

E-Commerce Cargo at Airports

What Airport Managers Need to Know Today



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**A Report by the
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INTRODUCTION AND OVERVIEW

Over the past decade, perhaps the single greatest impact on the air cargo industry has been E-commerce, so it is critical that airports understand what this phenomenon is and how their operations, facilities, and infrastructure may be affected. E-commerce grows nearly 20% every year and it is projected to be a \$5 trillion industry by the end of 2020 (with overall retail being \$27 trillion and moving more towards E-commerce every day – *according to eMarketer Global E-commerce 2019 Report*), even during the COVID-19 pandemic (which has boosted E-commerce activity). The COVID-19 crisis in multiple ways have further accelerated the adoption and growth of online sales channels, highlighted by a McKinsey study showing ten years of e-commerce growth achieved in approximately 10 weeks of the pandemic. The big question for airports and their partners is how do we capitalize on this growth and what type of financial scenario will be associated with the opportunities. This report is designed to provide a high level overview of what E-commerce is, what distribution models are currently present at airports, what criteria operators are looking for in the development of new distribution centers and what planning factors should be considered if those developments start to materialize. There is a wide range of distribution models and not all airports are positioned to go after each one. This report will provide a guide to help you assess your current airport profile and overlay different distribution models in order for you to create your own cargo operations strategy.

Current conditions will dramatically change the existing environment, so trends driven by COVID-19 will cause this landscape to evolve even further. In the midst of the COVID-19 pandemic, airlines have reduced their passenger operations by as much as 65% or more, and many routes have been scaled back or in some cases eliminated: First quarter passenger volumes in 2020 were estimated to be down by 95% from 2019 levels. The result is that many of the remaining flights are largely dependent on belly cargo for revenue and a number of passenger aircraft have been converted to freighters. When combined with the recent and ongoing losses, the deferral of non-critical maintenance, and the projected reductions in traffic, the financial future for airports will be lean. It therefore is critical that airports identify every opportunity to enhance revenues (revenue diversification) and reduce costs for themselves, and their partners.

Increased tonnage would also have a substantial impact on regional distribution systems. The bottom line is that the industry will see significant near-term changes which could have lasting long-term impacts. It will be

critical that the physical platforms that airports provide are compatible with evolving regional and industry shipping dynamics.

E-COMMERCE DEFINED

E-commerce (electronic commerce) is defined as the commercial transaction of money, funds, and data, and the buying and selling of goods, products, or services over the internet. It can also be called internet commerce. Online stores like Amazon, Flipkart, Shopify, Myntra, Ebay, Quikr and Olx are only some examples of E-commerce operations. Most traditional brick and mortar stores have transitioned to some on-line type model or have developed a hybrid approach in order to survive, which further fuels the E-commerce engine. There are four basic types of E-commerce described below—however, despite the difference in the models, airports are impacted in one of two ways.

The discussion that follows provides additional background on E-commerce and then more specifically addresses the items E-commerce businesses and providers look at as they go through their site selection process:

E-commerce Models

E-commerce is typically classified into four main categories. The basis for this simple classification is the parties that are involved in the transactions.

- 1. Business to Business** – In Business to Business transactions, companies are doing business with each other. The final consumer is not involved. Therefore the online transactions only involve the manufacturers, wholesalers, retailers, etc.
- 2. Business to Consumer** - Here the company will sell their goods and/or services directly to the consumer. Consumers can typically browse business websites and look at products, pictures, and reviews. They place their order and the company ships the goods directly to them. Popular examples are Amazon, Flipkart, Jabong etc.
- 3. Consumer to Consumer** – In this type of transaction, consumers are in direct contact with each other; no company is involved. It helps people sell their personal goods and assets directly to an interested party. Goods typically traded include cars, bikes, electronics, etc. Virtually anything can be found in these on-line markets typified by eBay.

- 4. Consumer to Business** – In this type of transaction, the consumer provides goods or some services to the company. An example might be an IT freelancer who demos and sells his software to a company.

Within the context of these models, physical operations take several forms:

- **Single Distribution Center (DC)** - This is the large national facility that supports regional store inventory replenishment and the bulk of the work on E-commerce order fulfillment. This concept is less effective when there are rapid time definite guarantees on delivery involved.
- **Stand-alone Distribution Centers (DCs)** - These are decentralized regional facilities that focus on store replenishment and serve as stand-alone E-commerce fulfillment centers within specific regions.
- **Third-party sourcing** - Under this concept, the main business outsources its logistics operations for all aspects of fulfillment and transaction support.
- **Third-party sourcing for selected goods** - This approach is more specialized and is most often utilized to enhance product launch or the introduction of seasonal products.
- **Hybrid DC** - Goods have a Master DC, supported by smaller (Regional DCs)

Cargo DC models at airports:

- Traditional hub and spoke operations
- Super hub with regional mini hubs supporting (ultimately mini hubs are supported by final destination airports)—for example, Amazon/SF Express models
- Point-to-point air distribution

Advantages of E-commerce

There are several reasons why E-commerce has grown so rapidly as the internet proliferates globally:

- **E-commerce provides sellers with a global reach.** It removes the barrier of place (geography) enabling sellers and buyers to meet in the virtual world, without the challenges of location.
- **E-commerce can substantially lower the transaction cost.** It eliminates many of the fixed costs associated with brick and mortar shops. This allows the companies to enjoy a much higher margin of profit even with a lower selling price.

- **It provides quick delivery of goods** with very little effort on the part of the customer. Customer complaints can also be addressed quickly. It also saves time, energy, and effort for both the consumers and the company.
- **It offers substantial convenience** allowing a customer to shop 24 hours a day, seven days a week. The business website does not have typical "working hours" and is functional at all times.
- **Quicker to market for trendy items** maximizing the short life cycle.
- **E-commerce also allows the customer and the business to be in touch directly, without any intermediaries.** This allows for quick communication and transactions. If done properly, it also gives a valuable personal touch.

Disadvantages of E-commerce

At the same time, there are a few challenges with E-commerce which add an element of risk:

- **Very high start-up costs of an E-commerce portal.** The setup of the hardware and the software, the training cost of employees, the constant maintenance and upkeep can be quite expensive and difficult to recover without a successful early sales period.
- **Rate of failure.** Although it may seem like a sure thing, the E-commerce industry has a high incidence of failure. Many companies riding the dot-com wave of the 2000's failed and the risk factor still remains high.
- **E-commerce can feel impersonal.** It lacks the warmth of a face to face transaction which is important for many brands and products. This lack of a personal touch can be a disadvantage for many types of services and products where that type of interaction is key.
- **Higher product return rate,** due to lack of ability to physically touch and try on (size differences) or review of quality of items.
- **Security concerns.** In spite of protective protocols, there have been many security breaches where the personal information and data of the customers was stolen. Credit card and identity theft remain realistic concerns for customers.
- **Fulfillment problems.** Even after the order is placed there can be problems with shipping, delivery, mix-ups, etc. This can leave customers unhappy and dissatisfied. The return process ('reverse logistics') also poses unique challenges as it does not always mirror the purchase process.

SELECTING AN AIRPORT

Despite the challenges, the growth of E-commerce will continue for the foreseeable future. It brings with it a number of business, infrastructure and operating requirements, some of which can be very costly, but which are considered to be offset by the substantial economic benefit and job generation that they can bring to a community and a region. It is understandable, therefore, that airports and their municipal and/or regional partners extend themselves to attract an operation. However, the selection process is driven by the private sector. There are some very specific site selection criteria, from financial to operational, that these businesses use to evaluate their options.

Refinement Criteria (in order of general priority)

- A regional transportation system that provides efficient connectivity within the distribution area as well as connectivity to the airport, as may be needed. This should also provide easy access to the facility for employees. Available public transportation is a bonus.
- The availability of a site of sufficient size and location appropriate to the efficiency and planned scope of the operation.
- The overall estimated cost of doing business in a region. This includes labor, taxes, property costs, etc.
- Reasonable start-up costs.
- Workforce availability. This includes those available for full-time work as well as additional labor to cover demand surges.
- A political and business environment that is supportive of a substantial logistics operation and that transitions easily to E-commerce, as well as overall flexibility of airport operations, business terms, and governmental restrictions (you need to constantly have an appetite to change as E-commerce demands change)
- The availability and amount of local and regional incentives.
- If the operation is international, the availability of appropriate government agencies.
- The availability of real property or other tax incentives, with adequate expansion capacity given the growth rates of successful firms
- An established Foreign Trade Zone (FTZ) program if international shipping is involved.

Airports must remember that the competition for a large E-commerce operation is incredibly fierce, and, while there are some things that an airport and a region can do, the ultimate decision is usually out of their hands.

AIRPORT PLANNING IMPLICATIONS

Landside

Because E-commerce is consumer-driven rather than shipper-driven, it is more trucking intensive than typical integrator operations or traditional air cargo operations. This creates a number of planning considerations that are becoming even more critical as trucking activity increases.

As your cargo business changes, it is imperative to have advanced traffic monitoring/forecasting processes (or software) to constantly keep up with the changing needs (and coordinating with state & local transportation agencies):

- If possible, separate access and egress for cargo and passenger activity should be in place.
- Connecting on and off airport roadways must be assessed for changes to levels of service as well as for potential environmental impacts.
- Seamless access to interchanges connecting major regional, national, and international highway systems.
- Similarly, in instances where a potentially large increase in trucking activity might occur, or where the roadway system may be outdated, the geometry should be reviewed to ensure facile operations.
- Substantial truck queuing capacity should be provided to ensure that delays due to blocked truck docks or accessing roadways do not occur.
- The depth and maneuvering capacity of truck aprons should be reviewed to ensure that they can sustain the operation of full-size tractor-trailers.
- Increased auto parking will be required. Sortation operations are typically very labor intensive. Shift staffing should be considered in developing space allocations.
- Auto parking for employees and customers should be separated from the truck apron for both security and operating purposes.

The property requirements will typically be substantial for an E-commerce operation whether it is a manufacturing center, a distribution facility, or a sortation hub—or any combination of the three. Because E-commerce is typically time-sensitive, if an air component is directly involved, an on-airport location is preferred; lacking that, a site close to the airport is critical.

- For an E-commerce business with aircraft fleet (like Amazon) requiring an *on airport* operation, the property requirements will be extensive both airside and landside and could run from dozens of acres to 100 acres or more.
- For an E-commerce business without aircraft, the land requirement could be similar and range to 100 acres or more.

- For this type of a non-aviation operation to be on airport, forecast-supported airport layout plans, approved by relevant regulatory agencies, must be in place which protects airfield access and preserves land for long-term aviation growth.
- If the operation is to be situated off airport, then connectivity to ensure expeditious transfer of goods should be in place; the roads should be planned to achieve targeted levels of service.

Airside

For businesses that do not have their own aircraft, regardless of on or off-airport location, the direct apron requirements are minimal. There are potential indirect implications that need to be evaluated.

As the Air Cargo business changes, it is imperative to have advanced aircraft flow monitoring/forecasting processes (or software) to constantly keep up with the changing needs (this should include air routing as well as ground movements to minimize taxi and enroute times):

- Products to be moved by air, either inbound or outbound, will travel in the bellies of passenger aircraft, freighters or integrators.
- Increased belly cargo will change both cargo handling requirements at the terminal and transport requirements to the cargo handling facility. This may require changes to restricted service roads.
- Reliance on the integrators for enhanced product movement, will place greater emphasis on ramp utilization – first through an increase in the gauge of the aircraft and second (if needed) through the addition of other planes.
- In instances where additional product movement capacity is needed, other freighter activity may be generated requiring incremental ramp and taxiing infrastructure. Determining the location and sizing of the aeronautical infrastructure will be necessary and may present challenges regarding proximity and capacity of facilities.

Because of the volatility of the market, before any physical modification is considered, an assessment of the permanency of the business and operating environments should be undertaken and a forecast conducted. For the addition of any substantive infrastructure enhancements, an updating of the approved airport layout plans may be required.

Facilities

For *on-airport facilities* dedicated to E-commerce operations, the design will focus on:

1. Throughput if the main sortation facility is off-airport, or
2. Sortation if the bulk of the operation is on site.

The throughput facilities will have a smaller, more rectangular footprint and a reduced office requirement. Typically, the offices will be in a mezzanine which should be designed to allow oversight of the floor operations. Based on volumes and levels of mechanization, the buildings may have a greater height than a typical cargo facility. The key will be to optimize the available floor space. In instances of space constrained airports where the location is deemed critical, the business may opt for a multi-tier facility. This will substantially increase the construction costs but conserve airport land. The building should allow for a smooth transition between airside and landside; this will require maximizing doors and ensuring their alignment front to rear.

For sortation facilities, the footprint will be much larger and the building will typically be more square in shape. This provides for a more efficient processing environment but also creates planning challenges on both the airside and landside. In some recent planning examples, the facilities have been constructed with a cross-dock "T" wing which maximizes the number of truck bays that can be included.

Off-airport facilities are focused almost exclusively on sortation and distribution. Because there are no aviation planning constraints to deal with, and the land constraints are typically restricted to parcel size and cost, these complexes tend to be expansive. They are focused on time and dollars, designed to move products in and out as quickly as possible with the most reasonable cost achievable. Most of the core characteristics of the on-airport facilities can be found in the off-airport buildings—optimized floor space, mezzanine offices, and employee amenities including dining facilities and other onsite employee incentives.

The primary concerns with these facilities are the ground traffic, connectivity to the regional roadway system, and integration with the surrounding business community. In most instances, this integration will have been addressed during the due diligence of the E-commerce business. Despite their inclination to be "good neighbors", it's important to understand that the business will have a different agenda and priorities than the regional community and place less emphasis on potential disruptions to the overall region.

Development and Financing

- Air cargo in general and E-commerce specifically are very dynamic operationally and, from a financial standpoint, can create substantial volatility in cash flows related to changing market conditions. Planning and financially forecasting for this type of business can prove to be

challenging, so an airport must determine their appetite for risk as a key part of their cargo growth strategy. There are several options for adding or modifying the facilities and infrastructure necessary to accommodate evolving industry requirements. There are different public-private options that include:

- Airport bonds (higher risk to airport)
- Third party investment with airport backing (higher risk to airport)
- Airline tenant builds and finances (lower risk to airport, but less control)
- Third party investment with tenant backing (lower risk to airport, but far less control as well)

Ultimately the decision of how to proceed with development can be reduced to two considerations: risk and return.

The airport's return from the project will depend on whether a developer is involved. If no developer is involved, then all project revenues net of expenses ordinarily would be expected to accrue to the airport. This would hold true even if the airport were to hire a firm to manage the facility, in which case the management fee paid to the firm would be included among project expenses. While the airport's return is in principle not capped, the airport's exposure to cost increases and to revenue decreases is not limited. In contrast, when a developer constructs and operates the project, the return to the airport is typically a fixed (albeit possibly escalating) payment. In the air cargo world, percentage rents are uncommon but being considered with greater frequency.

As with return, the airport's project-related risks will depend on a number of factors including (perhaps most importantly) whether the project should be executed by a developer or by the airport itself.

RISK COMPARISON

	Airport Development	Outside Development
Airport Risks	Significant vacancy Balance sheet Initial cash outlay Completion risk Liability issues Operating costs Marketing costs Relocation costs Environmental costs	Some vacancy risk No exposure Lower revenues Developer credit risk (ground Environmental costs
Developer Risks	Not applicable	Securing financing Changing cost of money Significant vacancy risk Completion risk Operating costs Marketing costs Relocation costs

In the absence of a developer, the airport's risk-return profile may be likened to that of equity in that returns generally increase in proportion to the commercial success of the project in return for the airport assuming the risks of commercial failure of the project. Generally, this is not substantially changed by the retention of a firm to manage the facility on the airport's behalf. With the involvement of a developer, the airport's risk-return profile may be likened to that of debt in that returns generally are specified in advance and are largely independent of the commercial success or failure (short of bankruptcy) of the project. The airport gives up upside potential for protection from downside risk.

Typical Issues Regarding Third Party Development

One of the keys to new development will be the cost of money for whoever develops the facilities. It is hard to envision the cost of that money to be lower in the future. Airlines sometimes raise concerns over the utilization of a new cargo facility particularly if a third party is used. However, in most instances, it would seem counterintuitive for an airline or E-commerce business to oppose a project provided:

- a) there is a physical need
- b) there are competing demands on airport funds for other potentially higher priorities
- c) their own financial status
- d) critical timing elements

Comparative Cost Models

There are several important financial considerations in comparing a third party development to an airport development (extend beyond total costs to build):

- The term of the master lease. If the airport pursues third party development, the longer the period of amortization, the easier it is for the developer and the airport to achieve targeted returns while keeping the rental costs to the tenant lower.
- The cost of the ground lease is typically passed directly through to the tenants. To keep building rents under control, the revenue targets of both the developer and the airport must be realistic. A high ground rent will often discourage third party development.
- Operations and maintenance costs. These reflect the costs of maintaining and operating the complex to include landside and aeronautical infrastructure. The costs are typically passed on directly to the tenants on a pro-rated basis.

In developing construction models, several assumptions can be made based on industry input concerning the construction of new facilities. The first of these is that the private sector can construct a facility more quickly and for about 10%-15% less than the public sector because of a faster decision-making process and the ability to negotiate modification of construction and bid prices. The second is that private sector soft costs average about 20 percent of construction costs: this is substantially lower than the 33.5 percent differential between typical airport-estimated project costs.

The models should be based in part on assumptions of rates and targets that would need to be established by the airport and/or agreed upon in negotiations. They should also consider assumptions on structural costs for the buildings and infrastructure that would need to be determined in a preliminary cost estimate. Nevertheless, the costs do not change the relationship between the development approaches.

CONCLUSION

E-commerce is an exponentially growing business and may be that way for many years. The buying habits of consumers have forever changed & E-commerce will be a part of our lives for the foreseeable future. There is opportunity for airports of all sizes, and the upside is growth, economic development, and revenue diversification. It is up to each airport to understand the E-commerce markets in their geographic area, assess what criteria that they have to offer and create their own strategy. The key characteristic to understand is that E-commerce has evolved from its inception and is projected to further change. Airports must create flexible plans and change along with it in order to support sustainable air cargo operations.