

IMPACT OF E – COMMERCE ON THE STORAGE OPERATIONS OF AIR CARGO

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Abstract

Like wildfire, the e-commerce boom has spread to virtually every industry. The impact of this new digital commerce model on the air cargo sector is far-reaching and complex. By understanding how e-commerce affects the business operations of traditional air cargo companies, we can better prepare for its future development. Storage occupies a central role in any Supply Chain. The primary purpose of storage activity is to act as a buffer to adopt to the variability of the flow of production, consolidation of products and to add marginal value such as pricing, labelling or customization. Thus, in this research work the main aim of the researcher is to highlight the impact of E- commerce on Air cargo storage operations, followed by the opportunities and challenges associated with it. This study is based on the review of various literatures related to the topic of study. The study highlights that e commerce is changing the way people consume. The goal of increasing delivery speed while remaining cost effective poses significant new challenges for supply chains as they move on to satisfy the growing and fast-changing demand.

Keywords: Air cargo, E- Commerce, Handling, Logistics, Operations, Storage.

INTRODUCTION

The storage of cargo is an essential component of logistics activities, and it calls for extra care to guarantee the security of the items while they are being transported. It is crucial to adhere to recommended cargo storage procedures whether you are transporting products by land, sea, or air to avoid dangers like damage and theft. Storing goods in a satisfactory manner is essential for the goods to remain in good condition until the date of their delivery to their destination, which facilitates their delivery at the specified time and in the appropriate condition. Moreover, effective cargo storage procedures include selecting a suitable storage location, setting up the area to maximize efficiency and reduce the possibility of damage or loss, putting in place proper handling and inventory management procedures, making sure proper temperature and humidity control is in place, putting in place security measures, and keeping the storage location and equipment in good working order. Cargo storage operations may decrease hazards, cut costs, and boost client satisfaction in this way (Levy et al., 2022). Despite being a crucial component of the logistics industry, cargo storage has its share of issues. In addition, this article will discuss some of the frequent issues that arise when storing cargo along with solutions.

LITERATURE REVIEW

Design and Management of Storage facilities

According to Chen & Chou (2019), managing air cargo storage facilities is paramount in the logistics business. These sites can house everything from daily use products to unique tools or resources required for specific operations. The adequate transportation of this varied inventory requires an organized design with an adequately administrated process overseeing every step, ensuring safe handling that promotes fast delivery for ultimate customer satisfaction.



Figure 1: Warehouse Design and Management

Creating an aviation freight storage facility requires careful planning, with several critical variables that must be considered during the design process. Of these, there are more important things than determining a qualified layout plan. The plan needs to maximize storage capacity while ensuring easy transportation of products into and out of the site. High-density storage solutions such as pallet racking or shelf systems effectively achieve these objectives by capitalizing on floor space while providing quick access.

Another important factor in constructing an air cargo storage facility is determining which goods will be stored there. Different products require distinct conditions for optimal preservation, requiring customized design elements specific to the unique needs of each type of shipment. To illustrate this point further - When storing perishable items like fresh fruit or pharmaceuticals, preserving freshness and maintaining quality may demand temperature-controlled environments (Thompson, n.d.).

Furthermore, an air cargo storage facility should prioritize its practical layout for storage and safety concerns related to securing its contents. To this end, incorporating fire-suppression equipment, security cameras, and access control systems helps prevent potential harm such as theft or deterioration (Abeyratne, 2013).

Maintaining an efficient air cargo storage facility requires robust management practices beyond its establishment phase. Crucial among these is a practical approach to inventory control which tracks commodity intake while maintaining optimal inventory levels that cater to consumer demand needs appropriately over time (Chen & Chou, 2019). Modern technologies like barcode scanning systems make this process faster by precisely tracing goods' movement throughout the entire location effortlessly. Additionally, having reliable transportation networks underpins smooth logistics transfer operations within an air-cargo warehouse environment with automated guided vehicles maneuvering through open access areas while utilizing conventional transportation modes like trucks and airplanes to transport needed goods to their final destinations (Chen, Chang, & Chou, 2018). Moreover, regular maintenance programs must ensure that inspections verify the health of all durable equipment regularly, reducing performance downtime over its lifespan. Successful design, execution and management of these factors guarantee that clients worldwide will receive the expected merchandise on time. Consequently, these optimized facilities offer excellent logistics operation advantages for air cargo storage facilities worldwide.

E-commerce's Impact on Air Cargo Storage Operations

The growth of e-commerce has significantly impacted the air cargo industry, with increasing demand for small packet delivery, changes in packaging requirements, and the need for faster and more flexible storage and delivery options. In

this article, we examine how e-commerce affects air cargo storage operations and the tactics used to adapt to these changes (Florida-Benítez, 2023). According to (Settey et al., 2021) the widespread use of digital platforms for purchasing goods has fueled remarkable growth in business operations while ushering in new ways for customers to shop. Global market forecasts produced by eMarketer show that by 2024 worldwide e-commerce sales will surge from \$3.53 trillion recorded in 2019 to an estimated \$6.38 trillion. This transformational shift towards online shopping has notably impacted air freight transport services since more customers are demanding fast deliveries with small parcel sizes offered too frequently than before when heavier items like machinery were shipped via airlines.

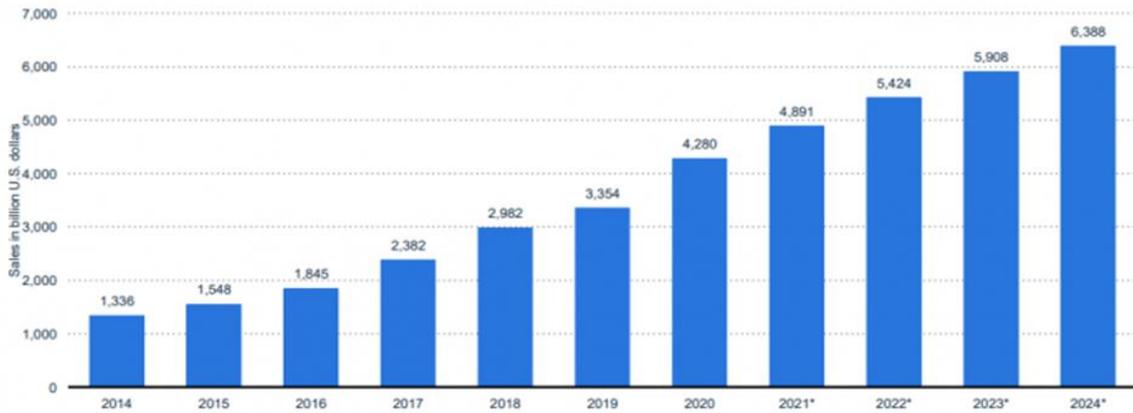


Figure 2: The growth of E-Commerce

Changes in Packaging Requirements

According to (Tseremoglou et al., 2022), developments within e-commerce continue to impact how shipping is packaged and handled globally. Traditionally large containers and pallets were often used for packaging air freight; however, our growing dependency on electronic commerce has resulted from an increase in smaller shipping units where standard sizes no longer suffice. To enhance delivery dependability while maintaining quality standards for all products delivered to customers, the storage and handling of these items must remain a top priority.



Figure 3: Packaging

Faster and More Adaptable Storage Solutions

The expansion of e-commerce has also increased the demand for quicker and more flexible storage options. Traditional air cargo storage facilities are built to handle vast amounts of goods and may need to be revised for the rising volume of smaller, lighter shipments. In addition, to fulfil this demand, air cargo firms are investing in novel storage technologies such as automated storage and retrieval systems (AS/RS) and robots, which can manage smaller, more frequent shipments.



Figure 4: (AS/RS) System

These systems can increase storage efficiency, safety, and accuracy, allowing for speedier and more flexible storage solutions that can react to changing demands.

Furthermore, air cargo businesses invest in modern technologies like artificial intelligence (AI) and the Internet of Things (IoT) to improve shipment tracking and monitoring. These systems can give real-time data on cargo location, condition, and handling methods, enabling a more rapid and accurate reaction to any problems that may develop (Azadeh, De Koster & Roy, 2019).



Figure 5: Internet of Things

Opportunities and Challenges

The rise of electronic commerce presents numerous opportunities but also substantial challenges for air freight providers globally. Facilitating quicker delivery times and flexible storage options requires significant investments in new infrastructure and technology. Additionally, delicate or perishable goods require particular handling solutions involving customized storage techniques, which translate into higher costs associated with air cargo services. However, ample prospects are created by the growth of electronic commerce, such as increased demand for air cargo services and novel logistics structures like third-party logistics providers (3PLs) who specialize in e-commerce deliveries and e-commerce platforms (Li, 2020). Furthermore, e-commerce expansion presents several hurdles that must be overcome by aerial freight businesses to remain competitive investors can benefit from these opportunities using innovative solutions through technological know-how advancements plus prompt responses catering to evolving demands within this dynamic marketplace.

METHODOLOGY

In this paper, we conducted a narrative literature review with the goals of summarizing the existing body of literature and identifying essential research gaps. To consider recent developments, we also included “grey” literature in our study. Furthermore, we used EBSCO Business Source Premier, Scopus, IEEE Xplore, ScienceDirect, and Google Scholar as our primary sources, but also screened numerous conferences proceedings and references (snowballing) of published papers to find additional and related materials. We used the following search terms: (“Storage operations” or “Storage”) and (“Air Cargo” or “Cargo”) and (“Cargo handling” or “Handling”). The paper collection and analysis took place between February and April 2023. The authors screened each paper for relevance, and the core topics were briefly summarized. Subsequently, we combined all topics and derived research questions by creating a map in which we listed the effectiveness of logistics services on the performances of the companies.

RESULTS AND DISCUSSION

The air cargo industry is a complex network of planes, pilots and luggage. It's like a complex web where each thread leads to a purpose in its own way. With the rise of e-commerce, the web is further complicated by the growing demand for faster delivery times, which puts pressure on those responsible for transporting goods around the world. A key factor driving the growth of e-commerce in the air cargo industry is consumer expectations. Today's customers expect their orders to arrive as soon as they place them online, which traditional postal services cannot provide. For this reason, many companies use air freight to quickly deliver their products from one part of the world to another. The move to faster delivery not only requires improved logistics, but also a higher level of security than ever before.

Another major area where e-commerce is impacting the air freight industry is automation. The use of advanced tracking systems and predictive analytics has enabled companies to monitor all aspects of their operations in real time, identify potential problems before they occur, and respond accordingly. In addition, businesses can reduce costs and increase

efficiency at the same time by using automated processes such as robotic sorting systems and automated loading and unloading processes.

The first impact of e-commerce on the air freight industry is the increasing demand for logistics services that have traditionally been handled by human operators or manual processes. This includes tasks such as order processing, package handling, packaging, shipment tracking, customs processing, payment processing, and warehousing. As more customers choose digital solutions for shipping management, these companies are increasingly turning to automated systems and platforms to meet their customers' needs. In addition, many air freight providers now offer bespoke online booking services, allowing customers to select specific airlines and quickly compare prices without contacting multiple providers directly. E-commerce also increases price transparency within the industry. With access to real-time information on current market rates and fees across a variety of websites and mobile applications, customers can easily make informed shipping decisions. There are also fewer intermediaries involved in the process, and many transactions between buyers and sellers are seamless over the Internet, resulting in a significantly lower total cost of ownership compared to standard paper-based transactions.

These benefits of e-commerce, such as efficiency and cost savings, have created a highly competitive environment, intensifying competition among vendors seeking to gain an edge in an environment driven by advances in digital technology. Moving forward, it will be interesting to see how companies continue to effectively leverage these advancements while addressing the potential challenges posed by the rapid development of the industry.

CONCLUSIONS

In conclusion it can be said that e-commerce revolutionizes how goods are moved worldwide via air freight. Through better customer expectation management, increased security measures, and advanced automation technologies, businesses have access to unprecedented levels of control over their supply chain operations enabling them to meet demand quickly and efficiently no matter what size shipment needs transporting.

FUTURE RESEARCH DIRECTIONS

For researchers planning future investigations, this study might be a valuable reference. In the present day of technological advancement, the rise of technology and artificially intelligent approaches are helping in raising the performance in all sectors and causing technological influence in every aspect of life. Therefore, technology and intelligent solutions in storage operations may solve the existing problems while also speeding up the storage and shipping of products to consumers. These technologies must be used, and their percentage usage must rise even further. Researchers may undertake further studies to investigate and evaluate the role of these technologies in the enhancement of the storage of Air cargo.

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