

DRONE MARKET DEVELOPMENT IN FRANCE AND CHINA

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ABSTRACT

Drones are a new technology with a wide range of civil engineering applications. UAVs are used in construction because they can complete complex tasks, making them suited for operations such as site planning, construction progress monitoring, site management, project management, and so on. Drones can assist construction managers, site supervisors, and civil engineers in monitoring the progress of a project using navigation, control, and image processing technology, among other things. Because drones offer various useful features that may be applied in various fields, many governmental organizations and corporations have used them as one of their key roles in recent years. Asia and Europe have the fastest-growing drone investments and are the world's major drone exporters. This research will observe the growth of the drone market in China and France's construction industries. In addition, the author will conduct a literature review.

Keywords: Drones, Market Development, Construction, Construction Drones

BACKGROUND

Drone applications illustrate that they can be used to do dangerous or costly activities instead of humans. However, there are other factors to consider, including technological disparities between countries and legal and technological limitations. As a result, Company Coach gives a task to determine which drone applications exist in two countries for a certain industry and analyze the growth of the drone markets in the two countries. The goal will be to figure out which country, in which sector, is most likely to develop more of the drone industry and why.

The construction industry started to develop toward the revolution of machinery and the revolution of the industry itself. The global technology competition threatens various industries, including the construction industry (Geng, 2003). The construction industry has been embracing new technologies that can reduce cost, increase efficiency, improve safety, etc. And it is no other than a drone (Keyvanfar, 2021). Unmanned Aerial System (UAS) or Remotely Piloted Aircraft Systems (RPAS), also can be called Drones, is a small aircraft that flies using a remote control from the ground that has been used for military applications before (Keyvanfar, 2021). Ciampa et al., 2019 stated that Drones have the ability to reduce casualties on building sites by avoiding dangerous conditions, such as high-elevation inspections. Drones are proving to be a quick and cost-effective solution that does not require traffic closure in some cases.

Drones are a new technology with a wide range of possible uses in civil engineering (Ciampa et al., 2019). Drones are a technology that is equipped with cameras and other sensors as a base to collect images and other information from unreachable and distant locations. From the early 2000s, the use of drones already expanded to many different sectors, for instance, engineering, archaeology, geology, etc. (Segarra-Oña, 2018; Keyvanfar, 2021).

According to Keyvanfar (2021), The application of UAVs in construction is that the UAV can complete a complicated task that makes them suitable for construction

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activities, site planning, construction progress monitoring, site management, project management, etc. Drones can help 3 construction managers, site supervisors, and civil engineers to monitor the construction progress through navigation, control, image processing technologies, etc.

With all the development, the fastest-growing investments in drones and the largest drone exporter globally are Asia and Europe (Sayler et al., 2016). In the latest years, China has developed and increased the capability of UAVs. Finnegan said, "They are quickly prototyping systems, seeing what problems they have and then moving on and incorporating those lessons into a new system." Over the past few years, many governmental organizations and businesses have used drones as one of their main functions because drones have multiple useful features that can be applied in many fields (Asia perspective, 2021; Insinna, 2015). China is not the only country that developed drones. After so many years, European countries may emerge with UAS. The three countries, The United Kingdom, Italy, and France, are planning to sign with a MALE system to develop drones with a funding agreement at the Paris Air Show in June, which was announced in March (Insinna, 2015).

LITERATURE REVIEW

Drones

Barnhart et al., 2012 stated that unmanned aircraft became one of the first aircraft, along with the Chinese kites and hot air balloons, to be aircraft without someone on board. In the younger years of aviation, the concept of flying an aircraft without a pilot has the advantage of reducing life risk. In the advanced technology era, unmanned aircraft or remotely piloted air vehicle means an aircraft that fly around mimicking human-piloted craft. Unmanned aircraft have a very different flight control system from an autonomous flight. Because unmanned aircraft have an independent system using any outside signals enabling pilots to remotely control and fly the aircraft, and many other variations. Based on Sayler, 2015 recently, unmanned aerial vehicles (UAV) or drones have had speedy development worldwide in both military and civilian.

Construction Drones

Damage assessment in projects is critical, and drones can assist engineers at the earliest stages of a problem's occurrence, allowing engineers to arrange experimental investigations for diagnostic purposes (Ciampa et al., 2019). Ahmed et al., 2018 stated that Drones and unmanned aerial vehicles (UAVs) can be utilized at several stages of a construction project, such as pre-planning, comprehensive survey and mapping of the job site, construction process monitoring, post-build checks, and sales and marketing. Drones can also be used as a real-time monitoring tool for planners to see if their construction projects on the ground are according to their concept. Drone data can also assist developers and construction companies keep track of their inventories and planning out the entire construction site. Construction drawings are utilized to build the BIM model, which is then used to plan the construction sequence and monitor progress in the traditional monitoring technique. The data from drone and UAV photographs from numerous locations and point clouds (from 3D scanning of a construction site) will be used to create a 3D model using the photogrammetry technique in the proposed approach.

Construction market in China

Global Construction 2030, a new analysis issued today, predicts that global construction production will expand by 85 percent to \$15.5 trillion by 2030, having three nations-China, the United States, and India, which is leading the way with 57 percent of global growth.

Construction market in France

In line with the total economy, the number of businesses in the broad construction sector expanded by 4.4 percent, from 698,034 in 2010 to 728,420 in 2020. Real estate operations (+47.3 percent) and architectural and engineering activities (+7.2 percent) were the main drivers of this expansion. However, this constituted an 11.4 percent drop from the previous year's level (Internal Market, Industry, Entrepreneurship and SMEs, 2022). The French construction business is undergoing significant changes with the new environmental rules (Attouri et al., 2022).

Relationship between drones and the construction market

Bogue, 2018 says that drones, or unmanned aerial vehicles, are becoming more common in the construction industry. Their use has increased dramatically in recent years. According to a poll conducted by a major drone reseller, 12 percent of construction companies in the United Kingdom are now adopting the technology.

RESEARCH METHODOLOGY

This research will be conducted using qualitative research. In this research, literature will be used for the sources. Including relevant journals by the publisher and professional writings. For the relevant articles and journals, there are several sources will be used, such as Journals, Books, Theses and dissertations, Academic articles, and relevant websites, Reports, and Professional papers. Two search engines also are used for this research to find relevant journals and articles. Google Scholar will be used for searching engine because it is a platform for academic articles or journals and relevant findings. Moreover, this engine is licensed and has access to many journals database. The University Library will also be used to find the theses and dissertations.

RESULTS AND DISCUSSION

Policy

This study is focused on the development of the drone market in France and China. As mentioned before, unmanned aircraft, also known as remotely piloted air vehicles, are aircraft that fly around like human-piloted craft in the modern technological period. Policymakers will need to grasp the underlying technology and the capabilities these technologies will bring to various parties as drones become more common. The regulation was published in the Federal Register on January 15, 2021. Under the law, the FAA has the right to take enforcement action against model aircraft operators who do not make proper use of their aircraft and endanger the safety of the national airspace system. Planning and monitoring construction activities are one of the key areas where drones and UAVs may significantly increase performance and speed. In fact, such technology might help the construction industry in almost every aspect of its operations. UAVs are revolutionizing a wide range of construction activities due to their advanced data collection capabilities.

The Permanent Representatives Committee of EU ambassadors confirmed the agreement on November 29 with the European Parliament on better civil aviation safety

rules and a new remit for EASA on December 22, 2017. The reform includes the first civil drone restrictions across the EU. The new laws are intended to create the necessary circumstances for the EU to handle the expected 50% increase in air traffic over the next 20 years due to increased drone usage. Drones are being utilized to assist the government in preventing the spread of the virus as the Lockdown spreads across France. China is the world's second-largest drone market, contributing to more than 70% of global sales. China, the first country to be affected by COVID-19, has made substantial use of drone technology to fight the virus, supporting authorities and citizens in various ways to keep the coronavirus pandemic from spreading further. Medical drone delivery has also seen a considerable increase in demand.

Limitation

There may be some limitations to this research. Despite the fact that drones are very popular these days and there is a lot of research on them, finding detailed data on construction drones in France and China is pretty tough. Because few construction drones are being made these days due to the COVID-19, collecting information about them is challenging due to a lack of past studies on the subject. Additionally, there is a linguistic barrier to consider. It's possible that the underlying data is written in French or Chinese.

CONCLUSION

France

The new rules are intended to establish the necessary conditions for the EU to be able to handle the estimated 50% increase in air traffic over the next 20 years, much of which will be due to the increased usage of drones (Brahimi et al., 2020). According to the data energy, construction, agriculture, real estate, and transportation have the highest turnover rates. Energy, water and waste, postal and courier activities, telecommunications, and mining will be intriguing markets for drone makers if we evaluate turnover by the firm. Drone makers are actively focusing on all of these industries (Maria et al., 2018). As the Lockdown spread across France, one of the most important techniques for dealing with numerous violators on the streets was broadcasting. The use of a loudspeaker drone. The French authorities used private drone services to supplement the city's law and order situation (Nair, 2020). Drones have been used in France to promote public awareness about the importance of following boundary gestures in order to prevent the spread of the virus (Rabahi et al., 2020).

China

China's drone business is booming, with a projected CAGR of 40.67 percent from 2017 to 2024. China is the world's second-largest drone market, with the United States set to close the gap in 2024. The Chinese drone industry has grown into a profitable enterprise, with a total market value of about 180 billion yuan expected in 2025 (The rise of China's drone industry, 2021). China, the first country to be affected by COVID-19, and has made extensive use of drone technology to fight the disease. Drones can be extremely useful in times of public health emergencies, such as the COVID-19 epidemic. They can be utilized to reach locations that are ordinarily unreachable, as well as minimizing human involvement (Chamola et al., 2020). Based on He and Tan, 2021 demand for medical drone delivery also grew significantly. In China, both the government and the private sector have expressed interest in linked drones, with many commercial drones uses such as parcel delivery requiring regular BVLOS or Beyond Visual Line of Sight operations. During China's "Singles' Day," drone is being tested in rural China, with drop-off points outside of Beijing and in Jiangsu, Shaanxi, and Sichuan provinces (Parmar, 2021)

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