from the manufacturer to the mother warehouse is relatively seamless as these warehouses can be accessed directly via the national highways, secondary transport, that entails the later stages in the transportation of products to the distributor and retailer is especially affected as retailers exist largely in dense residential catchments in urban and rural India that have poorly maintained, narrow and congested roads. The cost of secondary transport can thus be as much as 3–6 times of primary transport per unit due to the more fragmented nature of the market. Also, industry specific issues such as, low turnaround time and the need for on-shelf availability make it difficult to operate in the FMCG industry. These challenges coupled with uncertainty in demand and a fragmented consumer base drive down profitability of the industry.

FIGURE 2: LOGISTICS CHALLENGES IN THE FMCG INDUSTRY

GODREJ CONSUMER PRODUCTS:

TRADITIONAL SUPPLY CHAINS AND FEEDBACK-BASED BACKWARD INTEGRATION

Godrej Consumer Products is a leading emerging markets FMCG company. In line with its "3 by 3" approach to international expansion, GCPL, is building a presence in 3 emerging markets (Asia, Africa, Latin America) across 3 categories (home care, personal wash, hair care).

Its brands in India include household favourites like Goodknight and Hit in household insecticides, Cinthol and Godrej No. 1 in soaps, Godrej aer in air care and Godrej Expert and BBLUNT in hair care, among others. GCPL operates several manufacturing facilities in India spread over seven locations and grouped into four operating clusters at Malanpur (Madhya Pradesh), Guwahati (Assam), Baddi (Himachal Pradesh), Jammu, Pondicherry, Chennai and Sikkim.

GCPL operates pan-India, but selectively chooses which sub-regions to penetrate deeper in each of the regional markets. It usually uses part truck loads to get to the smaller markets and thus, the existing presence of other FMCG companies in the region is one of the decision making factors, as this enables the company to use pooled transport resources with other FMCG players. GCPL uses the classic hub-and-spoke model with the distributor as an intermediary between the B2C retailer and the manufacturer. The distributor is thus the last entity of the supply chain at the company. GCPL services most of its distributors twice a week and a few distributors in metros on a daily basis.

The company functions on a replenishment basis with the use of TOC mapped onto a comprehensive planning software APO and a Distributor Management System G-ONE, which connects all the distributors and GCPL. With these technologies, consumer demand is not only tracked backward through the supply chain for product placement, but they have integrated it seamlessly with their production and procurement systems as well. The company uses logistics partners for movement of finished goods and through these logistics partners, the company, on an average, operates 300 trucks (vehicles) ferrying goods on every day. However, depending on the demand for its products in the market, the company maintains the elasticity of running the number of sorties on a daily basis. In addition, it controls the volume of goods containers conditional to the volumes of products that are to be transported. Use of TOC principles and agility in end-to-end supply chain has considerably helped the company maintain a fill rate of 99%, which is the measure of the inventory's ability to meet demand, the highest in the industry.

GCPL runs on a traditional supply chain with close to 1,500 distributors catering to almost 7 lakh retail units. Its primary logistics involves the movement of goods from the manufacturing plant to one of the 7 Mother warehouses in Punjab, Haryana, Kolkata, Guwahati, Pondicherry, Bhiwandi, and Hyderabad, using full truck loads with a capacity of 10–15 tonnes or greater. These warehouses are used for consolidation and distribution. The company operates with 600-700 active Stock Keeping Units (SKUs) which translates into an annual outbound volume of 2 crore boxes of GCPL's products. The products are moved from mother warehouses to more than 30 C&F agents for further consolidation and redistribution. Secondary logistics for GCPL involves the movement of goods to the distributor, except in some cases, where certain larger multi-brand retailers are directly serviced by GCPL. Smaller trucks are used for secondary logistics to avoid city limit restrictions and to circumvent road width, also lower capacity in these trucks allows for smaller truck loads. Most of the times the company moves its products in secondary logistics in part truck loads with the other FMCG players.

AHMEDABAD WAREHOUSING MARKET

1. KEY FACTS

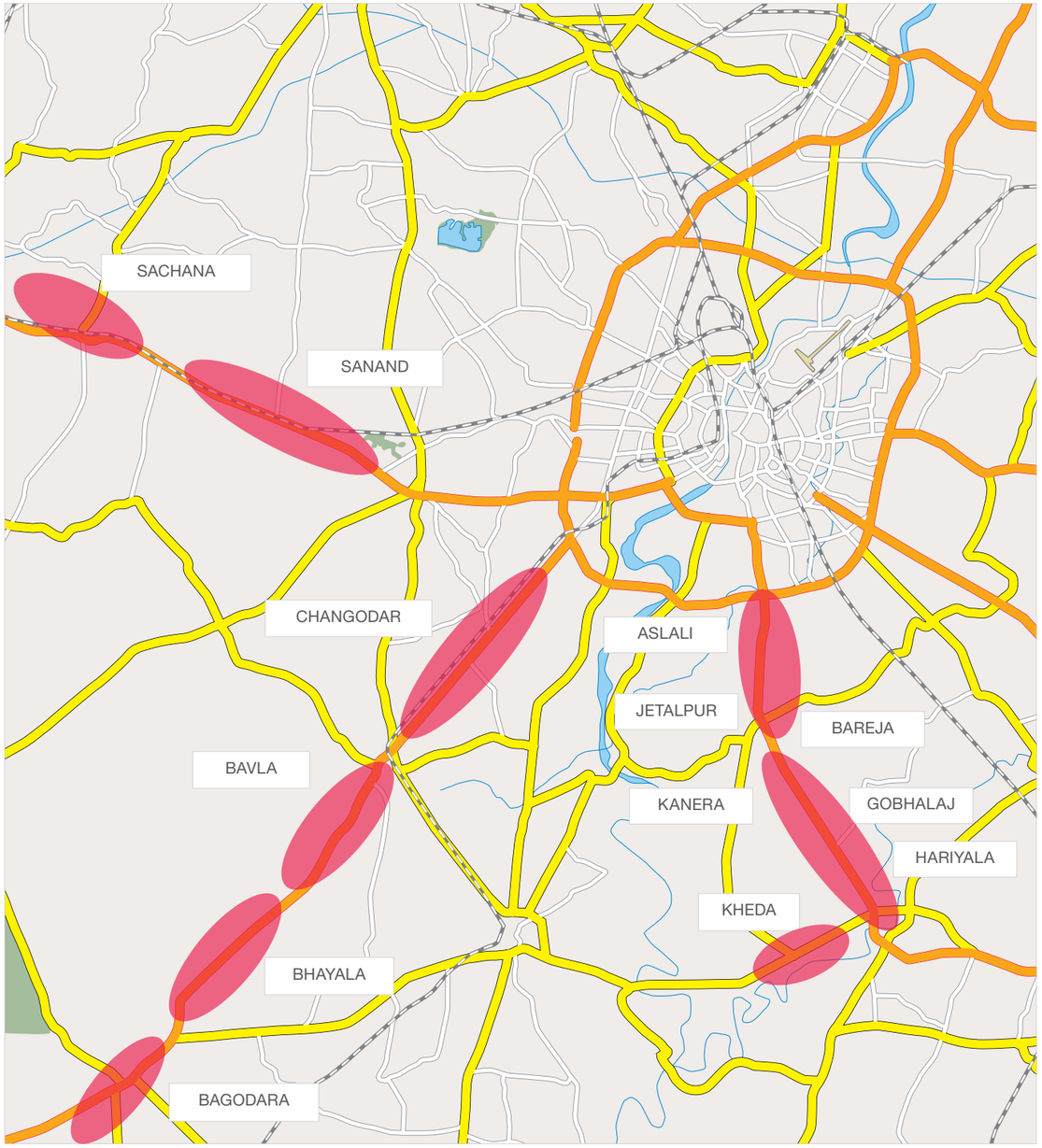
- The primary demand drivers of warehousing space in Ahmedabad can be broadly classified into two categories: manufacturing-led demand and consumption-led demand.
  - i. The demand from the manufacturing sector arises predominantly due to the distance between the manufacturer's factories, raw material suppliers and the consumption markets of the final goods. The quantum of space required is also dependent on the type of product that is manufactured. Hence, each manufacturer will have a different requirement for space, depending on these factors.
  - ii. Consumption-led demand is largely dependent on population, income level and the propensity to spend. The changing dynamics of the retail industry has resulted in the business model of a retailer becoming heavily dependent on a smooth and efficient supply chain network. In addition to this, the advent of e-tail in recent years has necessitated the need for huge warehouses close to urban centres in order to deliver in the shortest possible time.
- There are 2 major warehousing clusters – Aslali-Kheda belt and Changodar-Bagodara belt.
  - i. Aslali-Kheda belt: Aslali was one of the first warehousing markets to be developed in Ahmedabad due to the various advantages that this location commands. Before the National Expressway-1 (NE-1) was constructed, the Ahmedabad-Vadodara highway used to be the primary access road between Ahmedabad and cities like Vadodara, Surat and Mumbai. Aslali, which is located on this highway just before entering Ahmedabad city from the south, was a major transit point for all transporters and logistics players. With increased urbanisation and rising land prices, warehousing development started shifting southwards on this highway towards Jetalpur and Bareja.
  - ii. Changodar-Bagodara belt: The development of this area as an industrial hub shaped the demand for warehouses, especially industrial warehouses. With increased urbanisation and rising land prices, warehousing development started shifting southwards on this highway towards Bavla and Bhayala. Over the last few years, this shift has continued further south on the highway, with warehousing development stretching all the way till Bagodara.
- The annual transaction volumes of warehousing space for the Ahmedabad warehousing market in 2017 was 3.25 mn. The transaction volumes recorded 86% YoY growth over 2016.

Most of the warehousing activity is concentrated on the Ahmedabad-Kheda highway and Ahmedabad-Rajkot highway. Additionally, Sanand has also been attracting interest from warehouse developers over the last few years, but is still a relatively smaller market compared to the other two locations.

3.25 million sq ft
warehousing space transacted in 2017

2. MAP

MAJOR WAREHOUSING LOCATIONS IN AHMEDABAD



Source: Knight Frank Research

CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

WAREHOUSING CLUSTER	MAJOR WAREHOUSING LOCATIONS
Aslali-Kheda belt	Aslali, Jetalpur, Bareja, Kanera, Gobhalaj, Hariyala, Kheda
Changodar-Bagodara belt	Changodar, Bavla, Bhayala, Bagodara
Others	Sanand-Viramgam belt, Vitthalapur-Becharaji belt

Source: Knight Frank Research

3. LARGE OCCUPIERS

SR. NO.	OCCUPIER	OCCUPIER INDUSTRY	WAREHOUSE CLUSTER
1	DHL	3PL	Changodar-Bagodara belt
2	HUL	FMCG	Aslali-Kheda
3	DMart	Retail	Aslali-Kheda
4	Flipkart	E-commerce	Changodar-Bagodara belt
5	MRF Tyres	Manufacturing	Changodar-Bagodara belt

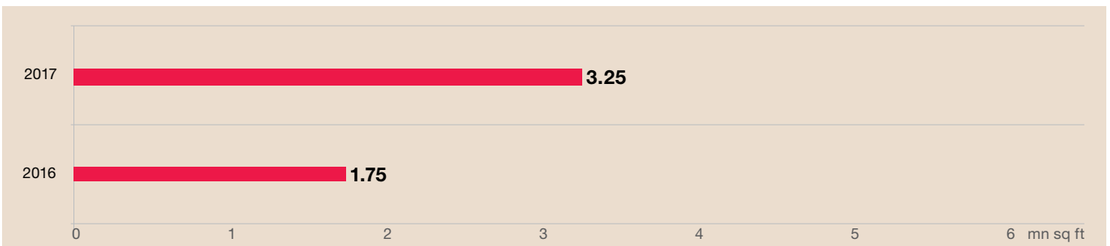
Source: Knight Frank Research

4. SELECT WAREHOUSE/INDUSTRIAL PARKS

SR. NO.	WAREHOUSE / INDUSTRIAL PARKS	WAREHOUSE CLUSTER
1	Crystal	Changodar-Bagodara
2	Corporate Warehouse Park	Aslali-Kheda
3	Sumar Logistic & Ind Park	Aslali-Kheda
4	Global Industrial Park	Others (Vitthalapur -Becharaji)
5	Mascot Industrial Park	Others (Vitthalapur -Becharaji)

Source: Knight Frank Research

5. WAREHOUSING MARKET TRANSACTION VOLUME (IN MN SQ FT)



Source: Knight Frank Research

6. LAND RATE AND RENTS IN THE ASLALI-KHEDA WAREHOUSING BELT

WAREHOUSE CLUSTER	LAND RATE (INR MN./ACRE)	RENT (INR/SQ FT/MTH.)
Aslali	18 – 32	16 – 20
Bareja	11 – 14	12 – 14
Kanera	9 – 12	12 – 14
Gobalaj	8 – 12	10 – 12
Kheda	6 – 11	10 – 12

Note: The above rentals indicate the rental range for spaces available in Grade A and Grade B warehouses.

LAND RATE AND RENTS IN THE CHANGODAR-BAGODARA WAREHOUSING BELT

WAREHOUSE CLUSTER	LAND RATE (INR MN./ACRE)	RENT (INR/SQ FT/MTH.)
Changodar	25 – 35	15 – 18
Bavla	15 – 22	13 – 16
Bhayala	7 – 12	12 – 15
Bagodara	4 – 7	10 – 12

Note: The above rentals indicate the rental range for spaces available in Grade A and Grade B warehouses.

7. EQUITY IRR FOR A DEVELOPMENT PROJECT

Feasible land cost matrix on the Aslali-Kheda warehousing belt (INR mn/acre)

		Equity IRR for a development project				
		14%	**16%**	**18%**	**20%**	**22%**
Rental value (INR/sq ft/month)	**10**	9	6	4	2	-
	12	12	9	7	5	3
	14	17	14	11	9	7
	16	22	18	15	13	10
	18	27	23	19	16	14
	20	32	28	23	20	17

Note: The table presents 30 options of land cost in INR mn/acre at different returns and rental value combinations. The 10 options that are possible to source on the Aslali-Kheda warehousing belt and are upwards of the minimum prevailing land rate, which is INR 6 mn/acre on this belt, have been highlighted in colour. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

Source: Knight Frank Research

16%

Upto 16% equity IRR for a development project can be achieved in the Aslali-Kheda warehousing belt

Feasible land cost matrix on the Changodar-Bagodara warehousing belt (INR mn/acre)

		Equity IRR for a development project				
		14%	**16%**	**18%**	**20%**	**22%**
Rental value (INR/sq ft/month)	**10**	9	6	4	2	-
	12	12	9	7	5	3
	14	17	14	11	9	7
	16	22	18	15	13	10
	18	27	23	19	16	14

Note: The table presents 25 options of land cost in INR mn/acre at different returns and rental value combinations. The 8 options that are possible to source on the Changodar-Bagodara warehousing belt and are upwards of the minimum prevailing land rate, which is INR 4 mn/acre in this belt, have been highlighted in colour. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

Source: Knight Frank Research

ASSUMPTIONS

Construction cost (INR/ sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	10%
Tax rate	30%
Cap rate	10%

Source: Knight Frank Research

18%

Upto 18% equity IRR for a development project can be achieved in the Changodar-Bagodara warehousing belt

BENGALURU
WAREHOUSING MARKET

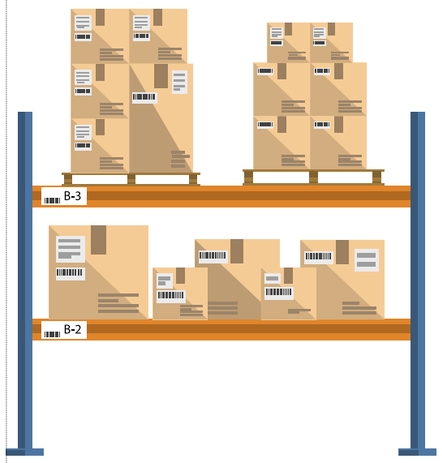
1. KEY FACTS

- The landlocked Bengaluru Metropolitan Region's (BMR) key manufacturing hubs have emerged next to the National Highway (NH)-4, which provides port connectivity via Mumbai and Chennai. Towards the north-west, Nelamangala-Dabaspete is a prominent warehousing submarket while the eastern belt of Hoskote-Narsapura is an emerging warehousing location.
- The Nelamangala-Dabaspete warehousing cluster is a 30 km belt on Tumkur Road that connects to Mumbai via NH-4. Situated near the Peenya Industrial Area, it is an excellent road with its service lanes lined with manufacturing units from automobile, pharmaceutical and food and beverage sector occupiers. This cluster's intrinsic strengths are complemented by lower land prices, which will ensure future supply of warehouses.
- The Hoskote-Narsapura cluster is an established industrial hub connected to Sriperumbudur in Chennai via Old Madras Road on NH-4. Easy access to this automobile hub has led many auto and auto ancillary occupiers to establish their footprint here.
- Hoskote-Narsapura is also emerging as a warehousing hub due to consumption-led demand by logistics and e-commerce occupiers. Ease of delivery to the eastern and south-eastern consumption centres of Whitefield, Outer Ring Road and Sarjapur Road, which are within an hour's drive away, is a major driver for this micro market.

In 2017, the warehousing transaction volume registered a strong growth of 91% over 2016 as demand for warehousing space from third party logistics, engineering, e-commerce and consumer durables sectors strengthened during this period.

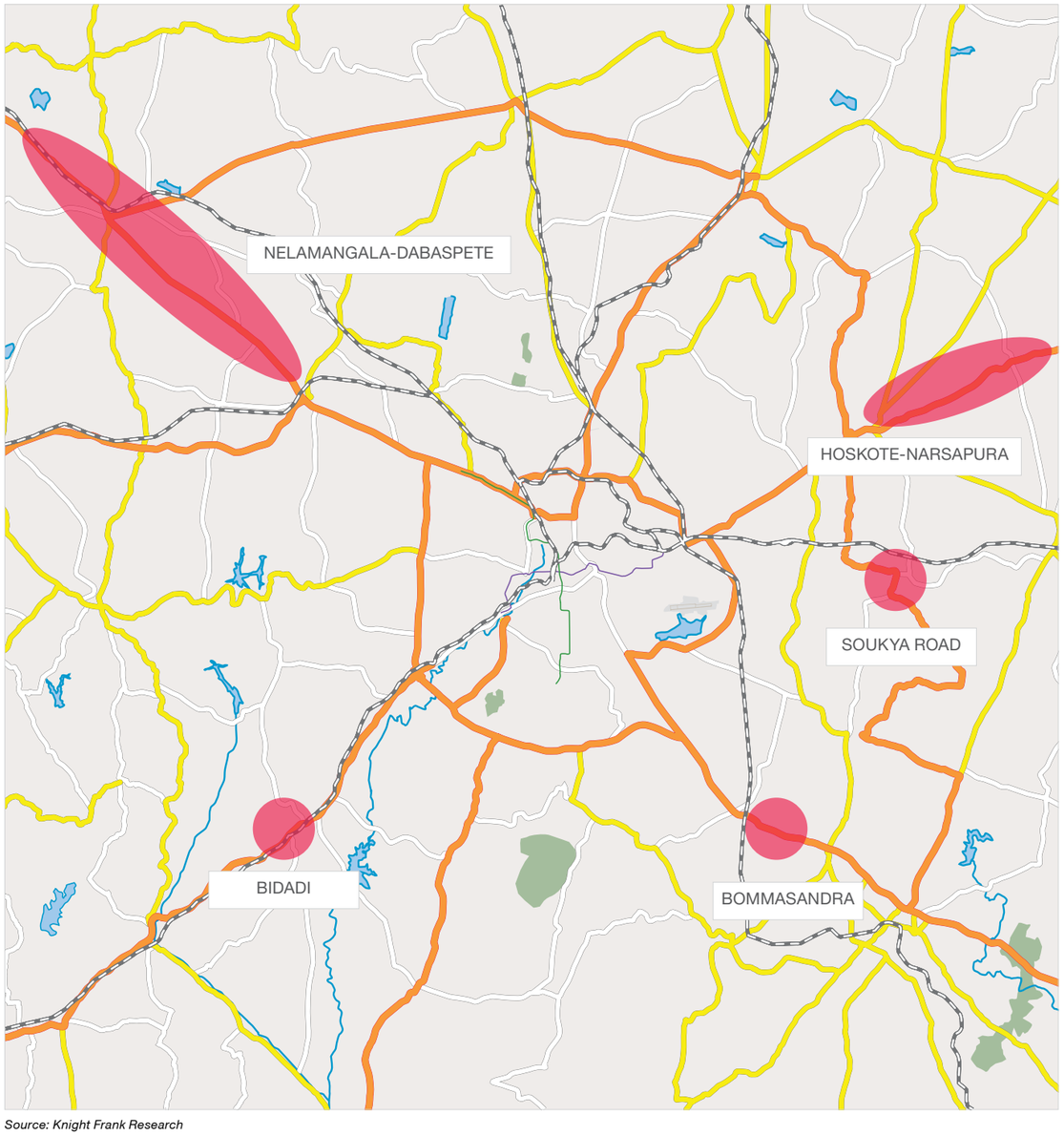
- Other warehouse clusters that have come up are Soukya Road in the East, Bidadi on Mysore Road and Bommasandra on Hosur Road. With the exception of Soukya Road that is in the vicinity of IT/ITeS belt of Whitefield, the other two clusters have come up in the Southern belt next to industrial clusters.
- Sustained growth rate of Indian economy coupled with the roll-out of the Goods and Services Tax (GST) kept occupiers focused on expansion and consolidations in 2017.
- The Karnataka State Budget 2018-19 envisages formulation of a Logistics Policy for seamless movement of goods and services from manufacturing hubs to consumers. A 400 acres multi-modal logistics park is also proposed to be developed near Bengaluru which should enhance the industrial and warehousing infrastructure in the city.

2.45
million sq ft
warehousing space transacted in 2017



2. MAP

MAJOR WAREHOUSING LOCATIONS IN BENGALURU



Source: Knight Frank Research

CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

WAREHOUSING CLUSTER	MAJOR WAREHOUSING LOCATIONS
Nelamangala-Dabaspete cluster	Nelamangala, T Begur, Govenahalli, Dabaspete
Hoskote-Narsapura cluster	Hoskote, Nidagatta, Thavarekere, Narsapura
Others	Soukya Road, Bidadi, Bommasandra

Source: Knight Frank Research

3. LARGE OCCUPIERS

SR. NO.	OCCUPIER	OCCUPIER INDUSTRY	WAREHOUSE CLUSTER
1	Hitachi	FMCD	Nelamangala-Dabaspete
2	DB Schenker	Logistics	Nelamangala-Dabaspete
3	Pepsico	FMCG	Nelamangala-Dabaspete
4	Volvo	Automobiles	Hoskote-Narsapura
5	Medreich	Pharmaceuticals	Hoskote-Narsapura

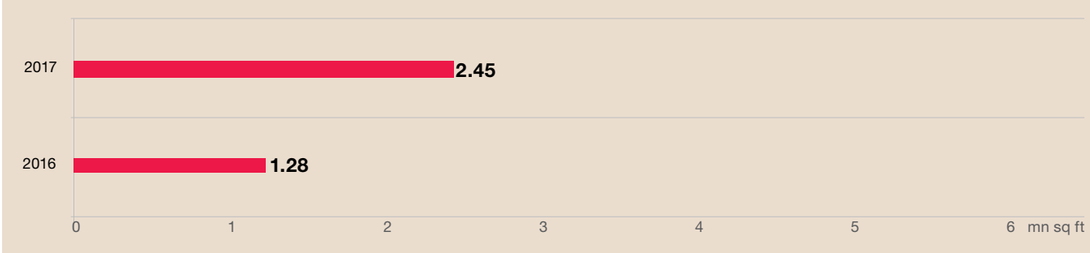
Source: Knight Frank Research

4. SELECT WAREHOUSE/INDUSTRIAL PARK

SR. NO.	WAREHOUSE/INDUSTRIAL PARK	WAREHOUSE CLUSTER
1	IndoSpace	Hoskote-Narsapura
2	IndoSpace	Bommasandra
3	IndoSpace	Nelamangala-Dabaspete
4	Individual Landlords	Nelamangala-Dabaspete
5	Individual Landlords	Soukya Road

Source: Knight Frank Research

5. WAREHOUSING MARKET TRANSACTION VOLUME (IN MN SQ FT)



Source: Knight Frank Research

6. LAND RATE AND RENTS

WAREHOUSE CLUSTER	LOCATION	LAND RATE (INR MN./ACRE)	RENT (INR/SQ. FT./MTH.)
Nelamangala-Dabaspete cluster	Nelamangala	15 – 23	12 – 16
	Dabaspete	10 – 23	10 – 14
Hoskote-Narsapura cluster	Hoskote	8 – 15	12 – 16
	Narsapura	7 – 15	12 – 16

Note: The above rentals indicate the rental range for spaces available in Grade A and Grade B warehouses.

7. EQUITY IRR FOR A DEVELOPMENT PROJECT

Feasible land cost matrix in the Nelamangala-Dabaspete warehousing cluster (INR. mn/acre)

		Equity IRR for a development project				
		10%	**12%**	**14%**	**16%**	**18%**
Rental value (Rs/sq ft/month)	**10**	16	11	9	6	4
	12	18	15	12	9	7
	14	24	21	17	14	11
	16	32	25	22	18	15

Note: The table presents 20 options of land cost in ₹ mn/acre at different returns and rental value combinations. Five options which are possible to source in the Nelamangala-Dabaspete warehousing cluster and are upward of the minimum prevailing land rate, which is ₹ 10 mn/acre in this cluster, have been highlighted in colour. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

12%

Equity IRR is achievable in the Nelamangala-Dabaspete cluster

Feasible land cost matrix in the Hoskote-Narsapura warehousing cluster (INR. mn/acre)

		Equity IRR for a development project				
		10%	**12%**	**14%**	**16%**	**18%**
Rental value (Rs/sq ft/month)	**12**	18	15	12	9	7
	14	24	21	17	14	11
	16	32	25	22	18	15

Note: The table presents 15 options of land cost in ₹ mn/acre at different returns and rental value combinations. Seven options which are possible to source in Hoskote-Narsapura warehousing cluster and are upward of the minimum prevailing land rate, which is ₹ 7 mn/acre in this cluster, have been highlighted in colour. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

18%

equity IRR is achievable in the Hoskote-Narsapura cluster

Source: Knight Frank Research

ASSUMPTIONS

Construction cost ((INR./sq ft))	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	10%
Tax rate	30%
Cap rate	10%

Source: Knight Frank Research

As per Karnataka State Budget 2018-19, a 400 acres multi-modal logistics park is proposed to be developed near Bengaluru

CHENNAI
WAREHOUSING MARKET

1. KEY FACTS

- Chennai has always been a centre for trade and commerce as is the case with most port cities. Over the years the port city of Chennai has evolved into a manufacturing hub with the automobile industry especially taking root and expanding in a big way. This in turn spurred the need for allied warehousing facilities that have evolved on and around the four arterial highways that branch out from the centre of Chennai towards the west such as the Grand Southern Trunk Road (GST Road/ NH 32), Poonamallee High Road (Bengaluru highway), Chennai Thiruvallur Road (MTH Road) and the GNT Road(Kolkata highway, NH 16) toward the north.
- Warehousing activity in Chennai is currently concentrated between 40-60 kms from the city centre in locations such as Oragadam, Sriperumbudur, Mappedu and Thiruvallur in the west and Periyapalayam in the north.
- The western locations that have been clubbed into one homogeneous cluster called the Sriperumbudur-Oragadam cluster, primarily cater to the warehousing requirements of the dominant Auto and Auto Ancillary industry and thus constitute the leading warehousing market of the city.
- Northern locations such as Puzhal, Cholavaram, Karanodai and Periyapalayam constitute the NH 5 - Periyapalayam warehousing cluster are served well by their proximity to the large consumption market in the city and cater largely to the FMCG sector companies such as Hindustan Unilever Ltd. and Proctor and Gamble Ltd.
- The Chennai warehousing market experienced an increase in its transaction volumes by 24% YoY to 2.35 mn sq ft during 2017.

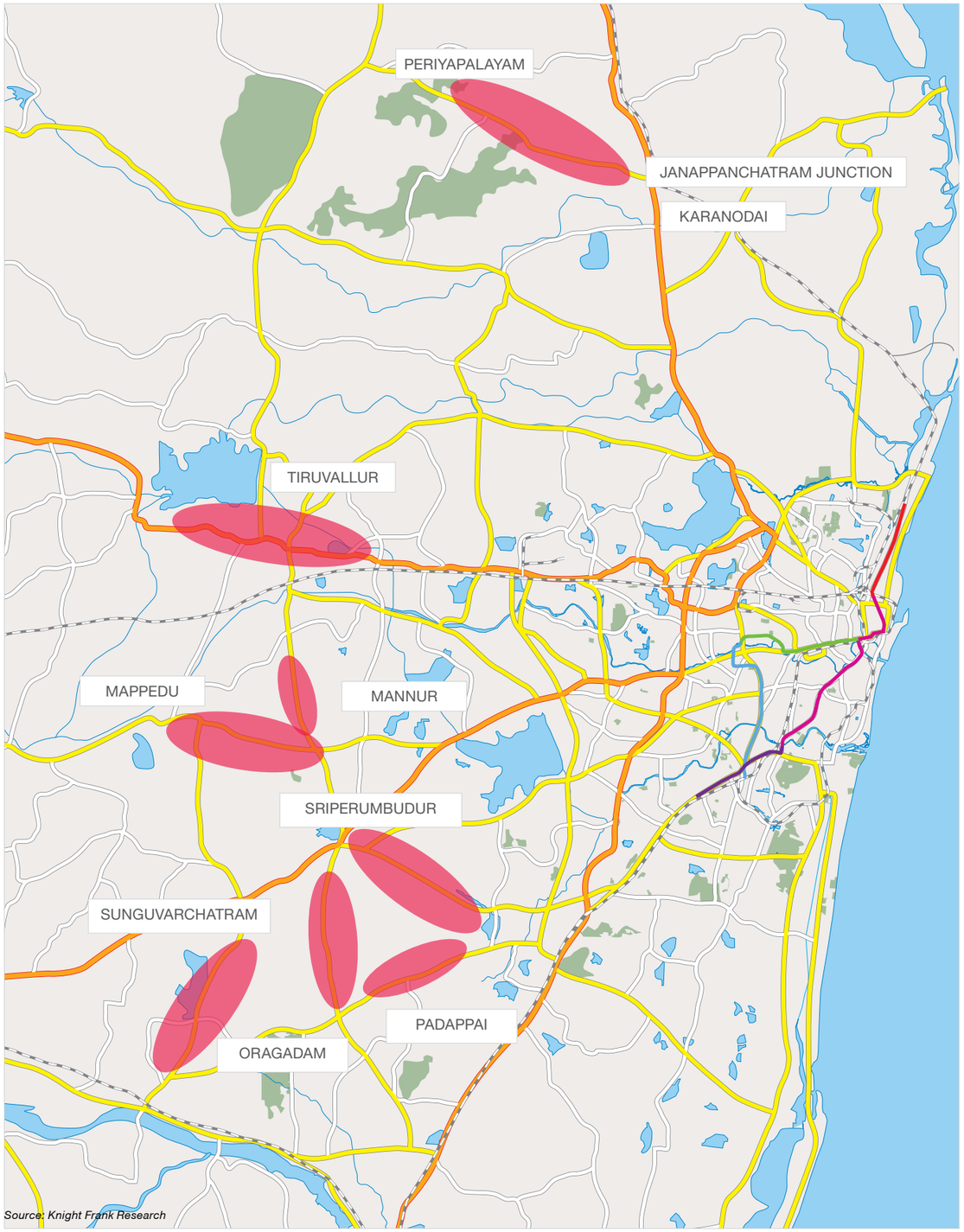
24%

YoY Increase in warehousing transaction volumes during 2017

Warehousing activity in Chennai is currently concentrated between 40-60 kms from the city centre in locations such as Oragadam, Sriperumbudur, Mappedu and Thiruvallur in the west and Periyapalayam in the north.

2. MAP

MAJOR WAREHOUSING LOCATIONS IN CHENNAI



Source: Knight Frank Research

CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

WAREHOUSING CLUSTER	MAJOR WAREHOUSING LOCATIONS
Sriperumbudur-Oragadam cluster	Oragadam, Sriperumbudur, Walajabad, Mappedu, Mannur, Tiruvalur and other locations on the in-roads branching from Sriperumbudur
NH 5 - Periyapalayam cluster	Red Hills, Karanodai, Jagannathpuram, Thatchoor, Periyapalayam, Kannigaipair

Source: Knight Frank Research

3. LARGE OCCUPIERS

SR. NO.	OCCUPIER	OCCUPIER INDUSTRY	WAREHOUSE CLUSTER
1	Indev Logistics	3PL	Sriperumpudur - Oragadam
2	Cooper standard	Manufacturing	Sriperumpudur -Oragadam
3	Indutch	Manufacturing	Sriperumpudur - Oragadam
4	Expeditors	3PL	Sriperumpudur - Oragadam
5	Apollo	Storage	Sriperumpudur - Oragadam

Source: Knight Frank Research

4. SELECT WAREHOUSE/INDUSTRIAL PARK

SR. NO.	WAREHOUSE/INDUSTRIAL PARKS	WAREHOUSE CLUSTER
1	Indospace	Sriperumpudur - Oragadam
2	Casa Grande	Sriperumpudur - Oragadam
3	Kailash Logistics	Sriperumpudur -Oragadam
4	Sugal & Damani	NH 5 - Periyapalayam
5	NDR Logistics	NH 5 - Periyapalayam

Source: Knight Frank Research

5. WAREHOUSING MARKET TRANSACTION VOLUME (IN MN SQ FT)

Source: Knight Frank Research

6. LAND RATE AND RENTS

WAREHOUSE CLUSTER	LOCATION	LAND RATE (INR MN./ACRE)	RENT (INR/SQ. FT./MTH.)
Sriperumbudur-Oragadam cluster	Sriperumbudur	15 – 30	18 – 22
	Oragadam	20 – 35	25 – 28
	Mappedu	10 – 15	15 – 17
	Mannur	17 – 25	16 – 18
	Irungattukottai	30 – 40	20 – 22
NH 5 - Periyapalayam cluster	Cholavaram	8 – 10	14 – 16
	Redhills	30 – 35	15 – 17
	Madhavaram	120 – 150	20 – 24
	Puzhal	80 – 90	18–20
	Karanodai	15 – 20	14–17
	Periyapalayam	10 – 15	14–16

Note: The above rentals indicate the rental range for spaces available in Grade A and Grade B warehouses.

7. EQUITY IRR FOR A DEVELOPMENT PROJECT

Feasible land cost matrix on the Sriperumbudur-Oragadam warehousing cluster (INR. mn/acre)

		Equity IRR for a development project				
		16%	**18%**	**20%**	**22%**	**24%**
Rental value (INR/sq ft/month)	**16**	18	15	13	10	8
	18	23	19	16	14	11
	20	28	23	20	17	14
	22	32	28	24	20	17
	24	37	32	26	24	20
	26	41	36	31	27	23
	28	46	40	35	30	26

Note: The table presents 35 options of land cost in INR mn/acre at different investor return and rental value combinations. The 21 options that are possible to source in this warehousing cluster and are upward of the minimum prevailing land rate, which is INR 10 mn/acre in this cluster, have been highlighted. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

22%

Equity IRR for a development project possible in the Sriperumbudur - Oragadam cluster

Feasible land cost matrix in the NH 5 - Periyapalayam warehousing cluster (INR. mn/acre)

		Equity IRR for a development project				
		16%	**18%**	**20%**	**22%**	**24%**
Rental value (INR/sq ft/month)	**14**	14	11	9	7	5
	16	18	15	13	10	8
	18	23	19	16	14	11
	20	28	23	20	17	14
	22	32	28	24	20	17
	24	37	32	26	24	20

Note: The table presents 30 options of land cost in INR mn/acre at different investor return and rental value combinations. The 7 options that are possible to source on this warehousing belt and are upward of the minimum prevailing land rate, which is INR 8 mn/acre in this cluster, have been highlighted. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

Source: Knight Frank Research

22%

Equity IRR for a development project possible in the NH 5 - Periyapalayam cluster

ASSUMPTIONS

Construction cost (INR/ sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	10%
Tax rate	30%
Cap rate	10%

Source: Knight Frank Research

HYDERABAD
WAREHOUSING MARKET

1. KEY FACTS

- Industrial parks established by the Telangana State Industrial Infrastructure Corportaion (TSIIC) in Jeedimetla, Karimnagar, Patancheru and Shamshabad have induced significant momentum for the manufacturing sector across industries such as pharmaceutical and biotechnology. To cater to this demand, an organised warehousing market is emerging towards the northern belt.
- The Jeedimetla-Medchal warehousing cluster is dominated by pharmaceutical and healthcare sector occupiers. It is not only located near the city centre but also well connected to Nagpur (NH-44) and Karimnagar (SH-1). Proximity to the city centre also makes it ideal for food processing industry to cater to the vast consumption market.
- Clear land titles coupled with the presence of old industrial areas around Jeedimetla has led to the concentration of small and medium-sized warehousing facilities in this region.
- Locations within the Outer Ring Road such as the Jeedimetla Industrial Area were instrumental in the development of an organised warehousing cluster in its vicinity which eventually moved northwards encompassing Bachupally, Bowrampet and further to Medchal that forms the present day Jeedimetla-Medchal cluster.
- Recently, the e-tail sector has emerged as a major driver for consumption-led warehousing opportunities, mainly in the western and southern city peripherals. However, it is premature to demarcate a particular cluster witnessing promise on account of the same in these regions. As a result, the city is dominated only by manufacturing-led demand concentrated predominantly in the Jeedimetla-Medchal cluster.

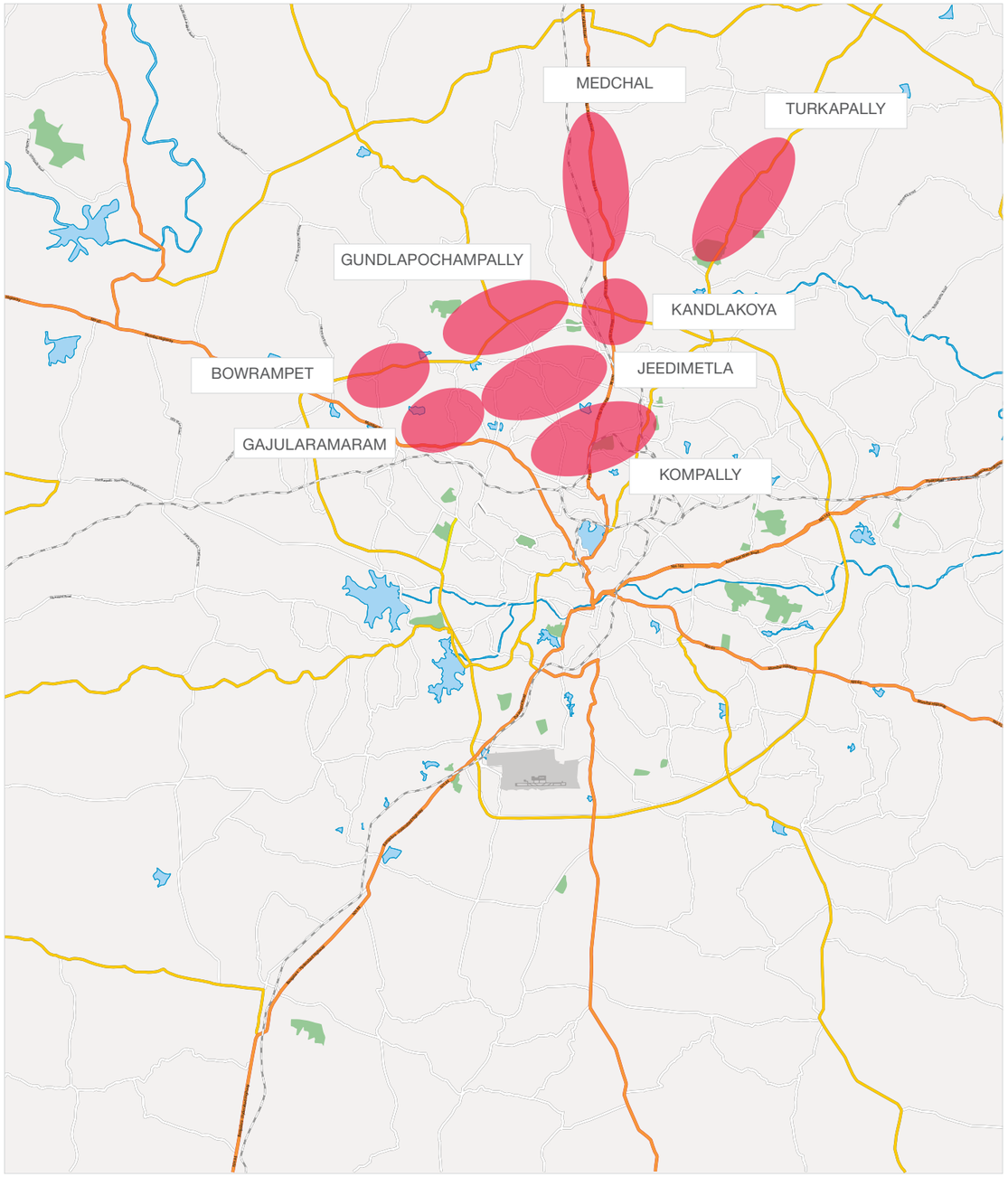
Though the warehousing market is still at a nascent stage, Hyderabad's strategic location and excellent road infrastructure will act as a catalyst to attract occupiers from segments such as e-commerce and third party logistics towards peripheral belts.

- The overall warehousing transaction volume at the end of 2017 surpassed 2016 by 68% due to strong warehousing leasing by pharmaceutical, e-commerce and logistics sectors. The subsequent roll-out of Goods and Services Tax (GST) in the second half of 2017 also contributed to positive occupiers' sentiment.

2.05
million sq ft
warehousing space transacted in 2017

2. MAP

MAJOR WAREHOUSING LOCATIONS IN HYDERABAD



Source: Knight Frank Research

CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

WAREHOUSING CLUSTER	MAJOR WAREHOUSING LOCATIONS
Jeedimetla-Medchal cluster	Jeedimetla, Gundlapochampally, Kandlakoya, Kompally, Bowrampet, Gajularamaram, Medchal, Turkapally

Source: Knight Frank Research

3. LARGE OCCUPIERS

SR. NO.	OCCUPIER	OCCUPIER INDUSTRY	WAREHOUSE CLUSTER
2	Flipkart	E-commerce	Jeedimetla-Medchal
4	DHL	Logistics	Jeedimetla-Medchal
5	Delhivery	Logistics	Jeedimetla-Medchal
7	Ratnadeep	FMCG	Jeedimetla-Medchal
8	Nestle	FMCG	Jeedimetla-Medchal

Source: Knight Frank Research

4. SELECT WAREHOUSE/INDUSTRIAL PROJECTS

SR. NO.	WAREHOUSE/INDUSTRIAL PROJECTS	WAREHOUSE CLUSTER
1	Satyanarayana Godowns	Jeedimetla-Medchal
2	DRS Logistics	Jeedimetla-Medchal
3	Zero Mile Warehousing	Jeedimetla-Medchal
4	Durgesh Godowns	Jeedimetla-Medchal
5	Vittal Reddy Godowns	Jeedimetla-Medchal

Source: Knight Frank Research

5. WAREHOUSING MARKET TRANSACTION VOLUME (IN MN SQ FT)

Source: Knight Frank Research

6. LAND RATE AND RENTS

WAREHOUSE CLUSTER	LOCATION	LAND RATE (INR MN./ACRE)	RENT (INR/SQ. FT./MTH.)
Jeedimetla-Medchal cluster	Jeedimetla	30 – 50	14 – 18
	Gundlapochampally	25 – 35	12 – 14
	Kandlakoya	15 – 25	12 – 14
	Kompally	30 – 50	14 – 18
	Bowrampet	15 – 30	10 – 12
	Gajularamaram	15 – 30	10 – 12
	Medchal	18 – 38	12 – 16
	Turkapally	15 – 30	12 – 16

Note: The above rentals indicate the rental range for spaces available in Grade A and Grade B warehouses.

7. EQUITY IRR FOR A DEVELOPMENT PROJECT

Feasible land cost matrix on the Jeedimetla-Medchal warehousing cluster (INR mn/acre)

		Equity IRR for a development project				
		10%	**12%**	**14%**	**16%**	**18%**
Rental value (Rs/sq ft/month)	**10**	15	11	9	6	4
	12	18	15	12	9	7
	14	25	21	17	14	11
	16	32	26	22	18	15
	18	38	32	27	23	19

Note: The table presents 25 options of land cost in ₹ mn/acre at different returns and rental value combinations. Five options which are possible to source in the Jeedimetla-Medchal warehousing cluster and are upward of the minimum prevailing land rate, which is ₹ 15 mn/acre in this cluster, have been highlighted in colour. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

Source: Knight Frank Research

12%

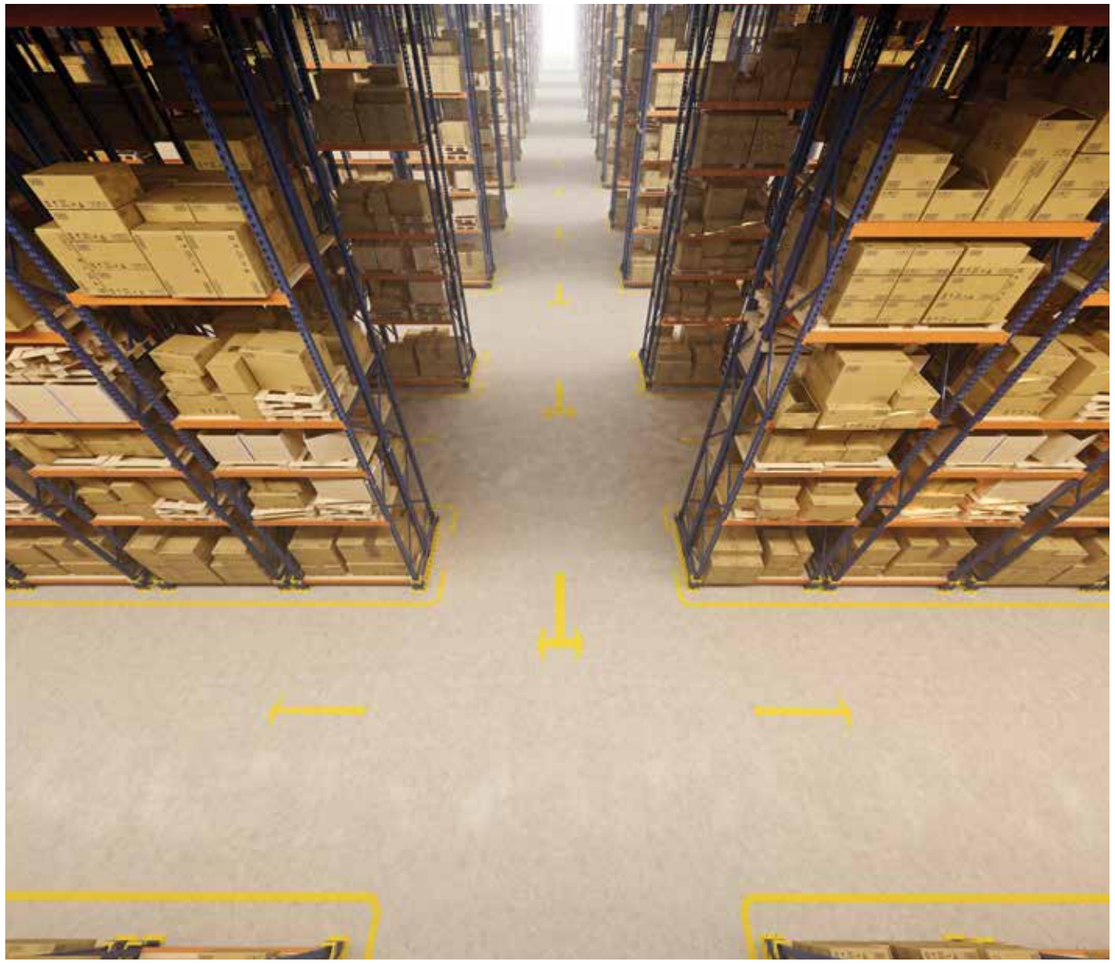
Equity IRR is achievable in the Jeedimetla-Medchal cluster

ASSUMPTIONS

Construction cost ((INR./sq ft))	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	10%
Tax rate	30%
Cap rate	10%

Source: Knight Frank Research

Many locations in the Jeedimetla-Medchal cluster score over the other emerging warehousing hubs due to proximity of the distribution network into the city which increases operational efficiency by bringing retail stores closer to warehouses.



MUMBAI
WAREHOUSING MARKET

1. KEY FACTS

- The main drivers of demand for warehousing space in Mumbai have been classified as manufacturing-led demand and consumption-led demand. While the manufacturing industry faces a challenge as manufacturing activities have been shifting to nearby cities like Pune, warehousing activities have flourished on account of large consumption base and port driven Export-Import (EXIM) cargo movement.
- The two major warehousing clusters:
  Bhiwandi warehouse cluster: Being strategically located within the Mumbai Metropolitan Region (MMR), Bhiwandi warehousing clusters is situated in proximity to the large consumption markets of Mumbai, Thane city and Navi Mumbai. Hence, the warehousing space in Bhiwandi is primarily being taken up to serve consumption demand. Availability of affordable land, labour and the existing textile manufacturing cluster were the factors that contributed to the development of a warehousing ecosystem in Bhiwandi. The regions from Kalher to Anjurphata and the Dapode road in the Bhiwandi warehousing cluster have now become dense residential catchments leading to traffic congestions and higher land costs, thereby, stifling modern warehousing growth.

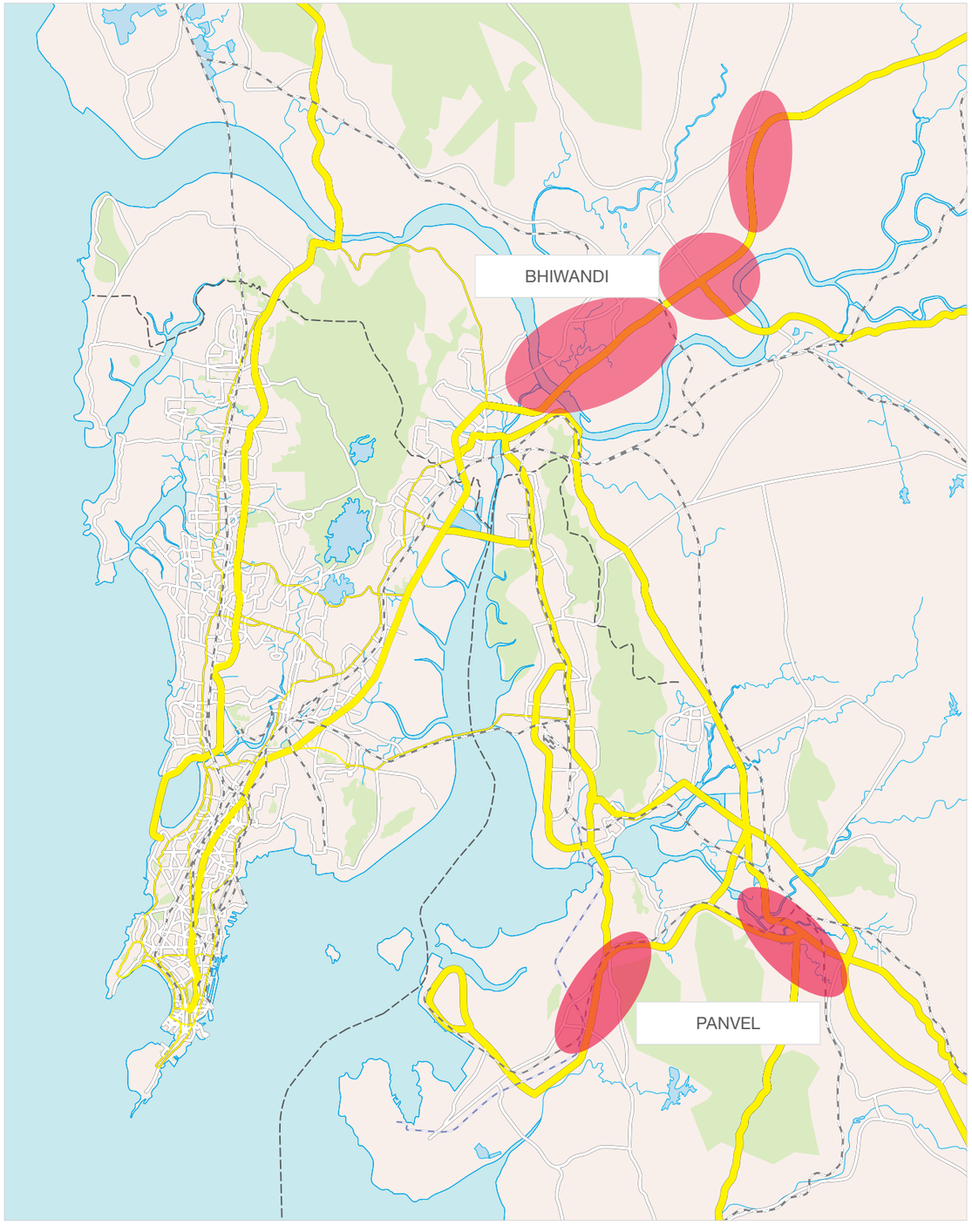
  Panvel warehouse cluster: The other prominent warehouse cluster in MMR is the EXIM-driven Panvel warehouse cluster. The Panvel warehouse cluster on account of its proximity to JNPT has emerged as a suitable warehouse hub for EXIM cargo that is mainly inbound. Besides connectivity through the national highway network, availability of affordable land and development of the Container Freight Station (CFS) have assisted the development of warehouses in Panvel.
- **Navi Mumbai Airport Influence Notified Area (NAINA):** The upcoming Navi Mumbai airport is expected to become operational in a few years, which would provide a much needed respite to the existing saturated airport of Mumbai. Earlier, most areas of Mumbai in and around the airport were developed in an unplanned manner leading to severe environmental, social and congestion problems. Learning from this mistake, the government has decided to develop the area around the new airport in a planned way. The undeveloped region around the airport is to be developed under the 'Navi Mumbai Airport Influence Notified Area' (NAINA), which would be spread over 500 sq km.
  i. Huge residential, commercial, educational, entertainment, trading, cargo, port and industrial activity hubs would be developed in this region that would create a new city in itself right outside Mumbai. This would drive demand for warehousing space in the upcoming years. A large amount of space would be required to cater to EXIM (due to proximity to existing ports) and manufacturing (upcoming under NAINA) along with the future consumption demand. Some of the major e-commerce companies in India have already started taking up land parcels to construct captive warehouses for catering to this future demand.
- The annual transaction volumes of warehousing space for the Mumbai warehousing market in 2017 was 5.15 mn. The transaction volumes recorded 230% YoY growth over 2016. This growth was led by e-commerce, big box retailers and 3 PL players.
- As per the recent announcement by the Union Minister for Transport and Highways, the NH-3 Padgha stretch would be widened. This would make it easier for multi-axle vehicles to ply in this region and also lead to widening of internal roads in the future, thereby opening up more land in the area for warehouse development. In addition, this market would likely to benefit from the upcoming Delhi-Mumbai Industrial Corridor (DMIC) and Mumbai-Nagpur expressway as this region falls at the intersection of their proposed layouts.

Integrated Industrial Area (IIA)

To promote industrial development in Maharashtra, the state government introduced a policy for development modeled as 'Integrated Industrial Area(IIA)'. This policy was enacted in 2013 but it did not kick off as envisaged. Hence, the government recently (in February 2018) made amendments to the policy. Some of them were: relaxed in minimum area requirements to half from 40 hectares to 20 hectares, increased the permissible Floor Space Index (FSI) on the plot, granted concessions in levies and stamp duty and reduced the minimum width required for approach road. The main advantage apart from these amendments of IIA policy is - the land title becomes clear from encumbrances, which is one of the major concerns for warehouse developers. Interest from warehousing players for taking up land in these IIA notified areas is being observed and if successful many such parks would come under the ambit of the policy.

2. MAP

MAJOR WAREHOUSING LOCATIONS IN MUMBAI



Source: Knight Frank Research

CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

WAREHOUSING CLUSTER	MAJOR WAREHOUSING LOCATIONS
Bhiwandi	Mankoli, Kalher, Kasheli, Dapode, Padgha, Vashere
Panvel	Palaspe, Uran road

Source: Knight Frank Research

3. LARGE OCCUPIERS

SR. NO.	OCCUPIER	OCCUPIER INDUSTRY	WAREHOUSE CLUSTER
1	Allcargo Logistics	3 PL	Bhiwandi
2	Amazon	E-commerce	Bhiwandi
3	H&M	Retail	Bhiwandi
4	DHL	3 PL	Bhiwandi
5	Myntra	E-commerce	Bhiwandi

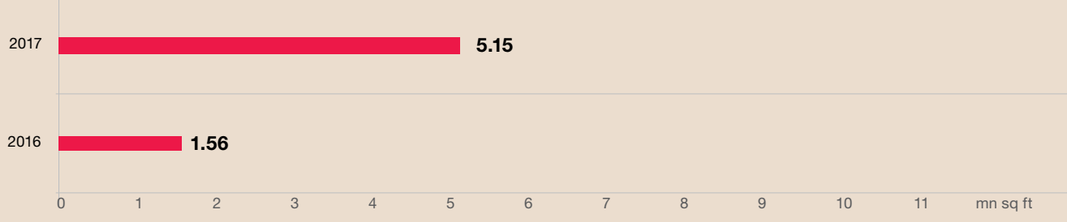
Source: Knight Frank Research

4. SELECT WAREHOUSE/INDUSTRIAL PARK

SR. NO.	WAREHOUSE/INDUSTRIAL PARK	WAREHOUSE CLUSTER
1	Renaissance Industrial Smart City	Bhiwandi (Vashere)
2	Indian Logistics	Bhiwandi (Mankoli)
3	Sai Dhara	Bhiwandi
4	K Square	Bhiwandi
5	IndoSpace Industrial Park	Khopoli (Panvel)

Source: Knight Frank Research

5. WAREHOUSING MARKET TRANSACTION VOLUME (IN MN SQ FT)



Source: Knight Frank Research

6. LAND RATE AND RENTS IN THE BHIWANDI WAREHOUSING BELT

WAREHOUSE CLUSTER	LAND RATE (INR MN./ACRE)	RENT (INR/SQ FT/MTH.)
Mankoli	30 – 50	11 – 14
Vadpe	20 – 35	11 – 14
Padgha	12 – 18	16 – 20
Vashare	12 – 18	16 – 20

Note: The above rentals indicate the rental range for spaces available in Grade A and Grade B warehouses.

LAND RATE AND RENTS IN THE PANVEL WAREHOUSING BELT

WAREHOUSE CLUSTER	LAND RATE (INR MN./ACRE)	RENT (INR/SQ FT/MTH.)
Palaspe	30 – 50	20 – 25
Uran Road	25 – 40	17 – 22

Note: The above rentals indicate the rental range for spaces available in Grade A and Grade B warehouses.

7. EQUITY IRR FOR A DEVELOPMENT PROJECT

Feasible land cost matrix on the Bhiwandi warehousing belt (INR mn/acre)

		Equity IRR for a development project				
		14%	**16%**	**18%**	**20%**	**22%**
Rental value (INR/sq ft/month)	**10**	9	6	4	2	-
	12	12	9	7	5	3
	14	17	14	11	9	7
	16	22	18	15	13	10
	18	27	23	19	16	14
	20	32	28	23	20	17

Note: The table presents 30 options of land cost in INR mn/acre at different returns and rental value combinations. The 12 options which are possible to source in the Bhiwandi warehousing cluster and are upward of the minimum prevailing land rate, which is INR 12 mn/acre in this cluster, have been highlighted in colour. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

20%

Upto 20% equity IRR for a development project can be achieved in the Bhiwandi warehousing cluster

Feasible land cost matrix on the Panvel warehousing belt (INR mn/acre)

		Equity IRR for a development project				
		12%	**14%**	**16%**	**18%**	**20%**
Rental value (INR/sq ft/month)	**16**	26	22	18	15	13
	18	32	27	23	19	16
	20	38	32	28	23	20
	22	43	37	32	28	24
	24	49	42	37	32	26
	26	55	47	41	36	31

Note: The table presents 30 options of land cost in INR mn/acre at different returns and rental value combinations. The 7 options which are possible to source in the Panvel warehousing cluster and are upward of the minimum prevailing land rate, which is INR 25 mn/acre in this cluster, have been highlighted in colour. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

16%

Upto 16% equity IRR for a development project can be achieved in the Panvel warehousing cluster

Source: Knight Frank Research

ASSUMPTIONS

Construction cost (INR/ sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	10%
Tax rate	30%
Cap rate	10%

Source: Knight Frank Research

NCR
WAREHOUSING MARKET

1. KEY FACTS

- Manufacturing activities are concentrated largely in the southern and north-eastern parts of NCR. Currently, the NH-48 and NH-19 cluster in the southern region and the NH-24 and NH-34 cluster in the north-eastern region together account for 85% of the total manufacturing activity within NCR. This is one of the primary reasons for which most of the existing warehouses operate from one of these clusters. While Delhi, NH-44 and NH-9 also have various manufacturing units, their share in NCR's total production output is considerably lower than the other regions.
- The factors clearly indicate that the demand for manufacturing-led warehousing space in NCR will be concentrated primarily in the NH-48 and Ghaziabad clusters, with sectors such as auto and auto ancillary, cement, chemicals and pharmaceuticals and food processing leading in terms of this demand.
- The NH-48 cluster is well served by its comparative proximity to the two most important retail markets in NCR- Gurgaon and Delhi. Together, they account for more than 86% of the total retail spending in NCR and hence, it becomes imperative for retailers to have their warehouses located as close to their target market as possible.
- Moreover, with the emergence of E-tail, the delivery time from the warehouse to the customer has shrunk to under three hours. This necessitates E-tailers to have a warehouse within a driving distance of 60-90 minutes of the end consumer. Since warehousing markets in the NH-48 cluster can access major consumption markets of Delhi and Gurgaon within this time frame, it gives the cluster an edge.
- Similarly, the Ghaziabad warehouse hub is coveted due to its proximity to the densely populated consumption hubs of Ghaziabad, Delhi, Noida and Greater Noida in addition to the manufacturing hubs of Ghaziabad, Faridabad and Sonipat.
- The NCR warehousing market is prominently located from a logistics standpoint as the upcoming Eastern and Western Dedicated Freight Corridors intersect at Dadri in the Ghaziabad warehouse hub.
- The NCR has always been a strong warehousing market and transaction volumes more than doubled YoY to 6.5 mn sq ft during 2017

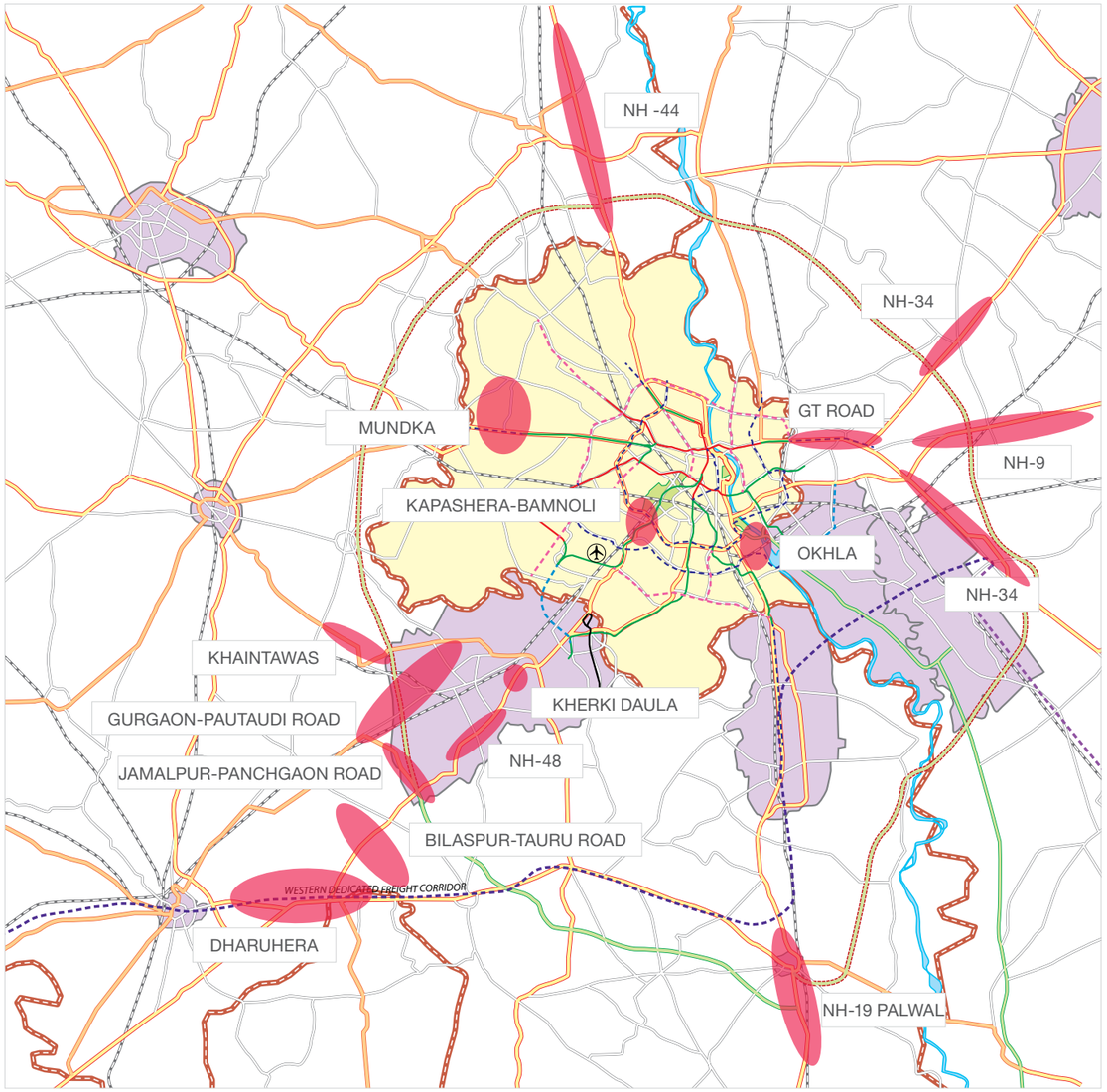
129%

Increase in annual transaction volumes during 2017

The NCR has always been a strong warehousing market and transaction volumes more than doubled YoY to 6.5 mn sq ft during 2017

2. MAP

MAJOR WAREHOUSING LOCATIONS IN NCR



Source: Knight Frank Research

CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

WAREHOUSING CLUSTER	MAJOR WAREHOUSING LOCATIONS
NH-48 cluster	Dharuhera, Gurgaon-Pautaudi road, Jamalpur-Panchgaon road, Bilaspur-Tauru road, Kherki Daula and other such areas accessible from NH-48 and NH-19
Ghaziabad cluster	Ghaziabad, Dadri and other such areas accessible from NH-24 and NH-34
Others	Palwal, Alipur, Kundli, Sonipat, Murthal, Barota and Mundka

Source: Knight Frank Research

3. LARGE OCCUPIERS

SR. NO.	OCCUPIER	OCCUPIER INDUSTRY	WAREHOUSE CLUSTER
1	Amazon	Ecommerce	NH-48
2	Amazon	Ecommerce	Ghaziabad
3	Decathlon	FMCD	NH-48
4	Safexpress	Logistics	NH-48
5	Subros	FMCD	NH-48

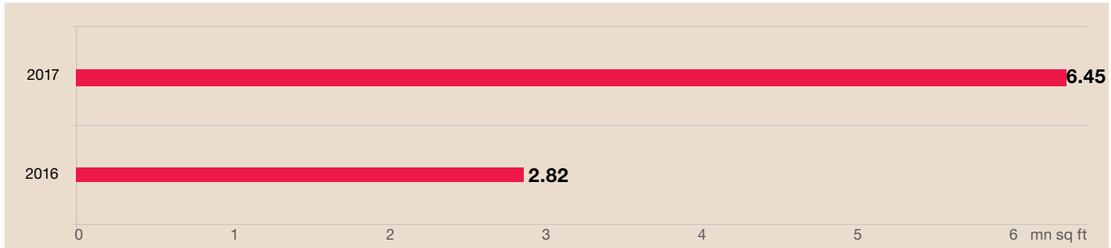
Source: Knight Frank Research

4. SELECT WAREHOUSE/INDUSTRIAL PARK

SR. NO.	WAREHOUSE/INDUSTRIAL PARK	WAREHOUSE CLUSTER
1	Indospace	NH-48
2	Ashiana Logistics	NH-48
3	Agson Global Logistics Park	Ghaziabad
4	Embassy Industrial Parks	NH-48
5	Good luck Warehousing	Ghaziabad

Source: Knight Frank Research

5. WAREHOUSING MARKET TRANSACTION VOLUME (IN MN SQ FT)



Source: Knight Frank Research

6. LAND RATE AND RENTS

WAREHOUSE CLUSTER	LOCATION	LAND RATE (INR MN./ACRE)	RENT (INR/SQ. FT./MTH.)
NH-48 cluster	NH-48 (Gurugram – Binola)	20 – 25	16 – 22
	Pataudi Road	18 – 20	12 – 18
	Jamalpur-Panchgaon Road	10 – 16	12 – 15
	Bilaspur-Tauru Road	12 – 16	12 – 21
	Dharuhera	12 – 18	14 – 20
	NH 71 – Kulana	12 – 14	14 – 18
	Farrukhnagar	12 – 14	12 – 16
Ghaziabad cluster	NH-91 (Dadri) & NH-24 (Hapur)	10 – 18	16 – 20
	Ghaziabad	28 – 40	16 – 22
	Meerut, NH-58	12 – 18	14 – 19
Others	Faridabad – Palwal	10 – 20	10 -17

Note: The above rentals indicate the rental range for spaces available in Grade A and Grade B warehouses.

7. EQUITY IRR FOR A DEVELOPMENT PROJECT

Feasible land cost matrix in the NH-48 warehousing cluster (INR. mn/acre)

		Equity IRR for a development project				
		20%	**22%**	**24%**	**26%**	**28%**
Rental value (INR/sq ft/month)	**12**	5	3	2	1	-
	14	9	7	5	4	2
	16	13	10	8	6	5
	18	16	14	11	9	8
	20	20	17	14	12	10
	22	24	20	17	15	13

Note: The table presents 30 options of land cost in INR. mn/acre at different return and rental value combinations. The 10 options that are possible to source in the NH-48 warehousing cluster and are upward of the minimum prevailing land rate, which is INR. 12 mn/acre in this cluster, have been highlighted. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

26%

Equity IRR for a development project possible in the NH-48 cluster

Feasible land cost matrix in the Ghaziabad warehousing cluster
(INR. mn/acre)

		Equity IRR for a development project				
		20%	**22%**	**24%**	**26%**	**28%**
Rental value (INR/sq ft/month)	**14**	9	7	5	4	2
	16	13	10	8	6	5
	18	16	14	11	9	8
	20	20	17	14	12	10
	22	24	20	17	15	13

Note: The table presents 25 options of land cost in INR. mn/acre at different return and rental value combinations. The 6 options that are possible to source in Ghaziabad and are upward of the minimum prevailing land rate, which is INR. 10 mn/acre in this cluster, have been highlighted. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

Source: Knight Frank Research

22%

Equity IRR for a development project possible in the Ghaziabad cluster

ASSUMPTIONS

Construction cost (INR / sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	10%
Tax rate	30%
Cap rate	10%

Source: Knight Frank Research

PUNE
WAREHOUSING MARKET

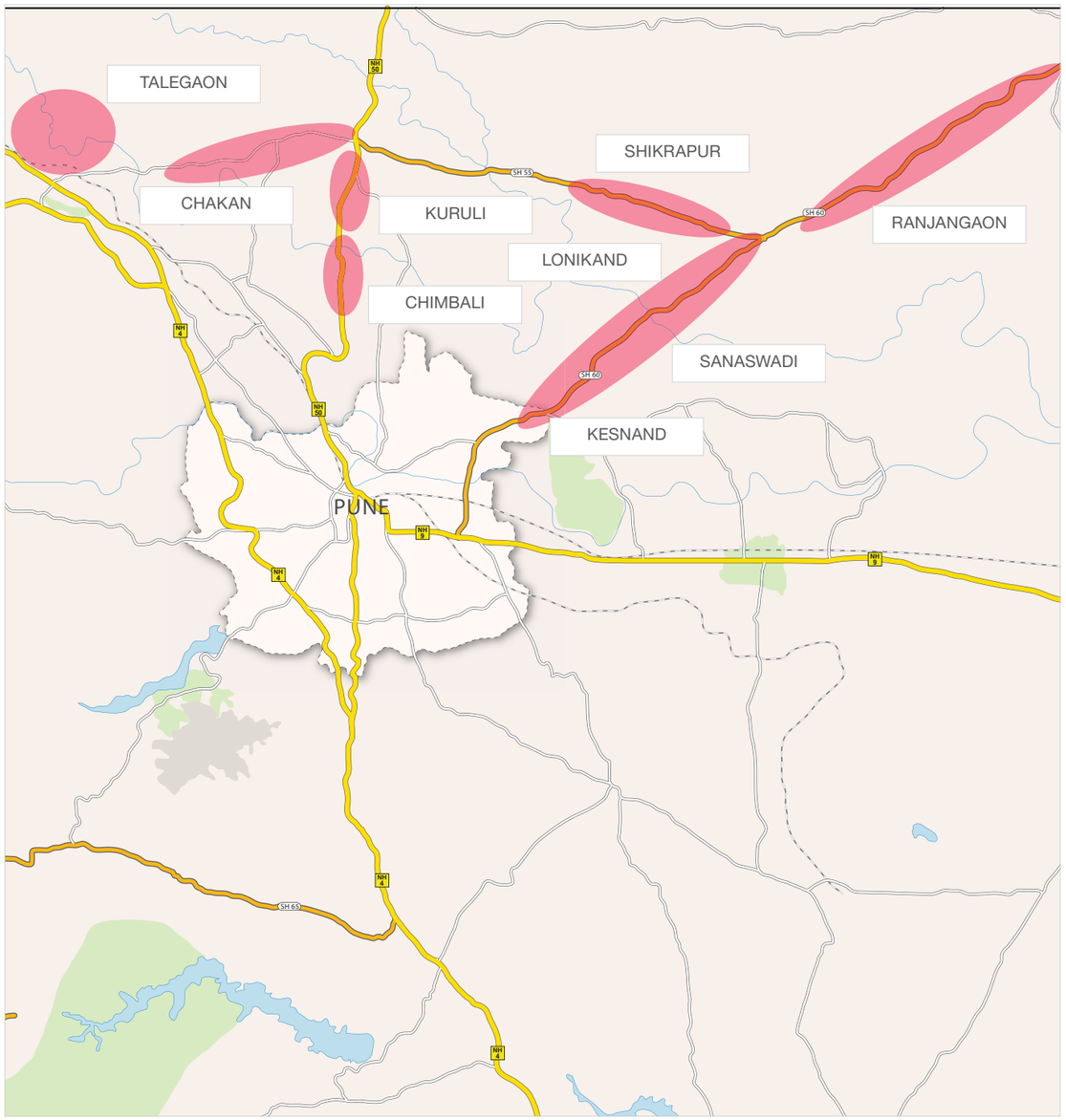
1. KEY FACTS

- The development of three large MIDCs – Talegaon, Chakan and Ranjangaon – in the northern region of Pune has led this belt to be commonly referred to as the manufacturing hub of Pune. Incidentally, emerging as base for the city's warehouse development.
- For the Chakan-Talegaon warehousing cluster, the biggest advantage is the location of two major MIDCs in its vicinity, namely Chakan MIDC and Talegaon MIDC. Additionally, it is also very well connected with the Ranjangaon MIDC and Sanaswadi industrial area, which are at a distance of 50 km and 40 km, respectively.
- In case of the Wagholi-Ranjangaon warehouse cluster, the advantage of this warehousing belt is its proximity to the city centre. Wagholi is located barely 16–18 km from the Pune railway station and 12–16 km from the prominent retail destinations of the city. The travel time taken for the last mile distribution to the various parts of the city is less than an hour's drive from Wagholi, thereby increasing its attractiveness. Additionally, the connectivity with the major industrial hubs of Sanaswadi, Ranjangaon and Chakan is excellent from this cluster.
- Another major industrial cluster that has gradually developed in Pune is the Sanaswadi- Shikrapur belt. This is also situated in the north-eastern part of the city where manufacturing units of companies are located. Since this industrial cluster is not developed by the MIDC, it is relatively small compared to the other clusters in Pune.
- The annual transaction volumes of warehousing space for the Pune warehousing market in 2017 was 2.45 mn. The transaction volumes recorded 22% YoY growth over 2016.

2.45
million sq ft
warehousing space transacted in 2017

2. MAP

MAJOR WAREHOUSING LOCATIONS IN PUNE



Source: Knight Frank Research

CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

WAREHOUSING CLUSTER	MAJOR WAREHOUSING LOCATIONS
Chakan-Talegaon belt	Chakan, Talegaon, Kuruli, Chimbali
Wagholi-Ranjangaon belt	Wagholi, Lonikand, Chakan-Shikrapur Road, Sanaswadi, Ranjangaon

Source: Knight Frank Research

3. LARGE OCCUPIERS

SR. NO.	OCCUPIER	OCCUPIER INDUSTRY	WAREHOUSE CLUSTER
1	IKEA	Furniture	Chakan
2	Mahindra Logistics	3PL	Chakan
3	Ericsson	Electronics	Chakan
4	Haier	Electronics	Ranjangaon
5	Kawasaki	Automobile	Chakan

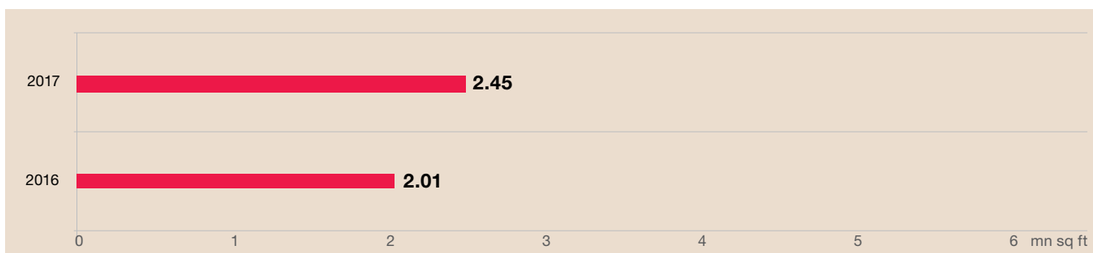
Source: Knight Frank Research

4. SELECT WAREHOUSE/INDUSTRIAL PARK

SR. NO.	WAREHOUSE/INDUSTRIAL PARK	WAREHOUSE CLUSTER
1	IndoSpace	Chakan
2	IndoSpace	Ranjangaon
3	Embassy	Chakan
4	KSH	Chakan
5	Global Group	Chakan

Source: Knight Frank Research

5. WAREHOUSING MARKET TRANSACTION VOLUME (IN MN SQ FT)



Source: Knight Frank Research

6. LAND RATE AND RENTS IN THE CHAKAN-TALEGAON WAREHOUSING BELT

WAREHOUSE CLUSTER	LAND RATE (INR MN./ACRE)	RENT (INR/SQ FT/MTH.)
Chakan	20 – 30	24 – 28
Talegaon	10 – 20	20 – 24
Kuruli	20 – 30	16 – 20
Chimbali	20 – 30	16 – 20

Note: The above rentals indicate the rental range for spaces available in Grade A and Grade B warehouses.

LAND RATE AND RENTS IN THE WAGHOLI-RANJANGAON WAREHOUSING BELT

WAREHOUSE CLUSTER	LAND RATE (INR MN./ACRE)	RENT (INR/SQ FT/MTH.)
Wagholi	25 – 35	16 – 20
Lonikand	10 – 20	12 – 16
Chakan-Shikrapur Road	15 – 20	18 – 22
Sanaswadi	14 – 22	16 – 20

Note: The above rentals indicate the rental range for spaces available in Grade A and Grade B warehouses.

7. EQUITY IRR FOR A DEVELOPMENT PROJECT

Feasible land cost matrix on the Chakan-Talegaon warehousing belt (INR mn/acre)

		Equity IRR for a development project				
		22%	**24%**	**26%**	**28%**	**30%**
Rental value (INR/sq ft/month)	**16**	10	8	6	5	4
	18	14	11	9	8	6
	20	17	14	12	10	8
	22	20	17	15	13	11
	24	24	20	18	15	13
	26	27	23	20	18	15
	28	30	26	23	20	18

Note: The table presents 35 options of land cost in INR mn/acre at different returns and rental value combinations. The 11 options that are possible to source on the Chakan-Talegaon belt and are upwards of the minimum prevailing land rate, which is INR 10 mn/acre in this cluster, have been highlighted in colour. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

28%

Upto 28% equity IRR for a development project is achievable in the Chakan-Talegaon belt

Feasible land cost matrix on the Wagholi-Ranjangaon warehousing belt (INR mn/acre)

		Equity IRR for a development project				
		16%	**18%**	**20%**	**22%**	**24%**
Rental value (INR/sq ft/month)	**12**	9	7	5	3	2
	14	14	11	9	7	5
	16	18	15	13	10	8
	18	23	19	16	14	11
	20	28	23	20	17	14
	22	32	28	24	20	17

Note: The table presents 30 options of land cost in INR mn/acre at different returns and rental value combinations. The 11 options that are possible to source on the Wagholi-Ranjangaon warehousing belt and are upwards of the minimum prevailing land rate, which is INR 10 mn/acre in this cluster, have been highlighted in colour. Keeping other development parameters constant, the variation in rental is attributed purely to the land price.

Source: Knight Frank Research

22%

Upto 22% equity IRR for a development project is achievable in the Wagholi-Ranjangaon belt

ASSUMPTIONS

Construction cost (INR/ sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	10%
Tax rate	30%
Cap rate	10%

Source: Knight Frank Research

ABOUT KNIGHT FRANK

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Supported by research and information experts, our consultants work with government authorities, infrastructure companies, developers, landlords, investors and occupiers to help them make the best use of their property.

We offer the following services to developers, government projects, PE funds and industrial development corporations.

- Valuation
- Development consultancy
- Strategic consultancy
- Government and infrastructure

CAPITAL MARKETS

Our experts evaluate and structure investments on behalf of high-net-worth individuals, leading institutions, developers and private equity funds. We provide acquisition and divestment services for all asset classes such as commercial, residential, hospitality, retail, and industrial entities.

We offer the following services to fund houses, developers, corporates and developers.

- Fundraising
- Land transactions
- Core Asset Sale

OFFICE

Our team assists and advises tenants and landlords / property owners on leasing, acquisition or disposition of property. We assist corporates on location selection, sourcing, financial analysis, structuring transactions, due diligence and negotiations. For landlords, we source tenants, market the project, structure the transaction and manage all the documentation.

We offer the following services to corporate, landlords and investors.

- Space Acquisition / Disposal
- Workspace Consulting
- Lease Administration
- Renegotiations / Re-gear
- Renewal Management
- Commercial Space / Project Marketing

INDUSTRIAL AND ASSET SERVICES

Our industrial team helps our clients with location analysis, site selection, securing an industrial plot and working with government agencies for approvals and documentation.

We offer the following services to industrial parks, investors, 3 PL companies, landlords and corporates.

- Industrial land acquisition
- Warehousing
- Industrial asset disposal
- Industrial investment opportunities
- Built-to-suit facilities

RETAIL

With a thorough knowledge of current market rentals and leasing trends, our team works with clients to build an entry strategy based on the brand's requirements, conducts location analysis and negotiates the best deal. From national chains to institutions and retailers of international luxury goods, our clients receive the widest range of transactional services for acquisition or disposition of property.

We offer the following services to retailers, high streets, developers and schools.

- Advisory
- Business Development
- Lamdlord Representation for Mall Owners

RESIDENTIAL

Our residential team specializes in new homes, resale, leasing and international properties. Working with corporates, MNCs and high-net-worth individuals, we offer comprehensive services to the buyers, sellers, tenants and landlords.

We offer the following services to corporates, investors and individual buyers.

- Primary Sale
- Resale
- Leasing
- International Property
- Second Homes

FACILITIES & ASSET MANAGEMENT

We understand the complex requirements of facilities management and offer customised solutions backed with international best practices to help our clients maximise operational efficiencies at optimum costs. We lay strong emphasis on sustainability measures while ensuring superior service delivery, quality and safe working environments.

We offer the following services to corporates, developers, commercial property owners, residential and retail properties.

- Consultancy
- Facilities Management
- Asset Management

PROJECT MANAGEMENT

Our team of qualified architects, engineers and construction professionals help clients with technical due diligence, audit management, programmer management and construction management services. Our Engineering, Procurement & Construction (EPC) model provides a one-stop shop for all services from start to close-out.

We offer the following services to corporates, developers, commercial property owners, residential developments and retail enterprises.

- Project Management
- EPC – Design & Build
- Other Services

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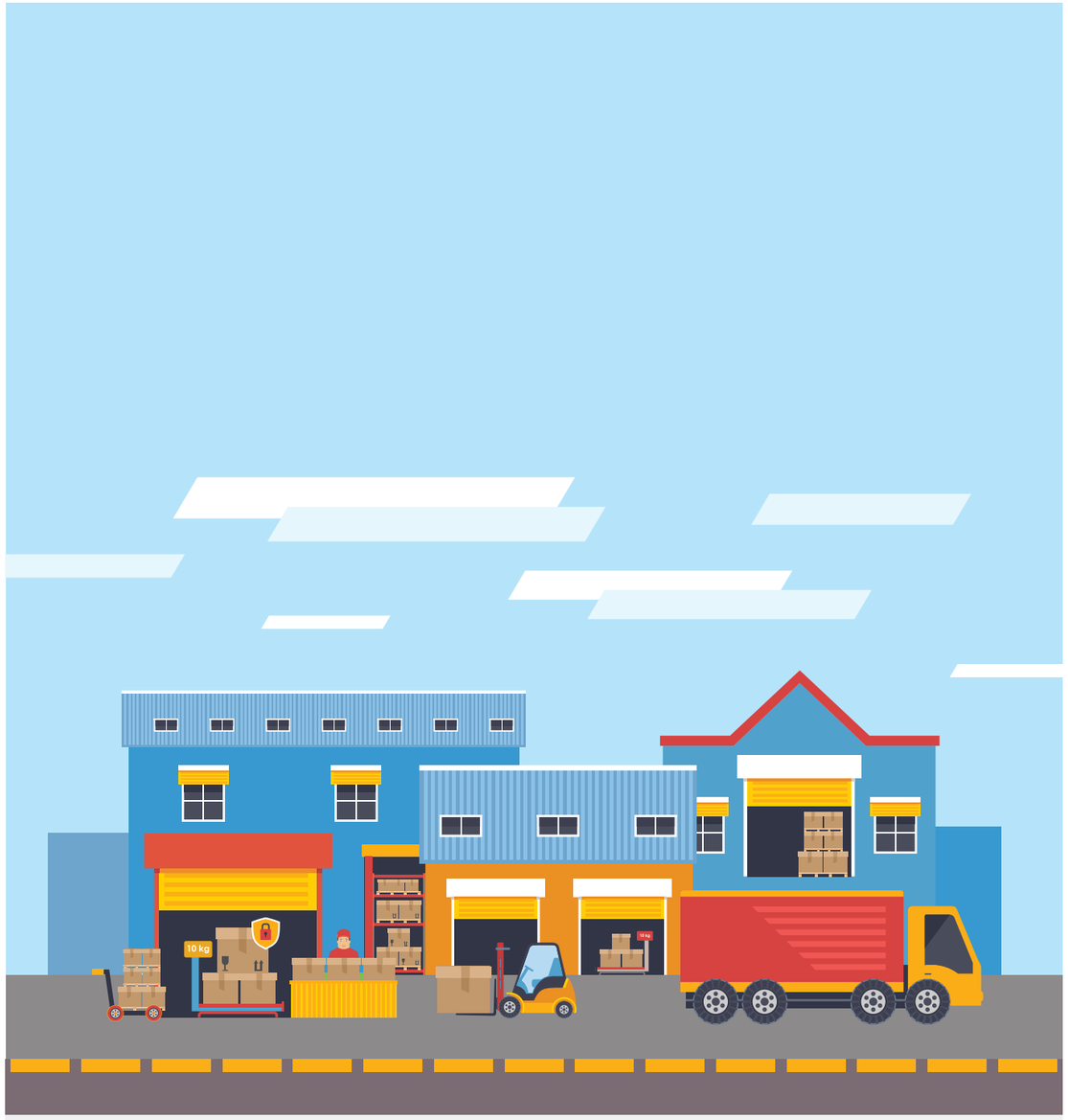

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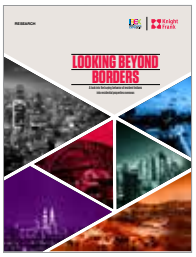

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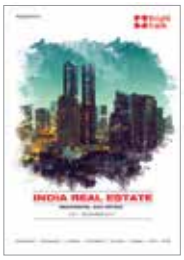

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