



The Future of Industrial: Designing for Efficiency in the Era of E-commerce

By Eric Aubort, principal at AO Architects

E-commerce has exploded in the last decade, driving strong demand for industrial development to keep pace with the growing market. The unexpected event of COVID-19 worldwide has only expedited this ongoing cultural shift to e-commerce, making industrial real estate well-positioned to not only endure but thrive during the current pandemic and what is now officially a recession.

The Rise of E-commerce

Combined shifts in the economy, culture and technology over the past decade have given rise to the worldwide popularity of e-commerce. Coming out of the 2008 recession, the economy began to flourish, bringing jobs and income to households striving to find balance between work and family. The convenience of e-commerce offered a per-

fect solution as time became a precious commodity and quickly led to a cultural shift marked by an increased dependence on online shopping from a majority of the U.S. population. E-commerce not only delivered products quickly but also delivered people the opportunity to enjoy time that would normally be spent in line at brick-and-mortar stores. During this same period, technology and smartphones added another layer of convenience via accessibility, making it possible for people to virtually shop from anywhere with an internet connection.

Fast-forward to February 2020, as the world began to experience the COVID-19 pandemic, yet another major phenomenon that would cause huge shifts in economy, culture and technology. Overnight, COVID-19 transitioned e-commerce from convenient to essential, both for people who could not physically go to the stores due to health concerns and

for those who could no longer find everyday items on the shelves of their local stores. Governments classified e-commerce as an essential business in an effort to bring goods to households and medical institutions on the front lines of the pandemic. The economic fallout caused by COVID-19 is situational by nature and, at its core, not a direct result of a financial meltdown like the 2008 recession. With the assumption that the curve is truly flattening and as life is slowly phased back into motion, the economic rebound is likely to be much quicker. However, the cultural desire and economic need for e-commerce will continue to hold fast.

Designing for Efficiency

The backbone of e-commerce is (and always will be) reliant on the ability of goods to be housed, transported and delivered efficiently. As a result, industrial warehouses and developments are on the rise and will continue to evolve to maximize operational efficiency at all levels. While this bodes well for future industrial developments, developers today are faced with one big challenge: to design projects that stay one step ahead of the sector's continuous and required innovations to remain competitive.

A critical component to maximizing efficiency for e-commerce is automation. While robotics in warehousing is not an entirely new concept, how it evolves to anticipate market demands will make a big difference in logistics and the process of delivery. Further, it is likely that the development of drones and driverless cars and trucks are on the horizon as technology and regulations develop. Some architects are anticipating the need for robotics in e-commerce by designing warehouses that not only fit current needs but also prepare for future technology by installing structural and programmatic components. In the interim, many of the sites currently designed are taking into consideration the infrastructure needed to accommodate future electric delivery vehicles.

Much thought and research has gone into how architects and developers can future-proof industrial buildings to accommodate how distribution or logistics will work five years from now. That may not seem like a long time, but in the ever-changing landscape of an industry that is so closely tied to technology, that is likely at the outer edge of forecasting. Currently, the vast majority of industrial warehousing and logistics centers are designed and built with single-story, tilt-up concrete construction. They are inherently economical and durable and have relatively short construction time frames which allows for speed to market. As developers and e-commerce companies look toward future growth, warehouse capacity remains a key issue, particularly as the decline of brick-and-mortar retail boosts e-commerce.

Because of development barriers, such as land availability and rising costs, many developers are looking to build taller, with large industrial, sort and distribution facilities pushing the envelope of the current capacity of construction equipment and constructability. Increasing storage volume in relation to land area is a relatively easy way to maximize the cost of construction; however, there are diminishing returns as you near the limit. Some of the limitations include current sprinkler design

capacities and tilt-up wall height engineering, as well as limited construction equipment capacities. For the interior, that means construction teams require larger forklifts to reach the increased heights, pushing the structural bays to accommodate them. Although these issues can be mitigated with alternative means of construction in some cases, the cost per square foot to do so will increase and may require specific approval depending on the jurisdiction. As demand grows for increased "standard single-story" industrial product, land availability and prices will start to drive the market towards multi-story industrial. Although that may be far away for some markets, we are beginning to see this trend emerging in dense, urban e-commerce markets with high demand for industrial product such as Seattle, Los Angeles, San Francisco and New York City. In the end, multi-story warehouse construction must be justified by the price of land in relation to demand for the product type.

Mixed-Use Industrial Is on the Rise

Traditionally, industrial product has been relegated to the areas within a city or county where zoning codes allow industrial construction. However, today we are seeing a rise in mixed-use industrial master plans. These blended site plans integrate industrial buildings with one or more consumer uses, such as retail, hospitality, entertainment or office, to meet the strategic needs of communities, local governments and developers alike. The condensed mix of product types creates a synergy that allows each use to feed off another and serve the needs of the community at large. These master plans become hubs of commerce, attracting a variety of businesses and consumers that provide diversity in product type. Another benefit of mixed-use industrial is its ability to alleviate exposure to market risk by not grouping large volumes of a single product type in one spot — similar to diversifying a stock portfolio to spread risk among market sectors. Architects are laying out large master plans that can accommodate these uses and still be sensitive to each market's building typology in regard to street exposure, parking, trucking, automobile circulation, pedestrian ways and common areas. All of these factors must weave together seamlessly.

In many jurisdictions, especially in California, it is important that the e-commerce client, their design team and city share a common vision and design expectation for the specific facility. Despite allowing them in specific zoning areas, not all jurisdictions see large industrial facilities as assets to their communities. In many cases, city leadership must come together and discuss the benefits to the city and the client for a win-win formula. This includes leading edge design to maximize the building's efficiency, interior function and appearance to the community at large. Hiring an architecture firm with experience in function, format and appearance is the catalyst for a successful industrial project.

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