

Flying High with DJI Innovations: A Comprehensive Look at the Success Story

Yinan Liu^{1*}

¹ Department of Foreign Languages, Guangzhou College of Technology and Business, Guangzhou, China

Email Address

Claraliuyinan@163.com (Yinan Liu)

*Correspondence: Claraliuyinan@163.com

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Abstract:

DJI is a leading manufacturer of drones and handheld cameras, known for its innovative technology and affordable prices. The company's success can be attributed to its focus on customer support, community engagement, and a range of product offerings. DJI has diversified its product line to include specialized drones for various industries such as agriculture and construction. DJI has cost leadership in drone manufacturing due to the cluster of supporting industry and differentiates its drones by integrating drones with gimbals and cameras. The company has built a loyal and engaged user base by offering comprehensive training and educational resources and excellent customer support. However, the company faces challenges related to public perception of drones and government regulations. To maintain its market leadership, DJI needs to balance innovation, customer support, and compliance with regulations to maintain its market leadership.

Keywords:

DJI, Technological Innovation, Global Strategy, Risks and Challenges

1. Introduction of DJI

Recognized as a premier flying camera manufacturer in the drone industry, DJI specializes in designing and manufacturing camera gimbals, camera stabilization, and flight platforms for aerial photography and videography.

DJI's drones are known for being lightweight and easy to use, featuring built-in GPS and a motorized mount that stabilizes the camera while allowing it to rotate in various directions. Despite the advanced technology, DJI drones are priced affordably, ranging from USD \$399 for the Spark Drone to USD \$2,999 for the Inspire 2 Drone. DJI has launched a variety of camera drones' series and handheld cameras, including the popular Mavic, Phantom, and Osmo series, etc. As shown in the product catalog from DJI's official website below, as discussed where [1], Mavic series are designed as compact and foldable drones designed for portability and ease of use. Phantom series are high-performance drones with advanced features for professional aerial photography and videography. Osmo series are handheld camera stabilizers with built-in cameras for capturing stabilized video footage.



Figure 1. DJI's Comprehensive Product Catalog on Official Website.

2. Materials and Methods

This thesis refers to the material such as product catalogue, and news published on DJI's official website to conduct case analysis of DJI to find out the factors of the success of DJI such as innovation, range of product offering. And Porter's five forces theory and Vernon's product life cycle theory are referred to analyze the global strategy of DJI. Personal interview with the employees of DJI are used to analyze the risks, challenges faced by DJI.

3. Key Factors in DJI's Success

According to the recent data, DJI continues to dominate the commercial UAS (Unmanned aircraft system), with an estimated market share of around 70%. The report from REUTERS revealed that DJI Innovations (DJI) has already achieved 70% of the UAS market used for commercial applications in 2020. From 2013 to 2021, DJI achieved tremendous increase in sales revenues, rocketing from ¥ 8.2 billion to ¥ 23.1 billion. As pointed by Black [2], How DJI Innovations, a Chinese technology company headquartered in Shenzhen achieved great success in manufacturing unmanned aerial vehicles (UAV)?

Technological innovation: DJI has consistently invested heavily in research and development, resulting in a range of high-quality products that are reliable and easy to use. DJI has dedicated itself to making aerial technology accessible and user-friendly. Handheld cameras can help users record daily life effortlessly. Some cameras even provide accessories such as built-in extension rod for easier selfies and low-angle shots.

Customer support and community engagement: DJI's dominance in the drone industry cannot be solely attributed to its expertise in flight-control technology. DJI has been able to establish a strong brand reputation through its commitment to customer support. Customers can fly the drones without worrying about water damage, collisions, malfunctions, or other accidents as DJI has provided DJI Care Refresh Service, which offers one more replacement and extend the official coverage period. Moreover, the company offers comprehensive training and educational resources to its customers, which has helped to build a loyal and engaged user base.

Range of Product offerings: DJI's success can also be attributed to its ability to identify and capitalize on new market opportunities. The company has expanded its product line beyond consumer drones to include specialized drones for industries such as agriculture, construction, and public safety. This diversification has helped to drive the company's continued growth.

In the past, China has relied on manual labor to cultivate the land. As pointed by Black [3,4], with an intelligent operating system like DJI's, many people are attracted back to agriculture, ensuring the continuity of the agricultural industry. Agricultural drones have achieved autonomous flight, with advantages such as high operating efficiency, stable posture, and better operating results for pest control. For example, DJI helps fruit growers in Jiangxi Province to promote the upgrading the agricultural

industry. Agricultural drones have been utilized for the full year operation and management of fruit trees, from cleaning to harvesting, which further validate the feasibility of drones in the entire process of orchard pest control and intelligent operations. Users can monitor the growth of oranges with DJI's drones anytime and anywhere. With the launch of drone-based fruit plantation project, DJI helps to explore the best solutions for fruit tree pest control with drones, promoting the mechanization of fruit industry. With the application of remote-controlled drones, farmers can enjoy greater convenience, more tangible benefits and achievement, truly realizing the goal of making agriculture easier and life better with the help of drones from DJI.

All in all, DJI's success in the UAS market can be attributed to a number of factors, including its focus on innovation, product quality, and customer support. The company has consistently delivered high-quality products that have met and exceeded customer expectations, which has helped to establish a loyal customer base and enhance the brand's reputation. DJI has invested in providing comprehensive after-sales service and technical support to its customers, which has helped to build trust and foster long-term relationships. In addition, DJI has built a strong ecosystem of partners and developers, which has contributed to the growth and expansion of the UAS market as a whole. By focusing on these key areas, the company has established itself as a leader in the UAS industry and is well-positioned for continued growth and success in the future.

4. DJI's Global Strategy

DJI strategically chose Shenzhen in the Pearl River Delta as its headquarters due to the location's established electronics industry and access to cheap labor, talent, and technology. DJI quickly gained economies of scale and set up industry barriers to entry for potential competitors. Being an early entrant, DJI became a market leader in modern civilian drone industry by innovating and focusing on technology. To maintain its market share, DJI uses both cost leadership and differentiation strategies, offering diverse product lines that include components of drones, gimbal stabilizers, series of drones combined with gimbal stabilizer and gimbal cameras. DJI's cameras have a separate brand name, which allows for cross-promotion between cameras and drones. Moreover, DJI differentiates even among its products with new features like collision-avoidance sensors and active object tracking, making its products more expensive but superior in quality.

Larson claimed in *How long can DJI rule the sky* that Eleven-year-old DJI more or less invented the modern civilian drone industry when it introduced its first Phantom in 2012, as discussed where [5], there are few competitors in the introduction of PLC (Product Life Cycle), competition could be intense as every producer wants to promote standardized products in the industry to gain cost leadership. When it comes to development stage in PLC, market share is more important for long term strategy. Thanks to the cluster of supporting industries and strong internal manufacturing, DJI is willing and able to cut price to a point that almost no competitors can. For other drone manufacturers, one of the biggest challenges is keeping up with DJI's rapid development pace and pricing approach as DJI focused first on tech and dedicated most of strong workforce to R&D, claimed by Michael Perry, managing director of DJI North America.

Besides the cost leadership in modern civilian drone industry, DJI also uses differentiation strategy for the diversity of products to maintain more market share. Just as the chart below shown, DJI's product lines include components of the drones, gimbal stabilizers, series of drones combined with gimbal stabilizer and gimble cameras. Ronin, the gimbal, with cameras on it producing high quality photography can be highly compatible with drones. Unlike products from other drone manufacturers, cameras that come on DJI drone are given separate name, Osmo, diversifying the branding for drones and cameras, allowing cross-promotion between cameras and drones. And DJI never stopped the differentiation strategy even on own their products. The new Phantom 4 is much more expensive then Phantom 3 as more than 2 years of lab work in R&D went into features like collision-avoidance sensors and active object tracking that is not available for competitors.

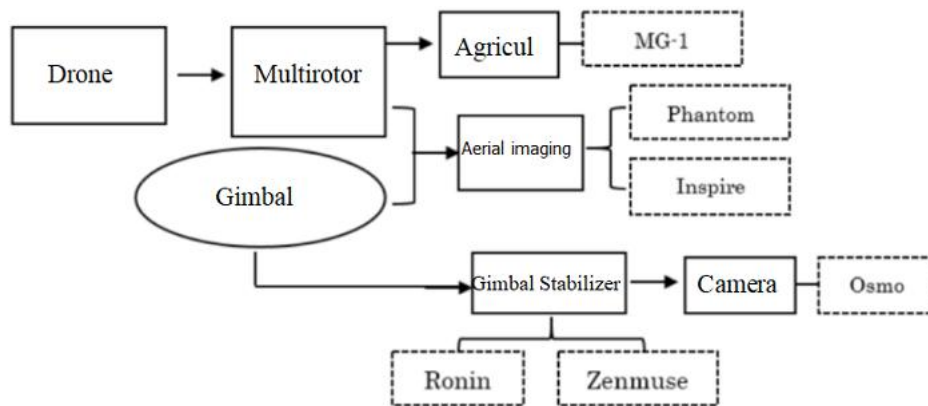


Figure 2. DJI's Comprehensive Product Category.

5. DJI's Strategy in USA Market

According to Vernon's Product Life Cycle Theory, when the new product is first introduced into market where the demand is, producers tend to stay closer to market to follow consumer response, as discussed where [6]. Nevertheless, instead of introducing drones into China first, DJI, with first mover advantage, chose global strategy, entering USA market first, and then Europe and Asian market. This global strategy allowed DJI to expand internationally, tapping into markets where competitors lacked similar competences. The globalization and integration of world economy enabled DJI to disperse production in Shenzhen in Pearl River Delta while introducing drones first in USA market.

Commercial Drone Brand Market Share

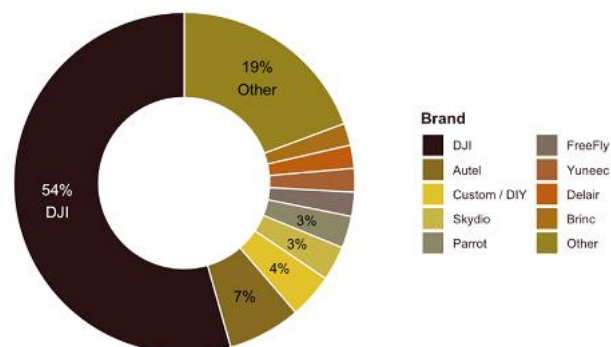


Figure 3. DroneAnalyst 2021 Market Sector Report.

As depicted in the pie chart shown above, DJI constituted 54% of the global commercial and civil UAV market. As discussed where [7], Porter's five forces framework is crucial to analyzing competitive landscape and attractiveness of DJI in USA market, as discussed where [8].

Access to the market for new entrants: The US Federal Aviation Administration (FAA) has strict regulations on the usage of commercial drones. As discussed where [9], these regulations create barriers to entry for new competitors, as compliance with FAA requirements can be challenging and time-consuming. DJI gained a significant advantage as FAA issued the first 333 exemption for DJI Phantom, making the Phantom eligible for commercial use in USA. As discussed where [10], DJI's early entry and regulatory advantage through the FAA 333 exemption allowed them to establish a strong foothold in the market, making it difficult for new players to replicate their success. This head start was attributed to DJI's first mover advantage in integrating cameras, gimbles and drones, which won brand identification and popularity among recreational users.

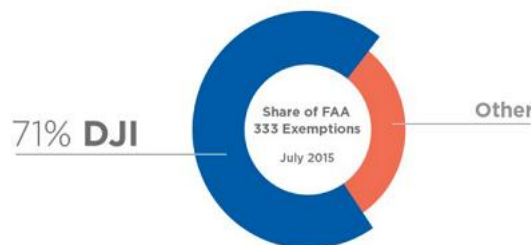


Figure 4. DroneAnalyst 2021 Market Sector Report.

The threat of substitute products: The threat of substitutes in the USA market mainly comes from other drone manufacturers offering similar products. Competitors such as Skydio Autonomy try to compete with low price strategy, while DJI's continuous focus on technological innovation and product differentiation help to mitigate the threat. By consistently introducing new features, improving performance, and expanding product range, DJI maintains competitive advantage over its competitors.

Bargaining power of suppliers: DJI has strong bargaining power due to its completely control of the supply chain, they have their own factories in Shenzhen and can do their own prototyping, the iteration cycle is only six months, so the strong internal manufacturing power, cluster of supporting industries and self-control supply chain enable DJI strong bargaining power of suppliers.

Bargaining power of Buyers: High-income groups are the target consumers for drone manufacturers as the expense is high. While DJI offered less expensive drones integrated with cameras and gimbal, reducing the availability of close substitutes and the bargaining power of customers. DJI also has a strong brand reputation and extensive product offerings, further reducing the bargaining power of buyers.

Industry rivalry: The drone industry in the UAS could be characterized as highly competitive among existing competitors. Though holding a dominant market share in the USA, DJI face competition from other established drone manufacturers. With early mover advantage and regulatory advantage through FAA exemption, DJI further solidified its market position. Brand recognition, technological expertise and extensive product offerings help to contribute to its competitive advantage.

6. DJI's Structure

According to personal interview with employee from DJI in Shenzhen, DJI has a functional structure, consisting of sales and marketing, R&D, purchasing and manufacturing. While there is a functional team from each department for each product line such as spark series, phantom series, and etc. As is shown in the below picture, DJI has Mavic Series, Spark Series, Phantom Series and Osmo Series for consumers, while Zenmuse and Ronin for the professional. Colleagues from the same marketing department could be competitors as they work for different product lines. As DJI spokesperson Adam Lisberg has said, now somewhat famously, about their aggressive price reductions and lightning-fast release cycles: "If that pricing cannibalizes our own products, that's OK." Although the overlapping of markets and duplication of effort exist in the internal competition. As DJI already accounted much of the market share, the internal competition helps DJI keep the product core competence and competitive. Rapid technology changes can make the carefully constructed business plan meaningless even though DJI is the leader in Drone manufacturers. To achieve absolute advantage in drone manufacturers, DJI makes R&D work on different technologies, and invest different channels to market and encourage different divisions to work different approaches as future is somehow unpredictable. Take Spark Series as an example of innovation technology in drone industry, comparing with phantom series, Spark series were introduced in 2017 as the tiniest drone and the first drone that can be controlled by hand gesture, diversifying the product lines.

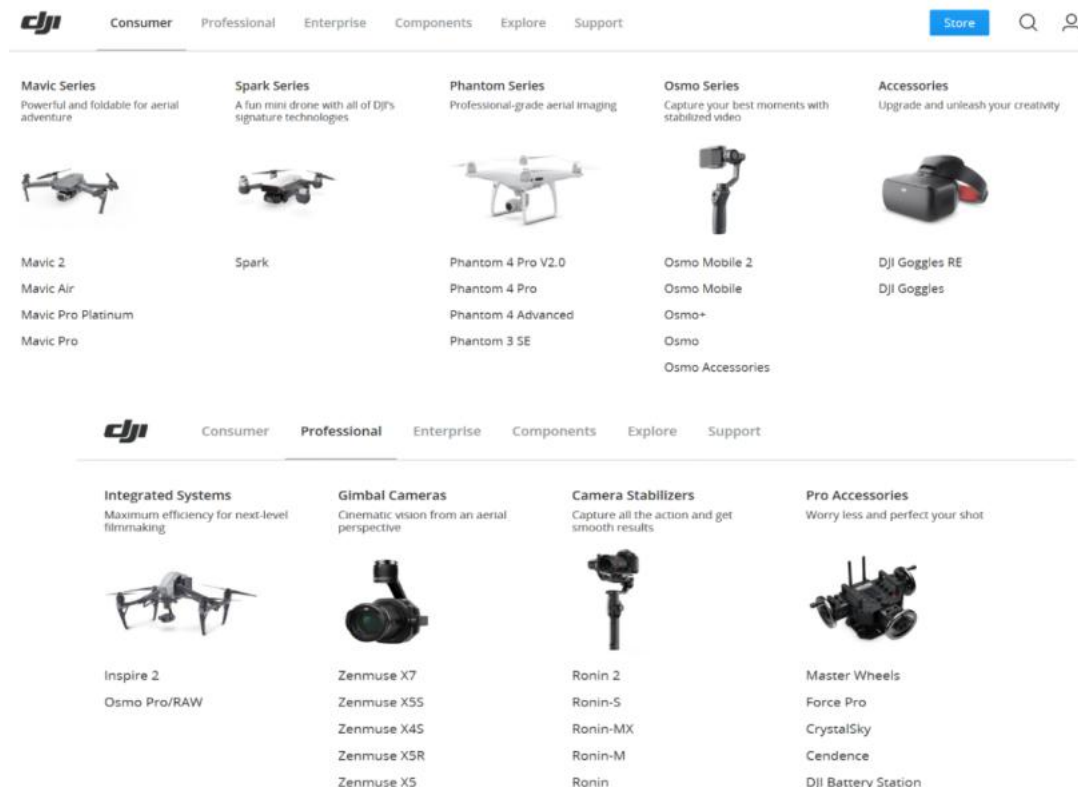


Figure 5. DJI's Product Catalog on Official Website.

DJI's high-end drones could be vulnerable to low price strategy employed by emerging rivals even though DJI has mighty pricing strategy, so DJI focuses on service and software as well. To promote the relationship with customers, DJI Care, the aftersales service was set to improve relationship with customers. If the customer

buys DJI Care, there is no limit to the number of times the aircraft can be repaired if the courage amount is not exceeded. With enough coverage amount, brand new aircraft could be provided if the damaged part is beyond repair. Besides aftersales service, smart branding and partnership with Apple help DJI maintain its lead in drone market. DJI Phantom 4 was launched exclusively in its own storefront and Apple's retail stores before expanding to third-party resellers. And the Phantom 4 could be used in tandem with Apple gear, Iphone or Ipad. As Apple stores are world class retail store, the launch of DJI products into Apple retail stores essentially is a good branding strategy.

7. Challenges and Opportunities in Future

Facing many competitors, DJI has expanded enterprise solutions that include aerial platforms, payloads and analytical tools that can be applied into different business across agriculture, construction, and mapping. The market for software and services is expected to grow a lot faster. It is necessary for DJI to develop software and services, the added value for the product even with strong internal manufacturing power, for example, new apps and uses for its drone operating system are encouraged to be developed.

But some criticized the usage of drones, regarding drones as the invasion of privacy and lack of security as it can be used by the terrorists. It is said that a phantom 3 crashed into the lawn of White House in 2015. For DJI, the no-fly Geo system updated with prohibited airspace was needed to update on all drones. And public opinion and PR strategy should be taken into consideration for brand image.

It is estimated that China will publish strict regulations on the usage of drones like the real name registration system and setting of prohibited airspace for drones because of the disturbance of UAV on civil aviation. DJI also needs to consider Chinese government's regulation's impact on the sales of Drones in Chinese market. The upgrading of the GPS system could be seen as the cooperation with the government, but negotiation with government is also needed if necessary because collecting the users' information for the real name registration system increases company's cost, and possible leakage of user's information is also needed to be taken into consideration.

8. Conclusions

DJI has cost leadership in drone manufacturing due to the cluster of supporting industry and differentiates its drones by integrating drones with gimbals and cameras. With the first mover advantage in drone industry, DJI chose to enter into USA market first to maintain much market share with functional team focusing on each product line, making the qualified technology upgrading possible. With cooperation with Apple retail stores and DJI Care, the aftersales service, DJI tries to provide good service to customers. While public issue on privacy and government's regulations on usage on drones should be taken into consideration for DJI's long term strategy.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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