



WAREHOUSE TRANSFORMATION WITH ADVANCED TECHNOLOGIES

The goal of warehouse operations is to ensure superior operational performance by boosting workforce productivity and warehouse efficiency while reducing effort and cost. Warehouses require a skilled labor force for smooth operations. However, the availability of skilled labor has become challenging due to rising labor costs and geopolitical issues.

Business is becoming more complex due to escalation in volume and rising customer expectations. Enterprises need to implement advanced technologies to transform their warehouse processes. Every process including receiving, put away/storage, picking, packing, loading, and shipping needs to be transformed with advanced technologies to gain a

competitive advantage. New and emerging technologies not only increase efficiency but also boost performance and increase customer satisfaction.

Let us evaluate advanced technologies that will reinvent the warehouse of the future:

Advanced Warehouse Management System (Recommendation – Must Have)

Warehouse Management System (WMS) software optimizes operational processes in a warehouse. WMS offers enhanced visibility into real-time inventory levels, storage locations, staff productivity, incoming shipments, stock transfer and order fulfillment workflows within a warehouse. Integration of WMS with material handling equipment (MHE) guides operators on the optimal

MHE based on the type of goods such as fragile, heavy or volumetric goods while also boosting workforce productivity.

Cloud-based WMS is gaining traction since the software is hosted and managed by the WMS vendor or a cloud service provider. It avoids installing, managing, and upgrading the system by the IT department.

WMS is now the baseline, with emerging technologies integration delivering proven benefits. For example, WMS integrated with TMS enables better coordination of inbound and outbound logistics tasks at the interface of warehouses and freight shippers. The global WMS market size is expected to grow from US\$ 2.8 billion in 2021 to US\$ 6.1 billion by 2026, at a CAGR of 16.7%.¹



RedMart, an online grocery store, implemented Manhattan SCALE in the cloud to manage its e-commerce grocery business. An advanced WMS system increased profit margins and helped the company scale its business while providing consumers with a superior shopping experience.²

IoT (Recommendation – Must Have)

Internet of Things (IoT) technology connects several types of equipment to the Internet and captures data on a common platform. IoT provides access to warehouse data on a real-time basis, status,

and location of stock on diverse devices such as mobile phones and tablets. Various types of equipment such as conveyors, cobots, lights and cameras can be hosted on IoT platforms. IoT devices along with integration with WMS help operators control operations remotely. Equipment

with sensors that are connected to IoT enable predictive maintenance based on logs generated.

IoT in the warehouse market is estimated to register US\$ 17.95 billion in 2025 growing at a 21.21% CAGR.³



Lids, a fashion apparel company, deployed IoT-based robotics to enhance the efficiency of its warehouse operations. Robots mounted with advanced sensors retrieve products, move them to designated locations, and deliver them to workers. The team working remotely can monitor warehouse activities via a live feed. This approach eliminated non-value-adding redundant processes for workers while enhancing warehouse efficiency.⁴

Business Intelligence and Predictive Analytics (Recommendation – Must Have)

Business Intelligence is an umbrella term for technologies that collect, analyze and visualize data to distill meaningful insights for informed business decisions.

Predictive Analytics has the capability to forecast warehouse demand, execute supply planning, and predict preventive maintenance using historical and current

data within a certain tolerance limit. It helps operators allocate resources and infrastructure in the event of a surge or lean period with better accuracy.



Amazon's patented 'Anticipatory Shipping' system has the ability to predict customers buying specific products based on their historical purchase behavior in a particular location. With advanced analytical prediction algorithms at work, Amazon ensures that the products likely to be purchased are stocked at warehouses located in proximity of customers, thereby reducing delivery time significantly.⁵

Cobots (Recommendation – Must Have)

Cobots are collaborative robots that collaborate with humans to accomplish tasks. Unlike robots, cobots are dependent on humans for cognitive ability.

A cobot can be guided via remote control, or follow instructions of humans for

material movement. This collaboration improves the efficiency and time required for processes such as loading and unloading, Put/Pick, and material movement within a warehouse.

Currently, only 3% of warehouses globally

use cobots. It is expected to grow exponentially in the near future. The workforce at a warehouse spends as much as 60% of its time moving material. This can easily be done by cobots while the workforce can focus on more productive work.

Put to Light System (Recommendation – Should Have)

Any light source has more impact compared to descriptive text. This phenomenon is used for Put process (inventory management) within a warehouse. It helps operators locate

the place where a shipment has to be placed very easily.

This system has several benefits such as reduction in errors, shorter order cycle

times, priority shipments placed in front, and reduced employee training time. It is used for small B2C shipments but can be adapted for larger size shipments with adequate infrastructure.

Pick to Light System (Recommendation – Should Have)

This system is similar to 'put to light' with one difference: in 'pick to light,' the shipment needs to be picked from the location. The light color for put and pick are differentiated to avoid confusion and errors.



Dan Hanrahan, CEO of Numina Group, a warehouse automation and warehouse execution system software provider, says that lights can be used to make workstations faster and more accurate. At warehouses supporting D2C e-commerce, coupons, product samples, or other documents need to be placed in designated customer cartons. Lights at each position can direct the worker and make it easier to pick and place the item in the right customer package.⁶

When to transform the warehouse with advanced technologies

The decision to transform warehouses depends on various parameters such as processes, examination of the supply chain, identification of in-house capabilities, assessment of gaps in the existing technology, and the end goals. Enterprises need to address priorities before initiating warehouse transformation projects. They need to undertake an assessment of different parameters by scoring them, as demonstrated below:

| Parameters | Measurement |
|---|---|
| How often customer orders are hampered due to labor-intensive processes and limited workforce in the warehouse? | Likert scale over 0-5, 0 being very rarely and 5 being more often |
| Is customer order fulfillment capacity diminishing? | Likert scale over 0-5, 0 being very rarely and 5 being more often |
| Is the company facing inaccuracies in inventory counts? | Likert scale over 0-5, 0 being very rarely and 5 being more often |
| Do warehouses face efficiency issues due to manual operations or managed by sub-par legacy systems | Likert scale over 0-5, 0 being very rarely and 5 being more often |
| Does the workforce need to be increased/decreased to meet fluctuating demand? | Likert scale over 0-5, 0 being very rarely and 5 being more often |

A score close to 5 suggests an immediate need for advanced technology transformation. On the other hand, a score close to 3 indicates that basic warehouse transformation technologies can address problems related to warehouses.

Before implementation, it is important to strike a balance between humans and machines to maximize digital transformation. The end state is achieved when multiple systems are integrated and work collaboratively. Even if siloed systems are enabled with best-in-class technologies, it cannot make end-to-end systems efficient.



Implementation Strategy



Post-transformation challenges

While warehouse transformation delivers several benefits, it also presents challenges:

Significant capital for purchase and installation

Skilled manpower to operate

Expertise to implement and maintain the system

Equipment breakdown may lead to repair and maintenance costs

Data security/leakage

Over dependence on automation

Maintenance issues can be reduced by following a regular maintenance schedule. Also, 3rd party vendor collaboration for skilled manpower can perform maintenance and repair activities. The high initial investment cost can be leveraged over time through efficiencies and increased sales volume. Enterprises can evaluate and mitigate challenges with proper risk assessment and planning.



Conclusion

According to a Bloomberg report⁷ on warehousing, the global warehousing market is valued at US\$ 245 billion in 2020, and estimated to grow at a CAGR of 7% between 2020 and 2024 to register US\$ 326 billion by the end of 2024. The Covid-19 pandemic has accelerated the e-commerce business. Even as the pandemic caused overall transaction volumes to drop in FY 2021, the share of e-commerce grew substantially from 23% in FY 2020 to 31% in FY 2021. This shift in business has increased the demand for –warehousing facilities.

Advanced transformation techniques abound, but the moot point is relevance of technology and extent of application. A cost-benefit analysis, evaluating anticipated returns (both tangible and non-tangible) on investment, long-term vision, future prospects, and scalability determine selection of the optimal technology for the warehouse. Transforming warehouses with advanced technologies is no longer a luxury, it is now a necessity to gain a competitive advantage. It is a trade-off between improvement in efficiency, productivity, reduction in errors, and capital investment.



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