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Building warehousing competitiveness

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Foreword

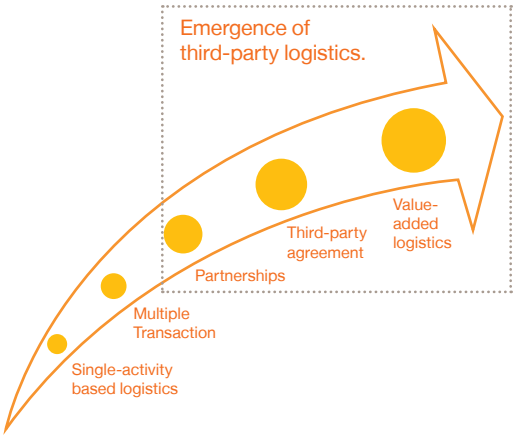
The CII Institute of Logistics, in association with PricewaterhouseCoopers Pvt. Ltd as knowledge partner, is proud to release this thought leadership publication ***Building warehousing competitiveness.***

The publication focuses on the evolution of the warehousing sector in India and the opportunities that the Indian landscape offers for the growth of its players. The sector's many challenges are being addressed through various initiatives. The economy flush with investments has also propelled this sector and created immense opportunities. This has compelled warehousing players to opt for ways to be competitive with sustainable growth. In this document, we also explain how the adoption of appropriate technology will increase the competitiveness of warehousing players by delivering substantial operating savings while also improving the quality of services.

Rachna Nath
Executive Director, PwC

Overview of warehousing in India

The Indian logistics market has evolved from traditional transport companies to a full-fledged logistics service provider, which offers various supply chain services such as transportation, warehousing and other value additions. Traditionally, there existed only pure transport or warehousing service providers of the in-house nature. The trend changed towards providing customised services and started being outsourced to specialised players in the industry. Thus emerged the concept of third-party logistics (3PL), where companies provide outsourced or third-party logistics services to companies for part, or sometimes all of their supply chain management functions. Third-party logistics providers typically specialise in integrated operation, warehousing and transportation services that can be scaled and customised based on market conditions and the demands and delivery service requirements for their products and materials.



The burgeoning Indian economy, strongly supported by increasing FDI, improved market reforms and regulations and growing consumption levels in the country has been the major driver of the logistics market. Outsourcing of manufacturing activity has been on the rise for industries such as automotive and ancillary products, pharma and industrial equipments. In addition, the entry of global organised players in the retail sector has been another driver for the development of organised players in the country. This has also led to the development of improved international trade activities. Increasing market sophistication, changing customer choices and global competition are pressurising manufacturers to provide better goods and services to customers at lower costs. In a way this has put the pressure on managing costs more efficiently. Various industries have taken up initiatives to cut down on direct material costs, administrative costs and have tried streamlining internal production processes. Yet it has been observed that the maximum cost savings can be achieved by managing the supply chain efficiently.

The supply chain is a vital component, efficient planning of which can bring down costs to a great extent. Manufacturers are working towards leaner supply chains with lesser lead times in order to gain competitiveness in the market. Transportation, warehousing and distribution are the critical components of the entire supply chain. With manufacturing activity increasing in the last few years, logistics has gained equal importance in order to provide better goods at lesser cost.

The logistics market in India was valued at ₹ 5.6 trillion in 2010 and is forecast to grow at CAGR of over eight per cent over the next five years. World Bank has ranked India 47th among 150 countries, in terms of logistics performance in 2010 and its potential in the future. It is forecast to grow annually at a rate of 15 to 20% to reach ₹ 17 trillion by 2015. However, logistics costs in India constitute around 13 to 14% of its GDP against seven to eight per cent being spent by developed countries such as the US, Japan and other European countries. This is due to market constraints such as highly fragmented structures, poor infrastructure and complicated tax structure.

The government is investing in infrastructure to make the sector more competitive, efficient and cost-effective. Changing regulatory set-up, government incentives, infrastructure development projects, increasing transparency, relaxed tax structures to encourage participation of foreign and private players in the sector and dedicated logistics parks and Free Trade Warehousing Zones (FTWZ) are fostering the growth of the logistics market in India and also helping identify it as an independent sector by the government.

In the complete logistics value chain, warehousing forms a very important link. Warehousing, which forms 20% of the total logistics market, was traditionally used as godowns to store goods from the time of production till the time of consumption. Over time and with the changing role of the sector, traditional warehouses have transformed to collection and storage points, where raw material, intermediate and manufactured goods are collected, assorted, stored and distributed to the point of consumption/ sale. The warehousing market in India is expected to grow at a rate of 35 to 40% annually, displaying high potential for growth over the next few years. Currently, the sector is highly fragmented with small players holding small units distributed across states with many challenges:

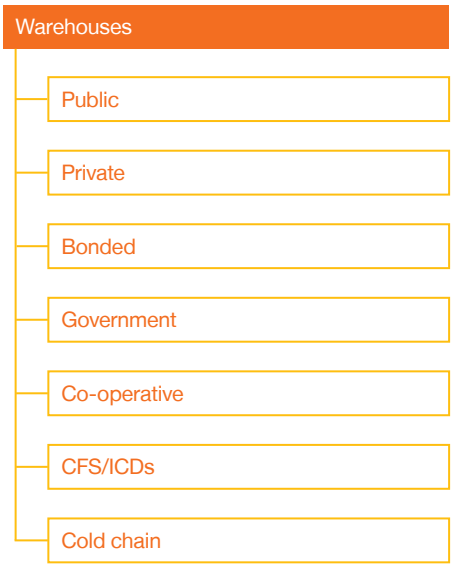
- Inadequate skilled labour
- Inefficient material handling with outdated handling equipment
- Limited technology penetration and innovation
- Lack of world-class standards and specifications

Almost 92% of the market is dominated by unorganised players, while 70 to 75% of the organised market is being controlled by PSUs such as Central Warehousing Corporation (CWC), the Food Corporation of India (FCI) and State Warehousing Corporations (SWCs). The current capacity of the organised warehouses, controlled by corporates, cooperative and private sectors, is 106.95 million metric tonnes (MT), of which the private sector has only 18 million MT, while Public Private Partnerships (PPP) are yet to start off in the sector.

Lately, the entry of international 3PLs has given this sector a move in the direction of further maturity with new technology interventions, automated material handling devices and standards. This has intensified the competition with domestic players. In addition, the growing demand of companies for better services at lesser costs, has led to the emergence of organised warehousing in the country. As a result, warehouses are now stressing on having efficient inventory management systems with greater emphasis on value-added services such as consolidation, labelling, packaging and re-packaging, bar-coding, distribution services, custom clearance service, customer service and reverse logistics.

Types of warehouses

Traditionally, warehouses in India were broadly classified into public-private, bonded, government and co-operative warehouses. Lately, the concepts of cold chains, container freight stations (CFS) and inland container depots (ICD) have been gaining importance. Increasing post-harvest losses have propelled the development of cold storages to enable the storage of agricultural produce almost throughout the year. Similarly, growing international trade and manufacturing activity has led to growing container trade and a greater emphasis on the concept of CFS and ICDs for easy maintenance and reduced pilferage of cargo.



Public warehouses

Warehouses, licensed by the government to private entities, individual or cooperative societies to store goods of the general public are called public warehouses. Usually, these warehouses are set up at transportation points of railways, highways and waterways, providing the facilities of receipt, dispatch, loading and unloading of goods. They are rented out against a certain fee. The government also regulates the functions and operations of these warehouses used mostly by manufacturers, wholesalers, exporters, importers, government agencies, etc. They are economical and easily available storage facilities for small manufacturers and traders too. Some warehouses provide facilities for the inspection of goods and also permit packaging and grading. The public warehousing receipts serve as good collateral securities for borrowings.

Private warehouses

These warehouses are owned by private entities or individuals and are used exclusively for the goods owned, imported by or on behalf of the licensee. The warehouses are usually constructed at strategic locations to cater various manufacturing, business and service units. They are flexible enough to be customised in terms of storage and placement, according to the nature of the products.

Bonded warehouses

The concept of bonded warehouses was developed in order to facilitate the deferred payment of customs duty by entrepreneurs, exporters and importers, to enable them to carry out their operations with least investment. These warehouses are used to store imported goods under an undertaking or 'bond', which does not allow the release of goods until the custom duties are paid. These are generally owned, managed and controlled by both government and private parties and are established near ports. Government and private parties together manage bonded warehouses. Currently, the Central Warehousing Corporation operates 75 custom-bonded warehouses with a total capacity of nearly 0.5 million MTs located at Ahmedabad, Bangalore, Bhopal, Chandigarh, Chennai, Delhi, Hyderabad, Jaipur, J N Port, Kolkata, Kochi, Lucknow and Mumbai.

Government warehouses

These warehouses are owned, managed and controlled by central or state governments, public corporations or local authorities. These warehouses can be used by both government and private organisations. CWC, SWC and FCI are examples of agencies maintaining government warehouses.

Co-operative warehouses

These warehouses are owned, managed and controlled by co-operative societies. They provide their members with warehousing facilities at cheaper rates.

Container freight stations (CFS)/inland container depots (ICDs)

CFSs/ICDs are custom-bonded facility with public authority status for the handling and storage for containers. These depots equipped with warehousing space, adequate handling equipment and IT infrastructure. Services of CFS/ICDs include the following:

- Loading/unloading
- Receipt/dispatch of goods
- Transit operations by road/rail to and from the port
- Stuffing/de-stuffing of containers
- Customs clearance
- Consolidation and desegregation of Less than Container Load (LCL) cargo
- Temporary storage of cargo and containers
- Repair and maintenance of containers
- Refrigerated warehousing
- Hub-and-spoke services

CFS is an off-dock facility located near the service port. ICD, on the other hand is located in the hinterland. CFSs/ICDs act as consolidation points, transit storage locations and ease the compliance procedure with local customs, reduce damage/pilferage, optimise container utilisation and reduce transport/ inventory cost.

Cold storage

A cold storage is a temperature-controlled storage space and caters to industries such as agriculture, horticulture, fisheries and aquaculture, dairy and processed food. The highly fragmented cold storage market has 5,386 cold storage units with the total capacity of nearly 23.7 million MT. More than 56% of the capacity is utilised by potato storage, while the rest is used for other commodities. Currently, the Indian cold storage market is valued at ₹ 117 billion and is expected to reach ₹ 558 billion by 2015. Sixty-five per cent of the total installed capacity of cold storage in the country is located in Uttar Pradesh and West Bengal. The key activities involved in cold storages are as follows:

- Aggregation
- Sorting
- Pre-cooling
- Packaging from farms to manufacturers

Integrated cold storage warehousing has huge potential in India. The cold storage system, when supplemented with temperature-controlled transportation connecting farm-level storage facilities, processing units and distribution outlets will not only improve efficiency but will also solve our problem of wastage of agricultural products. The cold chains market is dominated by private players despite the presence of state-owned players. Though the government has provided various incentives in tax and duties to encourage cold chain players the results are yet to be seen. In addition, cold chain and container-handling facilities should also be augmented at major sea and airports to target global markets.

Growth drivers

The growth in warehousing in India is primarily being driven by the burgeoning manufacturing activity, increasing international trade and the emergence of organised retail in the country. Increasing private and foreign investments in infrastructure and easing government regulations are further bolstering the growth of the warehousing sector in India.

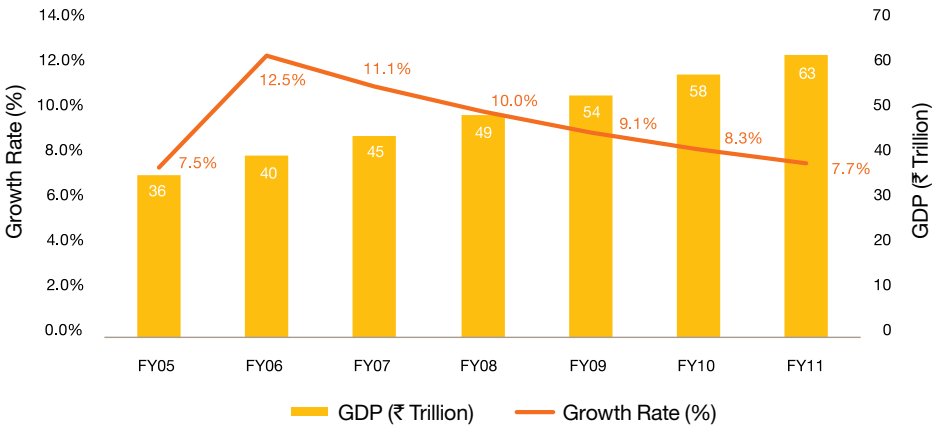
Policy reforms from the government including the establishment of logistics parks in the PPP model, the implementation of the Warehousing and Development Act 2007 and serious attempts to roll out Goods and Services Tax (GST) are added reasons for the expected expansion in the warehousing sector.

GDP, improving manufacturing activity and merchandise trade

The Indian economy has been registering buoyant CAGR of almost 10% in the last six years. Indian GDP in FY 2011 was recorded at ₹ 63 trillion, recording a growth of 8.5%. Though the economy suffered in 2009 due to the global recession, the quick revival of industrial production and surging domestic consumption helped revive it.

The growth of industrial output surpassed the growth of services in FY 2010 and FY 2011. Agriculture has been losing share to services, while industry is continuing to retain its share in the GDP.

GDP Growth Trends



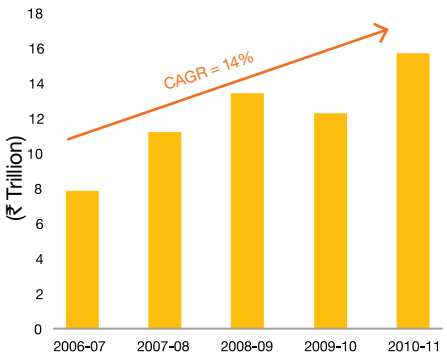
GDP growth at factor cost	Overall	Agriculture	Industry	Services
FY11 (AE)	8.6%	5.4%	8.1%	9.6%
FY10 (QE)	8.0%	0.4%	8.0%	10.1%
FY09	6.7%	-0.1%	4.4%	10.1%
FY08	9.2%	4.7%	9.5%	10.5%

Source: Ministry of Finance
FY= 1 April to 31 March
AE: Advance estimates
QE: Quick estimates

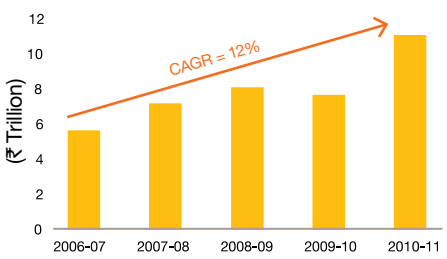
Though the contribution of the agricultural activity to the GDP has been dwindling over the last few years, it has regained its importance on account of attractive government incentives and the entry of private players in the sector. Warehousing plays a major role in the sector as it provides space to store agricultural produce until they are distributed to the end-consumer. As a result, agri-warehouses and cold chain facilities have been gaining importance. Over 40% of the agri-warehouses are organised with players such as FCI, CWC and SWC, unlike the highly fragmented industrial warehousing sector.

Industrial activity has been growing steadily due to the increasing outsourcing in industries such as automobile and ancillaries, pharmaceuticals, hi-tech electronics and processed food. This has in turn boosted the growth of more organised warehouses with better value-added services and facilities. In addition, the burgeoning merchandise trade has also been a strong driver of CFS and ICDs.

Imports (₹ Trillion)



Exports (₹ Trillion)



Investments in infrastructure

Infrastructure is one of the key growth factors for warehousing. Insufficient and inefficient infrastructure has been a major drawback of the Indian warehousing sector. The government has allocated funds in order to address this issue. According to the Planning Commission, an investment of ₹ 22 trillion is proposed for the 11th Five Year Plan, of which a significant share will be invested in infrastructure. It is expected that ₹ 200 billion will be spent on supply chain and logistics infrastructure in 2012. PwC, in a survey conducted with 1200 chief executives from 69 countries, found that government leadership in building infrastructure is critical in ensuring competitiveness of countries. PwC anticipates an investment of around ₹ 45 trillion in the infrastructure sector in India during 2012-17. The government has eased FDI norms and is promoting PPPs to pump in more investments in warehouses.

Private players are also taking initiatives to develop infrastructure:

- DHL Global Forwarding is planning to establish FTWZ at Sriperumbudur with an investment of ₹ 45 million to provide the advantages of a duty-free zone with high-quality infrastructure.
- Arshiya International's 165-acre state-of-the-art FTWZ at Panvel near Mumbai, is located near the container terminal of the Jawaharlal Nehru Port Trust. It is expected to yield higher profits, lower costs and higher efficiency for its customers. The company plans to set up another five FTWZs, five distriParks and a 75-train pan-India rail charter with an investment of ₹ 200 billion over the next five years.

With such investments in infrastructure, global companies are increasingly looking at Indian markets as a source hub for their business requirement. According to the survey, about 15% of the CEOs surveyed were looking forward to source their supplies from India, due to its cost-competitiveness.

Road

Projects such as north-south and east-west road corridors, the Golden Quadrilateral and other NHAI projects are being promoted to enable better connectivity and the development of multi-modal and inter-modal transportation. These projects have been attracting huge FDI. Investment of over ₹ 2.5 trillion to 3 trillion is required over the next five years in order to improve road infrastructure. In addition, an ambitious National Highway Development Programme (NHDP), involving a total investment of ₹ 2, 20, 000 crore up to 2012, has been established.

The government targets the following:

- Developing 1000 km of expressways
- Developing 8,737 km of roads, including 3,846 km of national highways, in the north-east
- Four-laning 20, 000 km of national highways
- Four-laning 6,736 km on north-south and east-west corridors
- Six-laning 6,500 km of the Golden Quadrilateral and selected national highways
- Widening 20,000 km of national highways to two lanes

Such extensive construction and expansion of the infrastructure will enable the construction of warehouses at common points of collection to become a hub-and-spoke distribution system.

Rail

India has one of the largest rail networks in the world and is the cheapest means of transport. Many initiatives are being planned to increase its utility and geographic reach. One is the construction of a dedicated freight corridor, with an investment of over ₹ 4 billion slated for 2008-09 and ₹ 30 billion for 2009-10. The dedicated freight lines will help the railways increase their capacity by building high-capacity, higher-speed dedicated freight corridors along the Golden Quadrilateral.

As per the present policy, the government is focusing on accelerating the development of the network for freight terminals with private investments in order to integrate rail projects with the supply chain. The government has already permitted 15 private train container operators to run container trains. It has also rolled out the following two schemes to encourage investments in rolling stock and terminals.

- Special Freight Train Operator (SFTO): Through this scheme, the share of railways is expected to increase in non-conventional traffic such as bulk alumina, fly ash and bulk fertilizers.
- Private Freight Terminals (PFT): This is expected to enable the rapid development of a network of freight terminals and integrate rail transport with the supply chain to provide efficient logistics to end-users.

The government's Dedicated Freight Corridor (DFC) programme is proposed to be completed in stages, with the western (Delhi-Mumbai) and eastern corridors (Ludhiana-Delhi-Kolkata) being the first two to be developed. These corridors will help boost India's industrial productivity by transporting raw materials to industrial hubs and manufactured goods to ports in a faster, more efficient manner, and at reduced costs. This will require the construction of warehouses with world-class facilities for the storage and dissemination of goods in transit.

Diamond Rail Corridor Project, a dedicated freight corridor is being commissioned, in order to connect the western and eastern rail routes. In addition, an investment of ₹ 58.5 billion is being made in cooperation with the government of Japan to commence engineering services for phase-I of the dedicated freight corridor. Improvement of the eastern corridor will also contribute to the development of the proposed Trans-Asian Railway involving infrastructure investments in India, Bangladesh, and countries further east.

The recent increase in containerised cargo has led to a demand for its movement through railway containers. The government, due to a lack of funds for infrastructure, has opened up the sector for private investments in 2006, thus paving the way for PPPs . In 2006, the ministry of railways had announced a new train policy, which allowed private players to obtain licences for operating container trains on the Indian Railways (IR) network. This was done to attract more container traffic and to introduce competition in the sector. CONCOR, a subsidiary of IR monopolised the container trains, until 2006. Gateway Rail Freight Pvt Ltd, was the first private entrant to run container trains and was followed by Innovative B2B Logistics, Pipavav Railway Corporation, etc.

The increasing competition in the sector is paving the way for more systematic and sophisticated services by the railways and is giving tough competition to the road sector as one of the most cost-effective modes of transport in the country.

IT penetration has been critical in managing and streamlining processes. This has eased container management at terminals with the help of online monitoring of transactions and container traffic at terminals and depots.

Ports

Manufacturing and power projects and higher cargo traffic at ports are driving the growth of the Indian ports sector. In addition, the government has been promoting PPP in the ports sector to enhance the capabilities and traffic-handling capacity of the ports.

The government has planned to invest ₹ 540 billion in 276 projects and has permitted 100% FDI under the automatic route for port development projects in order to improve port efficiency while handling increasing port traffic. The civil aviation ministry is also taking measures to improve airport efficiency through projects such as the multi-modal international hub airport (MIHAN) project at Nagpur, strategically located in the centre of the country. It may well become a hub-and-spoke distribution centre for India. The growing containerised traffic coupled with government initiatives is expected to drive the sector.

In addition, private players are also taking the initiative in developing port infrastructure. For example, Shreyas Shipping and Logistics plans to invest ₹ 1 billion to expand its shipping, warehousing and inland transportation capacities. It is also planning to set up warehouses at around 10 locations across India to increase its trailer strength from eight to 100 in phases to enhance its inland transportation capacity. Such private initiatives coupled with government investments are expected to boost the port logistics in India.

Opportunities for warehousing in India

India has become a manufacturing hub for most industries. The main reasons for this are increasing domestic consumption and the cost-effectiveness of outsourcing manufacturing activities. Some industries have gained tremendous traction over the last few years, cashing in on the ongoing trend of the economy. These include the following:

- Automotive
- Retail
- Pharmaceutical
- Agriculture

Automotive

The automobile industry in India has attracted much attention due to the sharp increase in the sales of automobiles in the country. In January 2010, total automobile sales in the domestic market reached 1,11,4157 units. The figures show an increment of 44.9% compared to the sales units of 7,68,698 in the same period last year. Annually, the Indian automobile industry is growing at an average rate of 30% and marking itself as one of the fastest-growing industries in India. The market, estimated to have a turnover of over ₹ 3 trillion in 2011, is expected to grow by 11 to 13% during 2011-12.

Now, with the advent of foreign players into the market, the increasing importance of efficient logistics and Just In Time (JIT) services, has made the automotive logistics industry in India evolve much faster as compared to that in other sectors. Almost all players in the automotive industry use 2PL or 3PL for a part of their logistics operations. A trend towards creating a perfect blend of in-house and outsourced service components to effectively manage supply chains is leading to the emergence of 4PL services.

Warehousing has been gaining tremendous importance due to the growing need to reduce storage and lead times for inventory. In addition, the concentration of the auto manufacturing activity in a few places has led manufacturers to construct warehouses in strategic locations, which then serves as the central point for distribution and collection of finished and intermediate products including auto parts. This primarily works on the theory of augmentation and assortment.

The government has also contributed to the growth of the warehousing sector. It has established Special Economic Zones (SEZs) especially for auto manufacturers, usually close to the ports, to cater to the growing demand in the automobile sector. SEZs in Haryana, Jharkhand, Karnataka, Maharashtra, Tamil Nadu and West Bengal are established by government. It is now planning to set up two new automotive manufacturing hubs spread across 10,000 acres each in central and eastern India. Mahindra World City is a prominent SEZ, located in Chennai, Tamil Nadu. Companies such as Wabco-TVS, Brakes India Limited, Madras Engineering Industries, Sundaram Brake Linings, Sundaram Clayton, Sundaram Fasteners, Timken India and UACL Fuel Systems have set up their manufacturing units in the SEZ to harness the advantage of being the major auto export hub in India. The main purpose of these SEZs is to help manufacturers either set up their own warehouses or outsource them to 3PLs. The SEZs provide manufacturers with dedicated as well as shared-user facilities wherein, two or more manufacturers share the warehousing services in order to cut down their supply chain costs. This has also increased the need for the use of modern technology such as RFID and WMS to track the goods in the warehouses.

The 3PLs such as DHL and NYK also provide value-added services such as assembling, pre-delivery inspection, cross-dock facilities, consolidation and deconsolidation centres, automation and sorting, catering to the needs of the automakers. The auto logistics market is expected to transform from traditional in-house logistics to increased outsourced activity to specialised 3PLs. This in turn is expected to result in sophisticated and mature supply chains, thus reducing costs and fostering the growth of the auto logistics market.

Retail

The retail market in India has been one of the most attractive investment destinations for multinationals and private equities. According to US consulting group AT Kearney's report published in June 2010, India is the third-most attractive retail market for global retailers among the 30 largest emerging markets. Favourable demographics, rising disposable incomes, increasing urbanisation, relatively low penetration along with

large expansions by existing players and the entry of new players are the major drivers of the Indian organised retail market. Though the market slowed down due to the economic downturn, the rebound in late 2009 and consequent recovery in consumer sentiments helped the organised retail industry expand by 25% in 2009-10.

Driven by buoyant consumer demand and the expansion plans of organised retail players, CRISIL Research forecasts the sector to grow at an average annual rate of 23% to ₹ 3.4 trillion in 2014-15 from ₹ 1.2 trillion in 2009-10. Consequently, organised retail penetration is likely to increase to 9.1% in 2014-15 from 6.4% in 2009-10.

Increasing industrial investments in manufacturing (near Chennai) and IT investments (in Bangalore and other southern cities) are expected to drive the growth of retailing especially in south India, thus pushing the demand for modern warehouse space. In addition, the increasing relationships of logistics players–DHL, FedEx, Gati, with retail companies–Celio, Pantaloons, Future Group, Danone, are increasing the demand for quality warehousing spaces in India.

With the increasing demand for modern warehouses, global players have started foraying into the market either in partnership with domestic real-estate companies or by setting up their own subsidiaries in the country. For example, Concerto Developments, one of the largest logistics and warehouse developers in Europe, has set up a company in India, Logistics India Real Estates, which is set to open a chain of modern warehouse and logistics projects. Its first warehouse infrastructure is to be constructed in Chennai, followed by one in Bangalore.

The success and credibility of retailers depends on ensuring continuous availability of a wide range of products in optimum quantities across a widely spread operational network. This translates to a high level of control on logistics. The retail segment also demands the highest quality of service from logistics solution providers. Global benchmarks are being increasingly applied to retail operations in India. Not only do logistics service providers require breadth of transportation network but also expertise in storage and value-added services to cater to such a dynamic market.

Food retailing has also gained importance in the recent past. India's food retail sector, worth around ₹ 3.1 trillion is expected to more than double, to ₹ 6.7 trillion by 2025, riding on the emerging organised retail as well as the change in consumption patterns along with fast-changing demographics and habits. As food products are perishable, there arises the need for temperature-controlled warehousing and transportation services, thus opening up investment opportunities in cold storages for multinational companies and private equity firms.

Apart from foods retailing, the changing spending patterns in rural areas have also been attracting retailers to establish their bases in there. As rural areas do not have well-developed infrastructure, retailers are investing in cold storages and customised warehouses nearer to the farms and manufacturing places to avoid damage during transportation and to reduce costs.

The Department of Industrial Policy and Promotion (DIPP) has plans to induce FDI in multi-brand retailing. It wants FDIs to first set up their back-end logistics to create employment in rural India before allowing FDIs to venture into multi-brand retailing.

Pharmaceutical

The pharmaceutical market is one of the few sectors, which has been relatively resilient during the economic downturn. A highly efficient logistics operation and integrated supply chain is essential to support the growth of the pharmaceutical industry. Most pharmaceutical companies have increased the outsourcing of their logistics functions to 3PLs mainly due to the pressure of lowering operation costs and increasing supply chain efficiency. Logistics costs account for about 45 to 55% of the costs in the pharmaceutical value chain. These costs include packaging, distribution and other value-added services.

More consolidation and integration of logistics operations are likely to happen in the future as customers are constantly looking to outsource their logistics operations to logistics service providers.

Pharmaceuticals require highly reliable and safe storage spaces as they are temperature-sensitive and require an environment where temperature range can be pre-defined to accommodate the specific qualifications of the cargo. As Indian pharma companies seek opportunities to supply drugs to the global market, more developed cold-chain management practices will be required to maintain their competitiveness in the market.

Some of the companies have either set up their own cold storages or have outsourced it to specialised 3PLs. For example, Eli Lilly in India have implemented initiatives such as having their own vehicles equipped with cold-chain management systems. Other companies such as World Courier have developed cold-chain management models to help pharmaceutical companies maintain the cold chain.

Agriculture

Agriculture, one of the main occupations of India, accounts for about 16% of the GDP. Despite agriculture losing its share in GDP, it is still the largest economic sector. Lately, agriculture has been regaining its sheen, with the government and private entities taking special interest in developing the sector. However, the agriculture supply chain in India suffers from inefficiencies in the supply chain, leading to heavy losses of commodities throughout the country due to lack of proper storage and transportation facilities. It is estimated that about 20% of the foodgrains are destroyed annually because of poor storage facilities.

There is a huge gap in the quantity of agricultural produce and the available storage. An estimated cumulative loss of ₹ 550 million is expected, owing to the lack of proper cold storage facilities for agricultural produce. The huge gap between the demand and supply of logistics services, which was left unattended due to the unorganised nature of the market, has opened up many opportunities for players.

Most supply chain activities for agriculture are handled and controlled by the state-run CWC and FCI or by the unorganised sector. Agricultural produce has to be procured from government-designated centres, run inefficiently by middlemen, who operate in cartels. However, the scenario is now changing with the entry of many private and multinational retailers into the market. The advantage of backward integration of their existing activities into the agriculture sector has helped many companies join the fray. This move has encouraged several logistics players to enter the untapped agri-logistics market.

Players like Shree Shubham Logistics of the Kalpataru group, Adani Agri Logistics, SafEx, National Bulk Handling Corporation (NBHC), National Collateral Management Services (NCMSL) and a host of unorganised players have already entered the market by setting up facilities for the agricultural sector. For example, Shree Shubham Logistics Ltd has already established five out of the 11 planned state-of-the-art agri-logistics parks (ALPs) providing world-class warehousing and storage facilities. It will provide cost-effective end-to-end supply chain solutions, scientific and reliable storage facilities with support amenities such as weighing, testing and certification. Cleaning, sorting, grading, packaging and funding will be easily available. This will benefit the farming and trading communities as well as corporates. These ALPs are expected to bridge the gap between the demand and supply of the required logistics services.

Apart from the logistics companies, even industry houses such as Reliance, Godrej and the Aditya Birla Group are entering the retailing segment of fresh produce and commodity markets. They are building their own warehouses and arranging transportation from farms to retail outlets. With the increasing participation of private players in the market, the agri-logistics market, predominantly an unorganised sector, is expected to consolidate and evolve gradually over time. This consolidation will result in the requirement of huge warehousing capacities with proper infrastructure and seamless backward and forward integration to manage the supply chain.

Key challenges for warehousing in India

Despite its strategic importance in the Indian economy, the opportunities that the Indian landscape presents and its immense potential for growth, the Indian warehousing sector confronts several challenges. While the lack of sufficient physical infrastructure is one of these challenges, the time lag between devising and implementing strategies due to the lack of international warehousing standards is another. Indian warehousing players face challenges and bottlenecks at various stages of their operation lifecycle. Some of these challenges are strategic while others are operational and need to be managed on an ongoing basis.

The sustainable growth of the warehousing sector will rely heavily on how effectively industry players and the government can work together to address challenges in the long term. Some key challenges that Indian warehousing players face are briefly discussed below:

Strategic challenges:

- ***Infrastructure:*** Infrastructure is one of the most important components of the warehousing sector. An efficient warehousing operation hinges critically on high-quality supporting infrastructure that includes a good national highway network, interstate roads and congestion-free city roads. The total share of organised warehousing space is less than eight per cent of the total warehousing space in India. The industry is fragmented and largely unorganised and is dominated by small players with small capacities, not well-linked with the national highway network and interstate roads.
- ***Land availability:*** Procurement of land in a strategic location with clear title and proper approvals is still a key challenge for any new entrant to set up a warehouse. Government policies have intervened with the help of various initiatives through various agencies. The lack of existing clear land classifications in Indian cities and the reclassification of land are major concerns as far as the development of warehouse zones are concerned. With land values peaking in the last three to five years, the availability of affordable land is another concern for the industry. It is getting increasingly difficult to procure land at affordable prices for building warehouses in India due to escalating valuations even in the fringes of large cities. To add to the misery, further different states have different rules regarding agricultural land acquisition, which create entry barriers and have serious cost and time implications.
- ***Lack of standardisation:*** The demand for warehousing comes from many sources with specific needs. The lack of warehousing standards and accreditation poses a significant challenge to the industry where quality and flexibility of available warehousing space is a major concern. In most cases for ready-to-occupy warehouses, the companies have to invest further in order to upgrade the space and its specifications to standards that support their operations. As we go forward, the demand from occupiers is expected to put pressure on developers and owners to adopt the standards formulated by policymakers. Many of the ready-to-occupy off-the-shelf basic warehouses do not easily lend themselves to upgradation in terms of technology compliance or accommodating automated equipments.
- ***High cost of credit:*** Access to adequate and timely credit at a reasonable cost is one of the most critical problems faced by this sector. The main reason for this has been the high-risk perception among banks about the unorganised nature of this sector and the high transaction costs for loan appraisal. Since a majority of the players in this sector are small or medium entrepreneurs, they are unable to provide collateral in order to avail of loans from banks and are hence denied credit.
- ***Fragmented market with unorganised players:*** Economies of scale cannot be explored as the warehousing sector in India is dominated by small players with small capacities spread across India. Also cold-chain logistics solutions are always driven through consolidation. All over the world, cold-chain service providers have large fleet sizes and big warehouses with state-of-the-art technology. So far, the current practices of fleet ownership and other policies in India have not encouraged large ownership of fleets. Thus, the costs of cold chain supply are prohibitive at a large scale in India.
- ***Power outages:*** Power outages are a major problem currently plaguing cold chains leading to a huge wastages of agri-products every year in India. The increasing cost of power adds further to the warehousing cost for agri-products.
- ***High costs due to long transit time:*** Longer transit time and inadequate infrastructure also increase transportation costs. This leads to collection of material directly at mini-warehouses distributed across locations thereby defeating the purpose of augmentation and distribution.
- ***Complex tax regime:*** The delay in the implementation of GST and the existing complex sales and transport tax system tends to discourage the establishment of a national-level centralised distribution centre or hubs, the likes of which are often seen in developed countries.

Operational challenges:

- ***Lack of integration with complete supply chain:*** Though warehousing is an integral component of the supply chain, currently warehouses are structured on a standalone basis. Warehousing service providers often struggle with other supply chain stakeholders for integration of information and visibility. This disintegration in the upstream, downstream or both ends of warehousing leads to unpredictability of usage of space and facilities. In addition, this impacts the value-added service performance level expected from warehousing service providers.
- ***Lack of trained manpower:*** The lack of training institutes adds to the woes of the warehousing sector. Evolving warehouse management processes and operations with more demanding customers, lack of attraction for new recruits arising from poor working conditions, relatively less attractive incentives and benefits, and the emergence of attractive alternate career options are reasons that contribute to the skill shortage in the Indian warehousing sector.
- ***Lack of IT penetration:*** The warehousing sector in India, with some exceptions, is characterised by low technology levels, that act as a handicap in the emerging Indian and global market. Limited real-time visibility with manual inventory management, warehousing management, documentation, billing and reporting has raised doubts on the sustainability of a large number of warehousing players. The existence of these will be in jeopardy in the face of international competition from 3PL and 4PL service providers.
- ***Lack of expertise in warehousing technologies:*** A majority of the Indian warehousing players today have inefficient methods of storing, handling and monitoring of goods. They also suffer from stock visibility issues, stock traceability, higher pilferages and damages.
- ***Process inefficiencies:*** There is an absence of standardised operating processes and procedures at warehouses. The material unloading, handling, storing and loading are more often carried out in an ad-hoc manner. This not only builds in inefficiency but also leads to many mishandling problems including damages and subsequent increases in cost.

Creating a competitive warehousing market in India

Changing business dynamics and the entry of global 3PLs have led to the re-modeling of the supply chain including logistics and warehousing services in India. From a mere combination of transportation and storage services, logistics is fast emerging as a strategic function that involves end-to-end value-added solutions that improve efficiencies in the supply chain. Increasingly, warehouses are being used to serve several important functions, beyond mere storage of products.

This has made it imperative for warehousing players to overcome the challenges they face and maintain, and how improve and sustain competitiveness. Various measures such as skill development, policy initiatives and government measures, and IT adoption and increased investments in the sector can be effective in increasing the competitiveness of the warehousing players.

There are several functions that warehouses perform today, apart from their general functions of being physical storage points, such as shipment consolidation, break bulk operations, processing/postponement, assortments, stockpiling, product mixing, value addition, distribution, customer service, billing or invoicing and at times even order-taking, etc. Besides, several other core and non-core activities carried out by warehouse service providers include inventory management, proper handling practices including usage of warehousing equipment like stackers, pallet trucks, documentation management , communication management, etc. These functions require varied skill sets and hence, warehouse service providers today need to develop proficiencies in a diverse set of both core and non-core activities.

The government has played a significant role in fostering the growth of the warehousing market in India. It has encouraged 100% FDI in some categories of warehouses and has also reframed its tax structure to make the sector more lucrative for investments. Investments in SEZs, logistics parks, dedicated freight corridors and improving the port facilities is helping the market attract many private participants to provide sophisticated services that meet global standards. This in turn is reducing logistics costs and making India more competent in the global logistics market.

The warehousing players that are successfully competing today are the enterprises that have developed a culture of success through appropriate IT interventions that has enabled them to stay ahead of others. The layered service providers (LSPs) and warehousing players with heavy infusion of technology are much better adapted to meet business needs and compete in domestic as well as global markets. The organisations that have succeeded in being competitive are those that have demonstrated both the willingness as well as the competence to improve their offerings over a period of time through appropriate technology interventions.

In the highly agile but complex environment of Just-in-Time and Kanban inventory management, the unpredictability of warehousing performance is unacceptable to customers. Any failure in the supply chain ultimately results in heavy losses to the manufacturer or sellers. However, warehousing has yet to accept the accountability and impact of non-performance at the warehousing end on the manufacturing side. The manufacturers and sellers are demanding clear service level agreements with the various intermediaries in the supply chain.

The warehousing service level performance and its competitiveness will be highly dependent on the internal targets of their performance indicators. It will be important for warehousing players to measure and monitor their KPIs to ensure quality of service. These KPIs could be around factors such as cost, resources, IT efficiency and effectiveness and space utilisation. Though few warehousing service providers have internal KPIs, there are challenges to monitor in the absence of processes, appropriate management information tools and other relevant IT interventions. Manual interventions tend to provide a distorted picture of performances for internal evaluation of service levels.

Few major KPIs applicable for the warehousing industry are as follows:

Cost statistics

- Inventory management cost as a percentage of revenue
- Inventory management cost per full-time equivalent
- Inventory management cost per order
- Inventory management cost as a percentage of total inventory
- Inventory management cost breakdown

Staff statistics

- Average annual training hours per employee
- Personnel with certifications from professional associations

Systems statistics

- Electronic shipment and receipt confirmation percentages
- Technology usage
- Integration of information systems

Warehouse efficiency and effectiveness

- Dock-to-stock time
- Dock-to-stock distance for in-demand items
- Number of annually reported work injuries per full-time equivalent
- Defective incoming goods
- Cause of defective deliveries

Warehouse space utilization

- Dock bays per 100,000 square feet
- Warehouse strategies

Finance is another critical input for the promotion and development of warehousing players in India. Investments are needed to provide organised capital for a world-class infrastructure platform and to support greater sophistication in services. Investors in the warehousing sector and cold chains in India will have to assist these players in streamlining their operations, building business plans, gaining technical know-how and acquiring skilled manpower for becoming more competitive. Numerous investment opportunities exist across every segment of the Indian transportation and logistics industry.

The role of skill development, technology interventions, government policies and financial investments to create a competitive warehousing sector in India has been discussed in detail in the following sections.

Skill and talent development

Presently, the warehousing sector in India is in a highly fragmented state and comprises numerous competitors ranging from small truckers to non-registered business entities, which only offer some space for storage of goods. The majority of the players in this sector are small entrepreneurs running the warehouse as a storage facility for a single or multiple companies in India.

The emergence of the logistics industry in India and the compulsion to move away from traditional working methods are great opportunities for players to apply out-of-the-box thinking. However, this opportunity is plagued by many bottlenecks and one of the most critical is skill and talent deficiency. There is a huge gap in the knowledge and skill set requirement vis-a-vis availability. There are in fact very few professionals in the warehousing field in India and most of the activities, strategic or operational, are done by generalists. Skill and talent issues exist in varying degrees in the warehousing sector in India. The core issues leading to existing skill gaps in the sector include the following:

- Rapidly evolving warehouse management processes and operational skill requirements,
- Absence of structured skill development initiatives,
- Limited experienced professionals,
- Poor facilities for-on-the-job training,
- Lack of attraction for new recruits arising from inadequate working conditions,
- Relatively less attractive incentives and benefits, and

Going forward, due to the entry of international retailers and many global manufacturing players in India combined with the changes in the tax regime, this sector is likely to experience consolidation and hence large-scale warehouses. These developments will drive the need for value-added services associated with warehousing that require specialised skills like picking and packing, inventory management, stockpiling, shipment consolidation, break bulk operations, processing/ postponement, assortments, proper handling practices including usage of warehousing equipment like stackers, pallet trucks, etc. and the ability to understand and use information and communication technology.

The growth in the number of private container train operators (PCTOs) in India has given a boost to the development of CFSs and ICDs which require specific operational skills of loading/unloading, stuffing/destuffing etc. at the operational level.

Similarly, cold chains demand technically competent manpower capable of understanding the temperature and humidity control requirements and skill for operating sophisticated controlled atmosphere equipment.

The tables here provide a snapshot of the profile of people presently employed in the warehouse sector in India.

	Qualification and number of years of experience	Hierarchical levels
1	Graduates with 5-7 years of industry experience	Managers
2	Diploma holders/graduates with 4-5 years of experience	Supervisors
3	10th/12th pass with/without experience	Operators

Source: www.nsdcindia.org

By 2015, India will need approximately 35,000 to 40,000 warehouse managers. But there is no training institute which can train people for managerial skills or to cater to the needs of mid-level managers in the Indian warehousing industry. The operational needs for the industry as far as skilled labour is concerned, will undergo a tremendous change because of India's central position in the world economy. It will also raise training needs because of technological changes as well as evolving customer expectations.

Several business schools offer executive development programmes, which impart theoretical know-how but largely lack practical skills.

The detailed skill gaps observed in the warehousing sector in India for some of the reporting 'levels' at the operational level have been detailed here:

S .No	Hierarchical levels
1	Manager (C & F agents)

Skill gaps

- Limited knowledge of the latest and innovative warehousing technologies/formats
- Inadequate exposure/knowledge of warehousing IT systems
- Inadequate ability to invest in human resource development
- Inadequate knowledge of safety and security measures
- Inadequate knowledge of industry-specific stocking and handling practices (FMCG, perishables, textiles, etc.)

2	Supervisors

Skill gaps

- Inadequate ability to maintain appropriate inventory levels, leading to typically high inventory at warehouses
- Inadequate verbal and written communication skills to manage information flow between workmen and managers
- Inadequate team management skills, leading to the demotivation among workers
- Inadequate knowledge of global best practices

3	Operators/workmen/front-line staff

Skill gaps

- Inadequate knowledge about material-handling equipment
- such as stackers, hydraulic or hand-pallet trucks, forklift trucks, jib cranes, etc.
- Inadequate formal training leading to on-the-job learning
- Inadequate ability to maintain service standards, leading to damages

Source: www.nsdcindia.org

The required pace of efficiency and quality improvement will demand rapid development of capabilities of warehousing service providers in India. With the changing needs of the warehousing sector in India, there are specific profiles that will have to be developed both in terms of quality and quantity.

The detailed skill requirements in the warehousing sector in India for some of the reporting 'levels' at the operational level have been detailed here:

S .No	Hierarchical levels
1	Manager (C & F agents)

Skills required

- Excellent spoken and written language skills for meaningful interaction with customers and for proper documentation
- Knowledge of local language for interacting with in-house workers
- Team skills for motivation to improve operational efficiency
- Awareness of new technologies to take decisions regarding capital investment in appropriate technologies
- Knowledge of inventory, order management
- Ability to maintain specific standards and requirements such as temperature conditions in case of perishable goods, safety of goods, etc.
- Ability to ensure training in core warehousing operations as well as non-core or support and other value-added services

2	Supervisors

Skills required

- Ability to monitor daily warehouse operations
- Ability to maintain records of incoming or outgoing goods
- Ability to maintain records of wastages such as goods spillover during packaging, damages, and reporting it to managers
- Ability to undertake invoicing and order processing

3	Operators/workmen/front-line staff

Skills required

- Knowledge of stocking, packing and handling practices, including loading and offloading goods at different locations in the warehouse
- Ability to place goods in appropriate racks
- Ability to manually mark or pack goods, as required
- Basic reading skills for understanding the written or visual communication about standard operating procedures
- Ability to undertake value-added services such as MRP tagging, repacking, quality checks, etc.

Source: www.nsdcindia.org

The growing warehousing industry has created huge opportunities for direct and indirect employment. It is up to the government, policymakers and private players to tap this opportunity and accelerate the growth rate of the mushrooming logistics industry. Various initiatives will have to be undertaken to improve the skill level and develop talent in the warehousing sector in India. This will necessarily require a collaborative approach by various industry stakeholders. Leaders in the warehousing sector in India will need to pull together their resources to push for the establishment of a structured training infrastructure and provide incentives to employees for learning and development related initiatives.

The LSPs can also partner with management institutes and other organisations that can cater to operational as well as strategic know-how of the middle and top management of such firms. Some stakeholders have taken actions to reduce skill gaps. The education company Everonn Education of Chennai and Future Human Development Ltd (FDHL) of the Future Group have entered into a 50:50 JV to provide relevant training in supply chain management.

The sustainable growth and development of this sector's manpower requires collaborative effort and commitment from industry leaders as well as the government of India.

The government will need to support warehousing players in their initiatives and provide for a more conducive environment by providing tax havens, funding facilities, upgrading infrastructure and accelerating the consolidation of the industry. The PPP model can also be developed for building dedicated training institutes for the logistics industry. The National Skill Development Corporation (NSDC) can play a pivotal role in promoting skill development and organising vocational training for the workforce. With known success stories in various sectors, NSDC can foster private partnerships to bridge the skill and talent deficit in the warehousing sector.

IT intervention

Today the role of technology has transformed from being an enabler of productivity and quality through process automation and quality control to a more strategic role as a key influencer of competitive advantage. The last decade of the 20th century has witnessed rapid technological advances, especially in IT. Increase in IT adoption and knowledge infrastructure can provide a boost to the growth and maturity of warehousing players in India. IT has today presented enterprises with possibilities of delivering substantial operating savings while at the same time improving the quality of order fulfillment.
India's warehousing technology market in India is growing steadily, with the upswing in demand from the thriving logistics, retail and manufacturing sectors, as well as government promotion. As the booming manufacturing and retail sectors are the main users of these technologies, sustained demand from these areas is ensured. For instance, Wal-Mart has made it mandatory for its suppliers to deploy RFID. The growth of India as a major sourcing nation for the world's leading retailers is also ramping up demand. Until recently, the logistics industry was highly unorganised, comprising predominantly medium- and small-sized LSPs. However, the trend is changing with the increase in the number of organised LSPs and improvement in the services offered by them through 3PLs and 4PLs.
To obtain the cutting edge in the market, logistics and dedicated warehousing companies are adopting these technologies to improve warehousing and supply chain management. This enables them to achieve maximum warehousing efficiency.

Advantages of IT

IT adoption has the following advantages that can help warehousing players increase their competitiveness:

- Reduced labour costs
  Automated storage and order-picking systems can reduce the need for labour and wheeled machinery in the warehouses. In automated goods to person order-picking systems, the right goods are brought automatically to the right person at the right time. This eliminates the need to walk, increasing the productivity of slower-moving SKUs nearly 10 times from traditional zone-picking or pick-to-pallet approaches. Higher productivity automated systems also reduce the number of operators required for storage, picking, packing, etc.
- Improved space efficiency
  By making maximum use of headroom and minimising aisle widths, automated storage systems for pallets, tote-bins and cartons, we can reduce footprint requirements for stock storage and with it land and storage costs.
- Improved ergonomics and safety
  Automated storage systems reduce the need for forklift trucks and eliminate the need to have pallet movements interleaved with other tasks such as order-picking. Automated goods to person palletising stations provide for sliding rather than lifting of cases. Also, ergonomic pick-from-tote stations for small and split-case items minimise bending and twisting, reducing injuries, complaints and lost time.
- Flexibility to different order profiles
  Automated order-picking systems are equally productive for small as well as large orders and the productivity is independent of the number of SKUs as against the manual systems, where more SKUs and smaller orders mean greater walking distances which reduce productivity.
- Higher customer satisfaction
  Automated order-picking systems allow for greater flexibility with respect to how and when an order is assembled and the order to be picked up at any time, improving response times and increasing fulfillment consistency and quality. All this contributes to higher customer satisfaction
- Quick response and access to information
  Automation of warehouses through warehouse management systems helps eliminate paperwork and costly shipping errors by helping access the information quickly and efficiently.
- Track and trace
  Warehouse management systems can track inventory throughout the warehouse and the movement of the product from one location to the next.
- Standardised procedures
  Use of warehouse management systems ensures standardisation of processes and procedures such as set acceptance standards for product receipt, monitoring vendor performance, managing customer inventory, expediting orders more efficiently, etc.

IT intervention in the warehousing sector

Warehouse management systems

Warehouse Management Systems (WMS) is one of the most significant technologies used for logistics which enables efficient management of material flow, proper tracking of the movement of goods and on-time delivery of goods to customers. WMS is a system to manage the segment of an enterprise's logistics function responsible for the storage and handling of inventories beginning with supplier receipt and ending at the point of consumption. It is a software application that supports the day-to-day operations in a warehouse, by enabling centralised management of tasks such as tracking inventory levels and stock locations. Its primary objective is to manage a warehouse's resources, including space, labour, equipment, tasks and flow of material.

Today, a complete warehouse management system incorporates picking, inventory control, label-printing, return material authorisation (RMA), receiving and automatic data collection (ADC), wave/batch/zone picking, task-interleaving, integration with automated material-handling equipment, cycle-counting, cross-docking, pick-to-carton/pick-to-light, yard management, transport management, labour management and voice-picking, multiple inventory ownership, billing and invoicing and voice-directed distribution and much more.

There are multiple forms of WMS solutions available in market used by LSPs. The need for WMS is completely dependent on the complexity (in terms of size and volume) of warehousing operations and throughput efficiency (in terms of operational productivity):

- For service providers with small godowns in cities or towns storing small amounts of inventory catering to local markets like local distributors and suppliers and whose operations are simple with limited volumes, traditional ways of managing operations and tracking inventory is still the best bet.
- For service providers operating at a regional level who have significantly large operations with considerable volumes like regional distributors, small logistics firms managing inventory for their customers, or replenishment locations for retailers, mini WMS solutions are available that are good in managing inbound and outbound operations and can also manage and track inventory levels. Organisations using various ERPs can also extend their ERP systems and use a WMS module that will help resolve integration challenges. Such solutions can be customised and are also easy on the pocket.
- For service providers running large warehouses and 3PL companies having multiple customers and facilities spread across the nations. These organizations have multitude transactions and inventory movements within and outside their network. For these organizations , WMS systems can manage inbound, outbound, value-added service, work order management, quality checks, picking, packing, shipping are needed. RFID integration, global inventory view, intelligent analytics, ERP integration etc.

Typical features needed

- Timely order fulfillment
- Economical management of resources
- User-friendly features
- Ability to cater to typical Indian requirements including legal and statutary requirements taxations, road permits, etc.
- Rich functionalities as provided by Best-of-Breed (BoB) solutions proven in thousands of sites across the globe having the ability to cater to growing volumes
- Ability to manage and operate each and every movement in a warehouse
- Shorter implementation cycles
- Ability to track, trace and centrally manage inventory stocked in all facilities, channels, regions and networks
- An intelligent analytics and dashboard to manage KPIs
- Ease of integration with ERPs like SAP and Oracle
- Competitive pricing

Other technology interventions

- WMS solutions can be standalone, like those supplied by RedPrairie, Infor, Manhattan Associates or can be part of an ERP application as in the case with warehouse management solutions from SAP, Oracle and other IT solution providers in the domain. Several ERP-based WMS are being used in India for warehouses attached to factories.
- Heavily automated facilities are using a warehouse control system (WCS) that controls conveyor belts, carousels, and other materials-handling systems.
- Retail-warehouse management systems are implementing automatic data detain and identification technology integrated with mobility solutions such as mobile computers, GPS, SMS gateway linking barcode scanners and RFID. These can professionally supervise product flow all through the warehouse.
- The warehousing sector in India is also using voice-based solutions that provide the 'process logic' that directs a warehouse employee to perform functions with accuracy. These solutions free the workers' hands and eyes allowing them to completely focus on their work and communicate with the WMS system using the most natural form of human communication, which is voice.

Barriers to IT adoption

Although the prospects for the warehousing technology market look upbeat, there are some challenges preventing forward momentum. The sector is generally perceived to be reluctant in investing in IT. Several factors like the unorganised and fragmented nature of the sector, lack of regulatory compulsions and the view of the players of IT as an expense rather than an investment are said to have contributed to the low penetration of IT in this sector.

Some of the factors that act as barriers to IT adoption in the warehousing sector have been detailed below:

- Absence of affordable solutions: Technologies such as WMS and RFID are significantly expensive, making them unaffordable for a majority of LSPs, warehousing players and end-users. The price-sensitive nature of the Indian consumers prevents them from opting for such technologies. This has deterred the growth of the warehousing technology market.
- Cost: Most warehousing players in India are cautious about investing in an expensive full-scale WMS. They find it easier and quicker to employ more people. Larger acceptance of low-cost or in-house applications has also hindered the acceptance of sophisticated WMS systems. Lack of long-term planning and small warehouse sizes also do not justify the cost of WMS implementation.
- IT budget: Most warehousing firms do not have a formal IT budgeting process and hence don't plan for IT investments.
- Network infrastructure issues: Reliability and affordability are key network infrastructure concerns for a majority of warehousing players in India, especially those that have warehouses in remote areas of India.
- Awareness of IT benefits: The management in most warehousing firms are small entrepreneurs who do not have a good understanding of IT and its benefits. The skilled resources in the warehousing sector have very limited exposure to IT thereby creating an understanding gap on the value proposition of IT utility vis-a-vis IT investments. Though there is no dearth of good WMS solutions in the market, there is a dearth of management keen on implementing WMS at their warehouse, keeping long-terms benefits in mind.
- Training issues: Very few warehousing sector employees undergo IT training during the course of their employment.

Emerging technology: Cloud computing

The challenges faced in IT adoption by warehousing players have several dimensions including price affordability, availability of support systems and skill sets and training issues. This has given way to IT solution providers thinking out-of-the-box to create products and services which are more relevant and affordable and address the real-life challenges of the warehousing players.

The giant web-based companies like Google, Amazon and Salesforce.com are providing the sharing of web infrastructure to deal with internet data storage, scalability and computation for small warehousing players looking for more affordable IT solutions. These solutions are catered through cloud computing.

According to NIST, "Cloud computing is a model for on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction".

Cloud computing is an online service model by which hardware and software services are delivered depending on customer requirements. Customers pay as an operating expense without incurring high cost. It has three dimensions--software-level service, platform-level service, infrastructure service. The main cloud computing attributes are pay-per-use, elastic self-provisioning through software, simple scalable services and virtualised physical resources. Models, such as cloud computing based on virtual technologies enables the user to access storage resources and charge according to the resources accessed. Cloud computing platforms are based on a utility model that enhances the reliability, scalability, performance and need-based configurability. All these capabilities are provided at relatively low costs as compared to dedicated infrastructure. Benefits of cloud computing range from cost savings to speed and flexibility to enhanced performance.

From a financial perspective, it is a less expensive capital investment to employ the services of an application provider: 1) to provide the application and 2) to host the application. The advantages are that you pay a monthly fee for this service with no initial investment. There are no operational costs, no investment in servers, no hardware maintenance and no need to employ highly skilled IT staff. The service provider ensures that the application is fed down line to the client and all users log in to use it. This is known as the provision of Software as a Service or SaaS. There are a number of benefits of using WMS as SaaS:

- This arrangement involves no capital expenditure.
- A hosted WMS can easily be interfaced to non-hosted applications, i.e. the ERP systems, sales order processing, the transport management system, pulling together the supply Chain.
- The cloud-hosted WMS allows ease of execution across a number of sites, creating more warehouse services, allowing clients to disperse stock into a number of locations and streamline the pick, pack and shipping process.

However, there are arguments against cloud computing. A hosted application may not have the functionality or flexibility a business requires. Warehousing players may not trust the technology to run a complex process. They may have to outweigh the cost of running an in-house development team, which can be expensive, against the capability of suppliers to easily adapt and customise their requirements to a cloud computing model. Data security is another potential issue, but the hosted application provider will probably have better security measures, i.e. anti-hacking protocols, disaster recovery provision and automated back-up services.

For the small to medium warehousing players, the financial benefits outweigh risks and where human resource is limited, they allow business owners/managers to concentrate on core business activities rather than distract resources to building internal hierarchies to maintain the WMS. The real advantage of cloud computing is that WMS application providers are able to supply a simple system for even a single user.

Cloud computing thus holds the potential to alter the Indian warehousing sector's IT landscape by overcoming some of the key barriers to IT adoption.

Government initiatives: Policies and measures

Free Trade Warehousing Zone (FTWZ)

Free Trade Warehousing Zones (FTWZ) were established by the government to develop infrastructure to facilitate import and export of goods and services with the freedom to carry out trade transactions in the free currency. These zones are established close to seaports, airports or dry ports, to be easily accessed by road or rail. According to the Special Economic Zones Act 2005, a FTWZ is a special category of Special Economic Zone (SEZ) and is governed by the provisions of the SEC Act and the Rules. FTWZ are foreign territories to carry on business and are envisaged to be integrated zones to be used as international trading hubs.

The minimum area of development under FTWZ is 0.1 million sqm, with 100% FDI approved. Some of the features of FTWZs are as follows:

- Customised categorised warehouses for industries such as chemicals, food, electronics, oil, etc
- Sophisticated freezer/cooler facilities
- Break bulk, containerised, and dry cargo storage facilities
- Controlled humidity warehouses
- Enhanced transportation facilities
- World-class information system for cargo tracking, etc.
- Office space
- Support facilities and amenities like medical facility, canteen services, business centres
- Some of the requirements/ stipulations for a FTWZ are as follows:
- Minimum area to be developed under FTWZ is 40 hectares with a built-up area of not less than 0.5 million sqm
- Minimum outlay for development is over ₹ 9 billion
- Supply of material into FTWZ to be treated as physical exports for the Domestic Tariff Area (DTA) suppliers
- Hundred per cent FDI allowed for the development of these zones
- Duty-free import/domestic procurement of goods
- Packing or re-packing without processing and labeling as per customer or marketing requirements to be undertaken within the FTWZ
- Principally governed by the SEZ Act 2005 and SEZ rules 2006
- Free foreign exchange currency transactions

With FTWZs, the government expects to generate more employment opportunities as a result of increased organised warehousing activity due to increased competitiveness among industries in turn boosting the economy.

Logistics parks

A logistics park is a stipulated area that facilitates domestic and foreign trade by providing services such as warehousing, cold storage, multi-modal transport facility, CFS, ICDs, etc. Logistics parks facilitate loading and unloading of cargo for distribution, redistribution, packaging and repackaging. They are developed in the vicinity of emerging industrial hubs such as Mumbai, Chennai, Hyderabad, Bangalore and NCR.

Speciality logistics parks are being constructed for industries such as automobile, pharmaceuticals, agriculture, electronic hardware and aero industry. These parks are being connected through well-laid rail links and multi-modal transport facilities. Logistics parks are similar to FTWZs but also cater to the domestic market.

Warehousing (Development and Regulation) Act, 2007

Despite the importance of agriculture in the economy, no adequate steps have been taken to protect the agricultural produce of the country. The introduction of the Warehousing Development and Regulatory Authority (WDRA) will make provisions for the development and regulation of warehouses. The government launched the negotiable warehouse receipts (NWR) system to help farmers gain access to loans from banks and allow the transfer of ownership of that commodity stored in a warehouse without having to deliver the physical commodity. NWRs are negotiable under the Warehouse (Development and Regulation) Act, 2007 and are regulated by the WDRA. These receipts are expected to improve the borrowing capacity of farmers as well as the quality of the bank's lending services in the agriculture sector, increase liquidity in rural areas as well as encourage better price risk management in agriculture commodities.

The provisions of WDRA also lead to increased efficiencies in the lending portfolios of banks, as well as further enhance the interests of lending institutions in ensuring credit with reference to goods in warehouses. The NWRs will enable the transfer of ownership of agricultural commodities stored in warehouses without having to deliver physical commodities to the financial institution. This in turn is expected to reduce the wastage/pilferage of goods during their transit from the place of production to the custody of banks/ financial institutions. The implementation of warehousing receipts under the supervision of WDRA is expected to ensure the smooth functioning of the system to foster the growth of warehousing in India.

New tax policies to reduce supply chain costs

The government has introduced good tax structures to reduce supply chain costs and also to encourage the participation of private players in the system. Octroi was one of the traditional taxes introduced by the government. This was introduced with a view to develop warehouses and trans-shipment hubs outside octroi/state boundaries. However, it was objected to by logistics organisations since they allow delays at the octroi checkpost as they ensure that only goods which need to enter the octroi zone do so. Otherwise, further delays are involved in pre-paying octroi on other goods and collecting the refunds later.

The implementation of VAT played a significant role in reducing logistics costs. VAT was introduced to avoid the cascading effects of tax as it was being paid at each level. However, a simplified tax regime will help logistics players service multiple markets and offer end-to-end solutions far more efficiently and at much lower costs.

Private sector participation plays an important role in developing the warehousing sector rapidly. Illegal warehousing can be curbed by the government by setting up stricter and clearer rules. This will enable deeper penetration by international and domestic players into the warehousing sector. The traditional tax policies failed to encourage this as they led to cascading effect on the downstream industry, thus leading to higher cost for such industries.

The government had then taken a step forward to phase out Central Sales Tax (CST) and introduce GST, expected to revolutionise the entire warehousing sector. GST, with a uniform tax-rate, is expected to increase revenue by increasing tax collections, while it will help the logistics industry in re-arrangement, to enable the manufacturer to store and distribute goods across the country without any state boundaries. The proposed tax structure is expected to integrate the country economically and also make cheaper goods available.

The 13th Finance Commission had recommended the following measures through ***Report of the Task Force on Goods and Services Tax:***

- It categorically stated that the tax on vehicles and tax on goods and passengers levied by the state governments should be submitted in the GST.
- The task force felt that all transport equipments and all forms of services for transportation of goods and services by rail, air, road and sea must form an integral part of the comprehensive GST base recommended by the task force over which both the central and state governments would have concurrent jurisdiction.
- The tax regime for transport equipment and services should be the same as in the case of any other goods.
- The task force stated that it is not necessary to levy a higher rate of tax on vehicles as is the existing practice since it is proposed to subject the use of these vehicles to tax at higher rates through excise on emission fuels.

The introduction of GST will result in the Indian manufacturing sector being globally competitive and will promote entrepreneurial initiatives and economic activity, on the whole. Most of the manufacturers have constructed regional warehouses of their own to avoid inter-state taxes. But under GST, they can streamline their operations and outsource their operations to 3PLs to save up to 20%. This is also expected to encourage the construction of centralised warehouses at key strategic locations that can operate on the hub-and-spoke model, in turn outsourcing the logistics activity to the organised segment. However, tax rates and structure are yet to be decided.

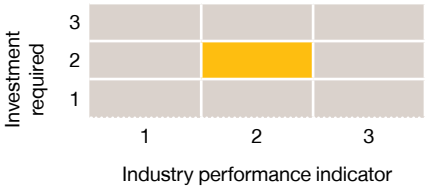
Investment opportunities in warehousing in India

Investment requirement

Investments are needed in the warehousing sector in India to provide organised capital to achieve a world-class infrastructure platform and to support greater sophistication in services. CRISIL Research projects investments of ₹ 170 billion to 190 billion in establishing warehouses by 2012-13 in India. A significant proportion of investments in warehousing are envisaged in the free trade and warehousing zones and logistics parks. By 2012, more than 100 logistics parks spread over more than 5,000 acres are expected to be commissioned. The growth will be driven by organised warehousing, changing tax structure and potential savings in carrying costs.

The table here shows CRISIL Research's Industry Performance and Investment (IPI) Matrix which determines the health of the Indian warehousing sector. This information also reveals a score of 2 out of 3 for the warehousing industry on the industry performance scale as well as on the investments required scale. The industry performance indicator measure takes into account the warehousing sector's growth prospects and returns. The investment required measure takes into account the likely investment in the sector, given its investment intensity, growth phase and investment cycle.

Over the last three years, the industry has recorded a CAGR of 10 to 12%. Going forward, it is expected to post a CAGR of eight to 10% over the next three years. In line with this, revenue and net profits of major players are further expected to grow over the medium term owing to higher growth in FMCG sectors and proposed implementation of the GST from April 2011. Investments of ₹ 170 billion to 190 billion over the next three years are expected which are significant for a mid-sized emerging segment such as warehousing. This gives it a score of 2 on the investments required scale.



The capital cost to build a warehouse unit of 0.15 million square feet is ₹ 140 million to 150 million (including land cost). The total cost will, however, vary depending upon exact location, proximity to the port/industrial hub, road/rail infrastructure, etc. CRISIL Research estimates the capital cost of a typical warehousing player, with a pan-India presence, to be in the range of ₹ 700 million to 750 million.

Source of funding

The last couple of years have seen considerable growth in investments through the PE and M&A deals in logistics, ports, warehouses and container freight stations in India. FTWZs, freight stations and cold chains are increasingly being seen as attractive targets now. Asset-heavy investments in the Indian logistics sector have mostly been observed to be PE investments and asset-light have mostly been strategic M&As.

The warehousing sector's highly fragmented nature is said to attract PE funds, which have played an important part in industry consolidation by focusing on aggregating smaller players and building scale through acquisitions. Even cross-border acquisitions are making their way in this sphere. Within the warehousing sector in India, significant investments have been observed in CFSs, yards and warehouses on the ports, custom-bonded warehouses near ports, shipyards, godowns, road-linked express cargo hubs and road-linked logistics and food parks.

Logistics parks and FTWZs are still in a nascent stage in India. Investors in these sectors will have to bring in the appropriate know-how from more mature markets. Going forward, investors in the warehousing sector and cold chains in India will have to assist players in streamlining operations, building business plans, gaining technical know-how and acquiring skilled manpower, to become more competitive.

Significant opportunities exist across every segment of the Indian transportation and logistics industry. International logistics companies have entered the Indian market, most international port operators are operating terminals across the Indian coastline and private equity investors have made investments across infrastructure and services categories. The logistics sector, on an expansion drive, offers strong and free cash flow coupled with low capital expenditure for potential investors.

A global private equity firm, recently made an investment of USD 100 million in India's leading logistics and warehousing company. This logistics company is one of the largest private warehouse providers, with over 10 million sq feet of storage space across 10 locations in India. This private equity firm has acquired a minority stake in the logistics company's flagship company. The new partnership will help the logistics company rapidly develop, create and offer the best feasible national network of logistics infrastructure facilities in India.

A supply chain and logistics firm also plans to invest ₹ 2,500 crore to set up five FTWZs across India. FTWZs will be created to allow duty-free storage of imported goods and provide space for assembling products.

Moving a step ahead in this direction, YES Bank and National Collateral Management Services Limited (NCMSL) have partnered to provide collateral management and warehousing services. Through this mechanism, YES Bank plans to avail of NCMSL's services like working capital financing to enter agro-based commodity industries.

Some other key PE investments in the logistics and warehousing sector as shown here are at different stages:

Company	Sector	Amount (₹ Crore)	Investors
Aegis Logistics	Logistics	66.55	Infrastructure India Holdings Fund
Cold Star Logistics	Cold chain	28.84	Tuscan Ventures
Continental Warehousing Nhava Sheva	Container freight	443.67	Warburg Pincus
Ennore Container Terminal	Container terminal	153.07	Eredene Capital
Fourcee Infrastructure Equipments	Logistics	115.35	India Equity Partners
JICS Logistic	Logistics (agri-commodities warehousing)	39.93	IIML
JSW Infrastructure	Ports	554.59	Eton Park
Karaikal Port	Port	146.41	IDFC Project Equity
Leeway Logistics	Logistics services	NA	Rajasthan VC
Ocean Sparkle	Port management	48.8	Eredene Capital
Palogix Infrastructure	Logistics services (3PL)	49.25	Bessemer, IFCI Ventures
Redington India	Logistics (IT products)	359.37	StanChart PE
Reverse Logistics	Logistics	35.49	Sherpalo Ventures, KPCB, Reliance Venture
Siesta Logistics Corporation	Logistics	44.37	Ashmore Alchemy
Snowman Frozen Foods	Cold chain	24.09	IFC
Swastik Roadlines	Logistics (cold chain)	44.37	India Equity Partners
Transpole Logistics	Logistics services	57.68	Fidelity
Vikram Logistic and Maritime Services	Logistics	NA	Infrastructure India PLC

Increasing the attraction for potential investors

Some PE funds are still wary of investing in the warehousing sector given the small size of companies and therefore, lower investment ticket sizes. Several factors affect the investment flow in the Indian warehousing sector. Concerns linger over the endurance of the economic recovery in many developed markets. The complex ownership structures of warehousing companies in India and weak corporate governance standards also act as deterrents for potential investors looking for investments in the Indian warehousing sector.

The key to more investments in this sector is, thus, unleashing the tremendous scope for improvement in the Indian warehousing sector. Much of it will be driven by infrastructure upgrades. As investments into India's infrastructure sector gain pace, investors will also look to put more money into warehousing and freight transport. Also, to increase their attractiveness to potential acquirers or PE funds, the warehousing players in India will have to concentrate on the following:

- Acquiring clarity on the vision and growth strategy of the acquirer
- Standardising and streamlining processes within the warehouses
- Ensuring appropriate tax planning
- Enhancing the use of appropriate technology
- Entering new and untapped target customer segments
- Building synergistic products and services for integrated solutions across the value chain
- Innovating operating models
- Offering value-added services
- Providing shorter lead times
- Providing differentiated services and products

Investments in agri-warehousing are critically deficient in India. The knowledge and input from the fund management team will help further growth of the investee company's agri-warehousing and collateral management activities. The investment will help deepen the commodities market in India while also enabling liquidity of warehouse receipts and strengthening price risk management capabilities of various stakeholders across the value chain, right from farmers to processors.

Healthier capital markets, which continue to recover from their post-leverage bubble hangover, the improved credit market conditions, an improved environment for financial investors and PwC's analysis of financial statements indicate that many large strategic investors will be in better position to engage in new deals in 2011. The focus on liquidity and de-leveraging during the downturn has resulted in improved balance sheets with reduced debt ratios and substantial increases in average cash positions. Thus, by concentrating on these improvement opportunities, the Indian warehousing players can be better positioned to attract the right investors that can further aid them in increasing their competitiveness.

The way forward

Warehousing forms an important constituent of the supply chain as it is where manufactured goods are collected, stored and distributed to the point of consumption. Warehousing in India, accounts for about 20% of the Indian logistics market and is expected to grow at a rate of 35 to 40% annually, displaying high potential for growth over the next few years. Changing business dynamics and the entry of global 3PLs has led to the re-modeling of the logistics and warehousing services in India. From a mere combination of transportation and storage services, logistics is fast emerging as a strategic function that involves end-to-end solutions that improve efficiencies. The growth of organised industry sectors such as retail, automotive, manufacturing, pharma and agriculture, etc, in India is expected to give rise to more integrated supply chains requiring better services, processes and storage facilities. Increasingly, warehouses are being used to serve several important functions, beyond mere storage of products, requiring warehouse service providers to expand their scope to include more sophisticated services.

Dynamic market requirements have made it imperative for Indian warehousing players to overcome challenges and maintain, improve and sustain competitiveness. Various measures such as skill development, policy initiatives and government measures, IT adoption and increased investments in the sector can be effective in increasing the competitiveness of the Indian warehousing players.

However, this journey can be smoothened and simplified if the challenges and concerns are addressed with collaborative efforts among all stakeholders including the government and its agencies, policy-makers, entrepreneurs, investors, logistics service providers, manufacturers, farmers and sellers. The mutual integration among them will rewrite the success story for the logistics and warehousing industry.

Various initiatives will have to be undertaken to reduce the skill gap in the warehousing sector in India. This will necessarily require a multi-pronged approach by various industry stakeholders. In addition, the training needs to be tailored to the requirement of warehousing such as cold chain, ICDs, etc. The training methods will also need to be upgraded using technology such as e-learning, online distance courses and practical classes through simulation.

In the changing market scenario mass awareness initiatives need to be identified to reveal the importance of warehousing and career opportunities in this sector.

The roll-out of GST is expected soon but the full implementation could take few months. The government will have to work overtime for its pan-India implementation. Along with GST, the government will need to increase its coordination with state governments at all levels.

India's warehousing technology market is growing steadily, with the upswing in demand from the logistics, retail, and manufacturing sectors, as well as through government promotion. Increase in IT adoption and knowledge infrastructure is seen to provide a boost to the growth and maturity of warehousing players in India. IT adoption carries the potential to increase the competitiveness of warehousing players by delivering substantial operating savings while also improving the quality of order fulfillment.

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