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# Will Ezhou become an air cargo superhub in China? A comparison to Memphis

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## Abstract

**Purpose:** As China boosts high-end manufacturing and modern services along with industrial relocation to its central and west regions, air cargo hubs become more critical for development in these regions. Meanwhile, aviation logistics has been listed as a new momentum for further economic growth in multiple Chinese cities, among which Ezhou is said to become Asia's first and the world's fourth professional cargo airport. This article assesses the possibility for Ezhou to realize this goal, based on a comparison to the US busiest air cargo hub, Memphis.

**Design/methodology:** Factors under comparison include Geographical location, city foundation, weather conditions, traffic connections, and policy support. Also, this article evaluates Ezhou's privileges against other Chinese cities, taking Zhengzhou as an example.

Findings: Ezhou is finally found to be more suited to be a Chinese Memphis.

**Research limitations/implications:** No permission was given to make interviews with the ground handling personnel and gather real-life data to analyze task durations and workers' body movements.

**Originality/value:** This article is the first to analyze the possible rise of an air cargo hub in China in English literature.

Keywords: air freight; cargo hubs; e-commerce; express delivery; aerotropolis

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#### 1. Introduction

The COVID-19 pandemic has exposed China's deficiency in air cargo infrastructure (Li, 2020), but in the meantime, efforts have also been made to reverse this situation step by step. On March 19, 2022, a Boeing 757-200 all-cargo aircraft completed a test flight after landing smoothly on a runway of Ezhou Huahu Airport (EHU). This is the first time a new airport is tested with an all-cargo aircraft in China. On July 17, 2022, EHU started commercial operations with the first cargo flight undertaken by SF Express (Xinhua Net, 2022). With an investment of 32 billion yuan (\$5.03 billion), EHU is expected to handle 3.3 million tons of cargo by 2030, performing the function of an air freight hub in China (Global Times, 2022).

For a long time, China had few all-cargo routes and few all-cargo aircraft, and a large proportion of air cargo was finished by passenger aircraft's bellyholds (Fung, Zhang, Leung & Law, 2005). Furthermore, all the airports in China were designed primarily for passenger traffic without sufficient consideration of cargo freight, especially the demand of cargo express carriers. The inadequate air cargo capacity and the inefficiency in cargo transport by passenger aircraft's bellyholds led to a conflict between supply and demand, in the view of the leading Chinese integrated express service provider, SF Express (Zhou, 2017).

SF Express is a significant stakeholder in the EHU project. In 2014, SF Express negotiated with the Hubei Provincial government regarding the construction of a cargo hub airport, also a logistics center for SF Express, in Hubei Province (Logistics Times Weekly, 2016). In the site selection stage, Ezhou outperformed other local cities based on its favorable conditions in linkage with other transport modes, location to the Wuhan Metropolitan Area, geologic structure, climate, regional industrial support, and others (Ezhou Government Net, 2021). In 2019, the National Development and Reform Commission of China (NDRC) approved the site selection of EHU, indicating the official recognition of this project (NDRC, 2019). EHU is planned as a hub cargo airport and a regional airport for passenger transportation. Moreover, it is expected to become Asia's first and the world's fourth professional cargo airport and the largest one in America, Ezhou is often depicted by public media as "China's Memphis". However, a question arises as to whether Ezhou bears the advantage of becoming the top cargo airport in China. Comparing the conditions in favor of Memphis's air cargo hub position may help illustrate the possibility in Ezhou.

In this article, we mainly conduct a review of the resemblance between Ezhou and Memphis and the strengths of Ezhou against other Chinese cities for being an air cargo hub. The empirical basis of this article comes mainly from public data disclosed by aviation administrative institutions in China. It adopts a narrative approach primarily but relies on information from major media and government agencies. Insights from previous secondary literature are also borrowed. The remainder of this article is organized as follows: after a literature review, it explores the necessity of professional cargo airports in China; it then makes a comparison between Memphis and Ezhou in the major conditions for being an air cargo superhub; also, it assesses Ezhou's strengths over other Chinese competitors, using Zhengzhou as an example. Based on this analysis, the end of this article looks to the possible evolution Ezhou in cargo hub function development.

## 2. Literature review

This article is related to three branches of the literature on air cargo management. The first is the significance of air cargo for regional development. Air cargo can be considered an indicator of a region's macroeconomic trend (Kasarda & Green, 2005), whereas the demand for air cargo hinges on economic vitality (Kupfer, Meersman, Onghena & Van de Voorde, 2017). As certain high-tech industries have been relocated to China's central and west regions, some inland Chinese cities compete for a domestic aviation hub position following several major

eastern cities (Li, Yan, Zhang, Xu, Chen & Zhou, 2021). Adopting the idea of aerotropolis (Kasarda & Lindsay, 2011), they are drawing on this type of expertise to guide city development (Zhengzhou Airport Economy Zone, 2021).

The second is air cargo development in China. Although studies in this branch are still limited, growing attention has been paid to it as the previous years have witnessed tremendous growth of air cargo demand in this country. Jiang, Ren and Hansman (2003) predicted that from 2003 to 2020, the sharp increase of air cargo traffic and air cargo throughput would bring challenges for system infrastructure in China. They claimed that Wuhan would become a sorting hub of express delivery in China in light of its geographical advantages. This claim corresponds with the analysis in this article because Ezhou is now a part of the Wuhan Metropolitan Area. The rapid development of China's economy and its aviation sector has brought uncertainties to Hong Kong's leading position in air cargo sector (Wan & Zhang, 2016). The robust freight demand during the COVID-19 pandemic has further illustrated the significance of China's air cargo sector (Li, 2020). Deng, Zhang and Wang (2022) found that Hangzhou, Shenzhen, and Nanjing are more critical for freighter operations following the pandemic owing to the existence of many e-commerce giant enterprises and relatively underutilized airport capacities in these cities. Zhang (2003) deemed that China would play a more critical role in air freight development in Asia and worldwide.

The third is factors affecting airports' ability to attract airport traffic. In contrast to air passenger freight, air cargo freight is concentrated in a few large hubs (Alkaabi & Debbage, 2011; Mayer, 2016). Favorable factors mentioned in previous studies include moderate weather conditions, convenient linkage to other traffic hubs, fewer restrictions in night flights, underutilized infrastructure capacity, and a supportive political background (Ohashi, Kim, Oum & Yu, 2004). Based on these factors, Cosmas and Martini (2007) compared the cargo operation in Louisville and Memphis, the respective central air hubs of the world's two largest carriers, UPS and FedEx. Likewise, this article uses similar factors to make a comparison between Memphis and Ezhou, for the purpose of assessing Ezhou's potential to be a central air hub in China.

# 3. The Significance of Air Cargo Hubs in China

A cargo hub airport serves mainly all-cargo aircraft. It is often a geographical center where many air routes assemble, disregarding its position to the origin and destination of the goods in transit. A major consideration for the location of an air cargo hub is its potentials in forming rapid transshipment. As China's largest air-cargo carrier, SF Express now maintains its express delivery service through 56 domestic airports and 28 airports at abroad. However, SF Express's domestic air freight relies predominantly on "point-to-point" routes, which have been increasingly unsuitable for further development. Owing 68 all-cargo freighters, nearly half of China's cargo fleet size (SF Airlines, 2022), SF Express needs a national air cargo hub to rearrange these "point-to-point" routes into "hub-and-spoke" routes, so as to increase the utilization of air traffic resources. This explains why it has been actively pushing forward the construction of EHU. Besides, professional cargo hubs are needed for China's overall aviation industry. Following are the reasons.

## 3.1. Unbalanced Air Passenger and Cargo Growth

Air freight has advantages in speed and reliability and is accordingly more eligible to transport high-value and time-sensitive products such as fresh food, emergency relief items, electronic goods, medical and pharmaceutical products, and luxury commodities (Rodrigue, 2020). Aviation logistics has also been regarded as vital impetus to promote regional economic development. As China's economy transits from the previous approach relying on labor cost advantage to a new approach prioritizing industrial upgradation and technological innovation, air cargo will maintain stable development in recent years. The Civil Aviation Administration of China (CAAC) reported that in 2021 Chinese airlines completed 7.32 million tonnes of cargo and mail traffic, increased by 8.2% than 2020 and reaching 97.2% of the volume finished in the year before the pandemic, 2019 (CAACNEWS, 2022). However, from a longer point of view, the development of air cargo looks trivial in comparison to that of air passenger traffic. From 2010 to 2019, the average air cargo growth rate was 3.33%, whereas the average air

passenger growth rate was 10.54% (Figure 1). The difference implies that the development of air freight is still at a preliminary stage.



Figure 1. Comparison of air passenger and air cargo growth rate, 2010-2019. (Annual reports of China's civil aviation development, CAAC.)

#### 3.2. Inadequate Air Cargo Capacity

Moreover, air cargo development is spatially unbalanced in China. In 2021, all the 248 airports in mainland China completed 17.83 million tonnes of cargo and mail throughput with a year-on-year growth of 10.9%, but over a half of this volume is fulfilled by five key air passenger hubs in the east region, namely Shanghai, Guangzhou, Shenzhen, Beijing and Hangzhou (Figure 2). They are also the major cities of the city clusters in Beijing-Tianjin-Hebei area, Yangtze River Delta, and Pear River Delta, respectively. In contrast, the volume finished by the airports in the central and western regions is minimal. In addition, most air cargo has been transported by passenger aircraft's bellies on "point-to-point" routes, and cargo flights are very difficult to find slots at these airports during daytime (The Chinese Central Government, 2022). As a result, air freight is a by-product of passenger transport. The number of all-cargo aircraft serving Chinese airlines is comparatively small. As of the end of 2020, Chinese airlines have a total of 186 all-cargo airlines. Although this number had increased by 63 since 2015, it was still far less than the cargo fleet size of one American cargo airline FedEx, which reports that it has 680 planes in operation (FedEx, 2022).



Figure 2. Distribution of cargo and mail traffic at civil airports by city, 2021 (Statistical bulletin of civil airports production in 2021, CAAC.)

#### 3.3. Rapid Development in Express Delivery Service

The past decade also witnessed explosive growth in express delivery services in China. In 2021, the parcels and express packages delivered by the express delivery enterprises in China reached 108.30 billion units (Pandaily, 2021). According to data from the State Post Bureau of China, from 2012 to 2021, the growth rate of express delivery remained above 25%, and between 2012 and 2016, this rate even remained above 48% (Figure 3). Besides, by 2021, China had been the top country for eight consecutive years in express delivery volume (China Daily, 2021). If express delivery service relies predominantly on ground transportation, its efficiency would be adversely affected. Therefore, more all-cargo aircraft and supporting air cargo hubs are urgently needed in China, which is facing a rapidly rising demand for air cargo capacity.



Figure 3. Growth of express delivery service in China, 2012-2021. (Annual report on China's postal industry, the State Post Bureau of China.)

#### 3.4. Momentum from E-commerce Growth

Over the last few years, e-commerce has become a significant part of the sales structure in China and the world. As numerous consumers request faster deliveries, air freight becomes more suitable for meeting this need (Wan & Zhang, 2016). The International Air Transport Association reported that the proportion of e-commerce in air cargo traffic would rise from 15% in 2019 to a higher level, even in the coronavirus epidemic period (IATA, 2020). China has unequivocally expressed an opening-up policy at a higher level in its fourteenth Five-years period. With 132 cities being designated as cross-border e-commerce pilot areas, transnational e-commerce has been targeted as another breakthrough for boosting foreign trade (The Chinese Central Government, 2022). As China's cross-border e-commerce imports and exports climbs, the aviation logistics market will gain more momentum as well.

China has set a goal to become a civil aviation superpower by the middle of this century, which specifies that, among others, China will have several large airlines with strong international competitiveness and a spatially and functionally reasonable airport network (Civil Aviation Administration of China , 2018). As one step, China attempts to establish an air cargo hub system comprising both integrated hub airports and professional cargo hub airports. It has been confirmed that EHU will start its operation in China's fourteenth five-year period (Civil Aviation Administration of China, 2018). This is the only professional cargo hub recognized in China's Civil Aviation Development Plan for the Fourteenth Five-Years, suggesting that higher importance has been attached to Ezhou for China's air freight development (Xu, 2018).

## 4. Comparison between Ezhou and Memphis

FedEx is the world's largest cargo airline in terms of freight tons flown (ITTA, 2021), with its global superhub located at MEM, which has ranked among the world's two busiest cargo airports for decades. EHU is set as the world's fourth and Asia's first professional air cargo hub, so it is proposed to serve as an air freight superhub in China. SF Express, as the earliest express delivery enterprise opening air cargo service in China and now China's largest cargo airlines in terms of fleet size, has positively advanced the construction of EHU. Accordingly, Ezhou to SF Express is much like Memphis to FedEx. Indeed, public media in China have widely reported Ezhou as the Chinese Memphis. For this reason, this section will further analyze the similarities between the two (Table 1), as a means to assess Ezhou's capability to perform the air freight superhub function in China.

## 4.1. Geographical Location

A central location within networks of cargo airlines is critical for airports that primarily rely on air cargo operation (Mayer, 2016). In 1973, Memphis's founder, Fred Smith, moved FedEx to Memphis to realize a business plan of establishing a hub system exclusively for door-to-door express service (Cosmas & Martini, 2007). Memphis's preferable geographical location is one of the incentives for FedEx to choose it as its superhub. Memphis is in the Central Time Zone of America and close to most of the nation's major markets. It is not located at the geographical center of the United States, but it is near to the economic geographical center of this country, which embraces major urban agglomerations and populations in the East. The initial Memphis hub, working like spokes in a wheel, connected 25 cities with each other (Davies, 1984). Now it offers non-stop service to many cities in North America, Europe, the Middle East, Asia and South America.

Ezhou is a small city in eastern Hubei Province. Lying approximately on the central point of the Central China region, it is about 1000 kilometers away from Beijing in the north, Shanghai in the east, Chongqing in the west and Guangzhou in the south. Within two hours of flight, Ezhou can reach a significant part of China accounting for at least 80% of the country's GDP (Figure. 4). Ezhou is endowed with the geographical privileges to become a cargo hub.



Figure 4. Ezhou is centrally located in mainland China

## 4.2. City Foundation

Memphis is well-known for its rich culture, especially its impact on Blues, Rock-n-Role, and other kinds of music. Also, as a major producer of cotton and lumber, Memphis attracted a large number of workers and immigrants from 1900 to 1950, laying a labor basis for the later logistics development. However, almost all traditional jobs languished in 1970s. When the governors of this city were looking for a new breakthrough for

economic development, FedEx arrived. Just relying on MEM and its derived resources, Memphis evolved from a city of cotton to an aerotropolis (Kasarda & Lindsay, 2011).

Likewise, Ezhou is famous for its long history, regarded as the root of Hubei's civilization. It was the capital of Dong Wu during the Three Kingdoms period and has since been an important political, economic and military town in the middle reaches of the Yangtze River. Nowadays, as a key component of the Wuhan Metropolitan Area, Ezhou is an important industrial base of Hubei province and a commodity distribution center in eastern Hubei. For many years, the steel industry has been the backbone of Ezhou's economy. The high energy consumption and pollution caused by this industry forced Ezhou to seek industrial transformation. Like Memphis (Bowen, 2012), Ezhou does not have heavy air passenger flow, which can guarantee 24-hour operation per day without night flights restriction. Fostering air logistics is a good choice for Ezhou's further development.

#### 4.3. Climate

Memphis has a good climate for air logistics development. Because of its east-central location in the United States, it is rarely affected by adverse weather conditions such as snowstorms, hurricanes, or tornadoes, which appear in the north, south, and west regions, respectively. Accordingly, MEM has been closed for comparatively less time (Davies, 1984).

Ezhou is at the roughly same latitude as Memphis and has a very similar humid subtropical climate. The weather is mild and there is less snow in winter, and therefore the taking-off and landing of planes will be less affected. Good weather condition guarantees sustainable operation of EHU. It is also reported EHU will enjoy a more precise and customized weather forecast service, especially for night flights as its core operation (Hubei Daily, 2022).

## 4.4. Traffic Connections

Memphis is well-suited for the transport and shipping industry, owing to its multi-modal access. It is located on the bank of the Mississippi River, served by five major freight railroads, and also intersected by five major freight railroads Highways, I-240 and I-55. Its access by water contributed a lot to its initial development, while railroad construction strengthened its links to the American East and West market.

Ezhou, as part of the Wuhan Metropolitan Area, enjoys the transport convenience of Wuhan, which, as a "thoroughfare to nine provinces", is the most advantageous water, land and air transportation hub in China. Ezhou is only about an hour's drive from Wuhan, located at the intersection of Beijing-Kowloon Railway, Wuhan-Kowloon Railway, and Wuhan-Huangdao Intercity Railway. Four express ways, namely Shanghai-Chengdu, Beijing-Zhuhai, and Daqing-Guangzhou, go through Ezhou. Being in the middle of the Yangtze River areas, Ezhou is about 1100 kilometers away by water from Shanghai in the east and Chongqing in the west. Ezhou has five ports that can berth 5000-tonnes ships all year round.

## 4.5. Policy Support

The government of Memphis has constantly supported the need for airlines to develop air cargo freight. When FedEx moved to Memphis, the governors of this city also encouraged the establishment of a new air cargo industry. Smith got favorable leasing terms plus a promise to issue bonds for required airport improvement (Sigafoos, 1983). In later time, the airport continues to invest in new facilities to improve its capacity and service for cargo airlines. Such support really makes Memphis a preferable place to run a cargo hub (Cosmas & Martini, 2007).

Government policies are significant in fostering the development of air cargo in China (Jiang et al., 2003). Ezhou receives policy support in air logistics from multiple government levels. In addition to the national-level support for constructing the first professional cargo hub, favorable policies at the provincial and municipal levels are also positive. At the provincial level, EHU has been confirmed as a key investment project in Hubei, with the provincial government assuming 49% of the total investment (China Newsweek, 2022). At the municipal level, Ezhou government has proclaimed to construct a world-class infrastructure system including warehouse, cargo

terminals, and customs inspection facilities. Meanwhile, Ezhou government has applied for the liberalization of fifth freedom traffic right and other traffic rights that are needed for facilitating air cargo development (Ezhou People's Government, 2021). In recent years, a number of large e-commerce enterprises, including Vipshop, Suning, Amazon, GLP, and Mapletree has establishes warehousing and logistics center in Ezhou. E-commerce development will pave the way for Ezhou's air logistics development.

	Memphis	Ezhou
Location	East Central America	East Central China
Weather	Mild and less snowy	Mild and less snowy
Traffic connections	Multi-modal accessible	Multi-modal accessible
Night-operation restriction	No	No
Policy support	From local government	From local to central government
Airport infrastructures	Growing capacity	Large enough

Table 1. Comparison between Memphis and Ezhou for being air cargo hubs

## 5. Competition with Other Chinese Cities: Zhengzhou as an Example

The above section shows that Ezhou of today and Memphis in the 1970s are similar economic geographical centers, endowed with parallel climate privileges, based on resemblant multimodal traffic conditions, supported by comparable government policies, and faced with analogous opportunities for economic transition. As has been realized since FedEx's presence in Memphis, SF Express has good reasons to expect an air-cargo superhub future for Ezhou.

However, as China takes steps to open up its international air transport services at a higher level, many Chinese inland cities desiring foreign trade growth but lacking international traffic links want to seize opportunities in the blue sky. Besides Ezhou, other inner cities such as Zhengzhou, Xi'an, and Jiaxing also proclaimed to become air cargo hubs by following the experience of Memphis. Xi'an Airport is the largest airport in Northwest China which presents a more salient passenger hub function than a cargo hub function. Jiaxing is reportedly to have a cargo airport for YTO Express, another important integrated express service provider in China, but the construction has not yet started (Tencent, 2022). Zhengzhou is the biggest one in terms of annual cargo and mail throughput, ranking the sixth in 2021, following the above-mentioned five air passenger hubs in the east region. As such, Zhengzhou can be regarded as a benchmark for comparison purposes. If Ezhou is endowed with more resemblances with Memphis than Zhengzhou, Ezhou will be of greater potential to become an air cargo superhub in China.

Zhengzhou, the capital of Henan Province, is also located in the central-east region of China, but 500 kilometers north of Ezhou. Zhengzhou is a major transport hub of China, where multiple railways, high-speed railways, intercity railways, and express ways run through. Based on Zhengzhou's advantages in geographical location, air logistics has been attached more importance to city development in recent years (Walcott & Fan, 2017). Since Foxconn Zhengzhou, the main manufacturing base for iPhone, started to run nearby, the cargo transport of Zhengzhou Xinzheng International Airport has been booming. In 2013, Zhengzhou was approved to establish the first airport economic pilot zone in China. In 2018, the government of Henan Province proclaimed to establish Zhengzhou as an international air cargo hub. In 2021, Zhengzhou airport's annual cargo and mail throughput exceeded 700000 tonnes, ranking the sixth among all China's airports. Overall, Zhengzhou develops earlier than Ezhou in air cargo logistics and also enjoys good city foundation and strong policy support.

A major difference between Zhengzhou and Ezhou is that Zhengzhou Airport serves passengers and cargo equally, whereas EHU will rely predominantly on cargo logistics. Moreover, Zhengzhou Airport is not backed up

by a chief cargo airline, whereas EHU as a freight hub serves a major all-cargo integrator, SF Express. In this sense, Ezhou resembles Memphis more closely than Zhengzhou in air logistics development.

#### 6. Concluding Remarks

The importance of traffic to the economic development is self-evident, and the value of airports is even greater for inland cities that are not coastal or along the border. The rapidly rising demand for air cargo logistics in China calls for the emergence of an air cargo hub serving primarily for air-cargo operators. On the global level, most of the leading all-cargo integrators have a global or national freight hub to improve cargo turnover and aircraft utilization. Just as the American cargo airline FedEx Express has its central hub at Memphis International Airport, the Chinese dominant all-cargo carrier SF Express should have its own hub airport. As many Chinese cities compete for an air cargo position, Ezhou gets favorites from SF Express and earns policy support from alllevels of Chinese government. Based on Ezhou's major conditions in air logistics development, Ezhou resembles Memphis more closely than other Chinese cities. Therefore, Ezhou is of greater potential to become a Chinese Memphis. After all, one or more professional air cargo hubs will emerge in China in the coming years, but it is up to time to tell whether Ezhou will become the super one.

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## References

- Alkaabi, K. A., & K. G. Debbage. (2011). The geography of air freight: connections to U.S. metropolitan economies. *Journal of Transport Geography*, 19(6), 1517-1529. https://doi.org/10.1016/j.jtrangeo.2011.04.004
- Bowen, J. T. (2012). A spatial analysis of FedEx and UPS: hubs, spokes, and network structure. *Journal of Transport Geography*, 24, 419-431. https://doi.org/10.1016/j.jtrangeo.2012.04.017
- CAACNEWS(2022). China's air cargo has made steady progress. http://www.caacnews.com.cn/1/tbtj /202202/t20220215 1339686.html (Accessed April 26, 2022).
- China Daily (2021). Express delivery sets new record but still has room for progress. <u>https://www.chinadaily.com.cn/a/202112/10/WS61b29d52a310cdd39bc7a779.html</u> (Accessed April 26, 2022).
- China Newsweek (2022). The first freight hub airport in Asia is showing up, and this small city will "fly". <u>http://</u> www.inewsweek.cn/finance/2022-04-11/15441.shtml (Accessed April 26, 2022).
- Civil Aviation Administration of China (2018). Civil Aviation Development Plan for the 14th Five-Years. http://www.caac.gov.cn/XXGK/XXGK/FZGH/202201/P020220107443752279831.pdf (Accessed April 26, 2022).
- Civil Aviation Administration of China (2018). Action Plan for Building a Civil Aviation Superpower in the New Era. <u>http://www.caac.gov.cn/XXGK/XXGK/ZFGW/201812/P020181212548784102983.pdf</u> (Accessed April 26, 2022).
- Cosmas, A., & Martini, B. (2007). UPS and FedEx air hubs: comparing Louisville and Memphis cargo hub operations. *Cosmas and Martini*, 16, 3.
- Davies, R. E. G. (1984). The history of air express in the United States. *SAE Transactions*, 93, 966-972. https://doi.org/10.4271/840706
- Deng, Y., Zhang, Y., & Wang, K. (2022). An analysis of the Chinese scheduled freighter network during the first year of the COVID-19 pandemic. *Journal of Transport Geography*, 99, 103298. https://doi.org/10.1016/j.jtrangeo.2022.103298

- Ezhou Government Net (2021). Towards opening for operation: the story behind the EHU project. https://weibo.com/ttarticle/p/show?id=2309404644011288953182 (Accessed December 15, 2022)
- Ezhou People's Government (2021). The 14th Five-Year plan and Vision 2035 of Ezhou. http://fgw.ezhou.gov.cn/lzhxxgk\_4613/zc/zcwj/202105/t20210525\_400375.html (Accessed April 26, 2022).
- FedEx. Company structure & facts. <u>https://www.fedex.com/en-us/about/company-structure.html</u> (Accessed April 26, 2022).
- Fung, M., Zhang, A., Leung, L. C., & Law, J. S. (2005). The air cargo industry in China: implications of globalization and WTO accession. *Transportation Journal* (2005), 44(4), 44-62. https://doi.org/10.5325/transportationj.44.4.0044
- Global Times (2022). China's first cargo airport in Ezhou welcomes maiden test flight. https://www.globaltimes.cn/page/202203/1255368.shtml (Accessed April 26, 2022).
- Hubei Daily, 2022. Ezhou has a special "Meteorological Observatory" to ensure the operation of its airport. <u>http://news.hubeidaily.net/pc/702036.html</u> (Accessed April 26, 2022).
- IATA (2020). The e-commerce impact in air cargo operations, November, 2020. https://www.iata.org/contentassets/d22340c37e0c4cfd8fc05ca6ebf6cc9f/ecommerce-impactchallenges.pdf (Accessed April 26, 2022).
- ITTA. World Air Transport Statistics 2021. https://www.iata.org/contentassets/a686ff624550453e8bf0c9b3f7f0ab26/wats-2021-mediakit.pdf (Accessed April 26, 2022).
- Jiang, H., Ren, L., & Hansman, R. (2003). Market and infrastructure analysis of future air cargo demand in China. Paper presented at the ALAA's 3rd Annual Aviation Technology, Integration, and Operations (ATIO) Forum. https://doi.org/10.2514/6.2003-6770
- Kasarda, J. D., & Green, J. D. (2005). Air cargo as an economic development engine: A note on opportunities and constraints. *Journal of Air Transport Management*, 11(6), 459-462. https://doi.org/10.1016/j.jairtraman.2005.06.002
- Kasarda, J. D., & Lindsay, G. (2012). Aerotropolis: the Way We'll Live next. Farrar, Straus and Giroux.
- Kupfer, F., Meersman, H., Onghena, E., & Van de Voorde, E. (2017). The underlying drivers and future development of air cargo. *Journal of Air Transport Management*, 61, 6-14. https://doi.org/10.1016/j.jairtraman.2016.07.002
- Li, C., Yan, X., Zhang, Y., Xu, N., Chen, J., & Zhou, G. (2021). Does airport preferential policy aggravate the competition of aviation hubs in central and western China? based on the investigation of 78 airports. *Mathematical Problems in Engineering*, 2021, 8387088. https://doi.org/10.1155/2021/8387088
- Li, T. (2020). A SWOT analysis of China's air cargo sector in the context of COVID-19 pandemic. *Journal of Air Transport Management*, 88, 101875-101875. https://doi.org/10.1016/j.jairtraman.2020.101875
- Logistics Times Weekly (2016). The leader of Hubei stated that having a cargo hub is a breakthrough for SF Express's development. <u>https://mp.weixin.qq.com/s?</u> <u>biz=MjM5MTczMTM5Mw==&mid=2649851571&idx=4&sn=1c0bb832caea226a114d6b4791246</u> <u>be2&scene=27</u>.
- Mayer, R. (2016). Airport classification based on cargo characteristics. *Journal of Transport Geography*, 54, 53-65. https://doi.org/10.1016/j.jtrangeo.2016.05.011
- NDRC (2019). NDRC's reply on the feasibility study report of the new Hubei Ezhou civil Airport project. <u>https://www.ndrc.gov.cn/fggz/zcssfz/zdgc/201901/t20190116\_1146171.html?code=&state=123</u> (Accessed December 15, 2022).
- Ohashi, H., Kim, T. S., Oum, T. H., & Yu, C. (2004). Choice of air cargo transshipment airport: an application to air cargo traffic to/from Northeast Asia. *Journal of Air Transport Management*, 11, 149-159. https://doi.org/10.1016/j.jairtraman.2004.08.004

- Pandaily, 2021. China's annual parcels and express volume exceeds 100 billion. <u>https://pandaily.com/chinas-annual-parcels-and-express-volume-exceeds-100-billion-average-daily-service-registers-nearly-700-million/</u> (Accessed April 26, 2022).
- Rodrigue, J. P. (2020). *The Geography of Transport Systems* (5th ed.). Routledge. https://doi.org/10.4324/9780429346323
- SF Airlines, 2022. The 12th anniversary of safe operation of SF Airlines. http://stock.10jqka.com.cn/20211231/c635608857.shtml (Accessed April 26, 2022).
- Sigafoos, R. A. (1983). Absolutely, Positevely Overnight !: Wall Street's Darling Inside and Up Close. St. Luke's Press.
- Tencent, 2022. YTO will start is operation in 2025. <u>https://new.qq.com/rain/a/20221019A00S6A00</u> (Accessed April 26, 2022).
- The Chinese Central Government, 2022. Special Plan for The Development ff Aviation Logistics in the 14th Five-Years. <u>http://www.gov.cn/zhengce/zhengceku/2022-02/16/content\_5673982.htm</u> (Accessed April 26, 2022).
- The Chinese Central Government, 2022. The number of cross-border e-commerce pilot zones in China has reached 132. <u>http://www.china.org.cn/business/2022-02/16/content\_78051810.htm</u> (Accessed April 26, 2022).
- Walcott, S. M., & Fan, Z. (2017). Comparison of major air freight network hubs in the U.S. and China. *Journal of Air Transport Management*, 61, 64-72. https://doi.org/10.1016/j.jairtraman.2016.06.006
- Wan, Y., & Zhang, A. (2016). Air Cargo transport and logistics in Hong Kong and Southern China. In Routledge Handbook of Transport in Asia (pp. 378-401). Routledge. https://doi.org/10.2139/ssrn.2881838
- Xinhua Net (2022). Asia's first professional cargo hub airport put into operation in central China. <u>http://english.news.cn/20220717/c0d1e7aab5304f3599a60d078b0b0c59/c.html</u> (Accessed December 15, 2022).
- Xu, X. (2018). SF Express will have an airport predicted to be China's Memphis. Storage and Transportation in China, 1, 62-63.
- Zhang, A. (2003). Analysis of an international air-cargo hub: the case of Hong Kong. Journal of Air Transport Management, 9(2), 123-138. https://doi.org/10.1016/S0969-6997(02)00066-2
- Zhengzhou Airport Economy Zone (2021). Information disclosure: Zhengzhou Aerotropolis Research Institute Co., Ltd, 2021. <u>http://public.zzhkgq.gov.cn/03EBB/4954203.jhtml</u> (accessed April 26, 2022).
- Zhou, W. (2017). The breakthrough for Wuhan's logistics industry under the influence of Ezhou Airport. Air Transport Business, 12, 25-27.

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