International Investment Strategies of Chinese High-Tech Company

—In the Example of DJI’ Four Flyings Strategy

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Abstract—nowadays many Chinese enterprises invest abroad, especially the high-tech companies, which possess stronger competence than before. For international enterprises, if they want to stand out in the intensive international competition and share a big piece of the international market, competitive products are essential. Undoubtedly, the magic weapon for good products is innovation! DJI is a representative of Chinese high-tech that attending international competition with proper strategy of innovation in the era of science and technology. By adhering to R&D and innovation of Unmanned Aerial Vehicles (UAVs for short), DJI have improved the competitiveness of its consumer UAVs and taken the lead in consumer UAVs worldwide, thus gradually acquires the largest market share of global consumer UAV. So, what is the core competitiveness of the DJI UAVs? The key point is that DJI holds the concept of “open” and “participation” and aims at producing the UAVs that common customers would like to buy and could manipulate, and always insists on “Four Flyings” strategy oriented products innovation.

Keywords: DJI UAVs, products innovation, “Four Flyings” strategy

I. INTRODUCTION

This era is labeled as innovation, and all countries in the world are advocating innovation because innovation is an inexhaustible source of development. For high-tech international enterprises, innovation is an effective way to deal with competition because vast international market also means intense competition while innovation is a sharp sword to that. Therefore, a strategy of innovation is essential. What is innovation? Schumpeter believes that the so-called innovation is to establish a new "production function", that is, “recombination of production factors”, which means to introduce a production factor or production condition that has never been introduced into the production system to achieve a “new combination” of factors of production or production conditions. In the international market, such a “new combination” enables companies to win in international competition. The current trend of competition is surging just like a big wave. The enterprises which still stay the same will be replaced by competitors and abandoned by the international market. Only by advancing with the times and continuous innovating can they lead the trend, gain recognition from the international market and achieve long-term development.

Take DJI as an example of high-tech companies which employ a strategy of innovation. DJI targets the international consumer UAVs market and adhere to the concept of “openness” and “participation”, and is committed to producing UAVs that common customers would like to buy and could manipulate to popularize UAVs. Through continuous product innovation, DJI has enhanced the competitiveness of consumer UAVs and occupied the world's largest market share of consumer UAVs. In just 13 years since its establishment, DJI has grown from a little known start-up technology company to a giant in the field of consumer UAVs [1]. So, what is the core competitiveness of DJI? The key point is that DJI has always insisted on “Four Flying” strategy-oriented products innovation.

II. ANALYSIS OF "FOUR FLYINGS" STRATEGY

DJI has always adhered to the concept of “openness” and “participation”. Open means that DJI targets the international consumer UAVs market, facing common consumers all over the world, continuously improving consumer UAVs through technological innovation, making UAVs can be used by...
international consumers, letting UAVs like daily supplies entering the lives of common consumers. Participation is that common consumers could join in the innovation process of consumer UAVs. DJI closely follows the consumer's desire and demand for UAVs, and continuously improve the consumer UAVs according to consumers’ feedback. Based on the concept of “openness” and “participation”, DJI proposed the “Four Flyings” strategy and took it as the direction for product innovation.

The "Four Flyings" strategy includes the "Desirable Flying" strategy, the "Accessible Flying" strategy, the "High Flying" strategy, and the "Global Flying" strategy. The specific analysis is as follows.

A. “Desirable Flying” Strategy

DJI, starting from the human’s dream of flying, combined with current background, turns the potential demand of the public into a realistic UAVs product through the product innovation. Then it has initiated a new market ----The Consumer UAVs Market.

1) Based on human flying dreams: Human beings have never stopped the step of exploring the sky since ancient times. From Chinese myths “The Goddess Chang's fly to the moon” to the fall of Icarus in Greek mythology, there are similar plots to pursue the sky. As modernization goes on, the process of exploring the sky has been accelerating and has entered a stage of substantiation with the advancement and development of science and technology. From kites to airplanes and satellites to rockets, these major achievements are just milestones. However, a limited range of applications does not allow the public to participate in the actual exploration directly. So, at today's level of technology, can we break the restriction of specific field so that common consumers in growing numbers can enjoy the fun of exploring the sky? DJI aims at the consumer UAVs market and has manufactured UAVs for common consumers to satisfy human's desire to explore the sky.

2) Rooting in the wish of a better life for mankind: The material and cultural demands of the people are constantly growing. The report of the 19th National Congress of Congress pointed out that it is necessary to keep up with the frontiers of the world's science and technology, strengthen basic research, and achieve major breakthroughs in researches of critical forward-looking field. In addition, technological innovation and industrial innovation have also been upgraded to the level of national strategy. The 19th National Congress of China clearly clarified that the core purpose of our pursuit of modern economy is to solve the constraints of nature and the lack of material that human beings are subjected to, and pursuing a better life on this basis. At the 40th Anniversary of Reform and Opening up Celebration, president Xi mentioned: “upholding centered on people and continuously fulfilling the people's wishes for a better life is our unswerving goal”. As what president Xi said, the desire of exploration to the sky and the best wishes for lives provides fertile soil for consumer UAVs. Thus, DJI aims to create UAVs that enters the lives of common consumers. It is committed to the development of UAVs through R&D and innovation, to offer another lifestyle for the public[2]

3) Creating consumer UAVs demand: DJI Consumer UAVs is positioned to “availability” which refers to technologies or products that were originally used to applied in a certain field or industry are widely used by more people in many fields or scenarios now after social innovation, and the use of the technology or products is no longer restricted to specific groups, which tend to be recognized and accepted by the public gradually. It covers the public with attributes of high social value. The “availability” in DJI UAVs products is characterized by convenience, easy-operation, security, intelligence and entertainment. This greatly reduces the limitation for the common consumers in growing numbers who begin to accept and use it. What’s more, UAVs is widely used in many scenarios now.

As the core idea of Say's Law says: Supply creates its own needs. It is well known that meeting demand is the basis, but creating demand puts higher requirements on enterprises. Creating demand is a process including the creation of new products, stimulating people's potential needs and ultimately satisfying it. This potential demand was originally a vague concept based on the fundamental demand of humans like the needs for a lifestyle that can add acquired happiness. And a certain carrier is needed to fulfill the potential demand, which could be an innovative product. In short, the course of finding is innovative product to meet people's potential needs is the process of creating real demand.

4) Attaching added value: Added value of product refers to the value beyond the main value of the product. It is independent from the value of the product's main body, which can add other value to the product, stimulating the customer's desire to purchase it. At the same time, added value bringing additional benefits to the customer and the manufacturer. The higher the added value of the product is, the stronger the market demand will be. Consumers prefer high quality UAVs and the demands continue to grow. In order to attract common consumers, cultivate their consumption habits and continuously expand the consumer UAVs market, DJI is committed to constantly increasing the added value of UAVs and promoting its competitiveness[3]. In the process of manufacturing products, DJI pays great attention to appearance design of UAVs. In addition, there are small tools for repairing by consumers themselves, such as wrenches in the package. To deal with the problem that consumers cannot repair with the auxiliary gadgets, DJI has set up offline experience service stores to provide more professional repair services, giving customers a better experience and increasing the added value of products.

B. "Accessible Flying” strategy

As the domestic and abroad leading enterprise of UAVs, DJI must gasp the basic needs of consumers for UAVs in order to attract the common consumers and expand the consumer UAVs market. What kind of UAV products do

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1 The consumer products refers to all products and services or products or services that are oriented towards and directly oriented to consumers.
consumers like? The answer given by DJI is: adhering to the consistent style of “stable flight and uncompromising performance”, performing functional advantages of UAVs perfectly, and rooting in the products designs themselves. As a result, DJI UAVs have the following features: easy-handling, portability, price competitiveness. Then DJI gradually improve the basic functions of flying.

1) Easy-handling: DJI has positioned its UAVs in the consumer-grade. It is easy to manipulate and use. Even non-professionals can achieve the ideal aerial photography through simple training, so that users can use it deliberately and love it. At present, there are not many enterprises with UAV flight controlling technologies in the world. The Woo Kong series and Naza series flight controlling system created by DJI have simplified the control operation and are the world's most advanced flight controlling system. At the same time, each UAV is equipped with detailed operation assistant videos for different series, which are convenient for users to watch and learn, and quickly familiarize themselves with the operation. For example, As the popular Mavic series including the most newly innovative consumer products of DJI, Royal Mavic Air is the first fold-able and portable UAVs. At present, this is the smallest portable one of the consumer UAVs, which supports gestures, mobile phones and remote controlling. To be consumer-friendly and easy to have fun, DJI insists on manufacturing “playful” and “sharing” UAVs from the perspective of users’ needs. Due to the exploration of easy-maneuverability and the innovative and advanced flight controlling technologies, precise interactions, controlling system and durable power-supply come to realities.

2) Portability: At the beginning of the invention of the UAVs (mainly used in military), they were bulky and difficult to carry. However, portable consumer UAVs appears and meets people’s needs with technological innovation. Therefore, the market for consumer UAVs have expanded dramatically, which makes the competition more intensive. According to IDG2, it is predicted that the market volume of global consumer UAVs will be about $5.1 billion in 2019, accounting for 40% of the global UAVs market. Common consumers expressed their demands for UAVs as lightweight, miniaturized, and endurable. Knowing the psychological needs of consumers, from the very beginning, DJI has positioned its products as consumer UAVs and continuously improved the portability of UAVs.

DJI focuses on discovering the needs of users in the consumer market segment and cultivating consumers' usage habits. Under the premise of trying to make them more convenient to carry, DJI divided consumer UAVs into two types: fold-able and non-fold-able[4]. Among them, the non-fold-able one is the Spark which is launched in New York in 2017. This is also the first time that DJI innovate the mini-type UAVs. Although it is non-fold-able, the body itself is designed to be small. The size of the whole body is about 14cm in width and about 16cm in length. The wheelbase is about 200mm, which is equivalent to the weight of a cola. It is in line with the regulations that can be carried on the civil aviation.

Although small in size, it is the same as the mainframe in terms of stability. It can resist the 4 class wind, and equipped two-axis mechanical stabilization Gimbal and Ultra Smooth technology. The maximum speed is 50 km/h. If Spark is the lightest model in the entire consumer UAVs, the most portable is the Royal Mavic Air. The overall volume is less than 685 cubic centimeters after being folded and other series including Spark are larger in magnitude. This fold-able Royal Mavic series of DJI is convenient for common consumer to carry and take aerial photography.

3) Price advantage: DJI not only focuses on technology R&D to guarantee the user's excellent experience, but also develops different levels of UAVs for different purposes. By carrying out targeted and differentiated pricing, each series of DJI UAVs possesses very competitive price in the same category and achieves the "unicorn" status finally. According to the latest data from the Economic Research Institute of Prospective in 2017. In the price range of foreign UAVs market, the market share of DJI UAVs have remained above 65%, and the shares in the domestic market more than 80%. The market share of DJI consumer UAVs in each price range is shown in the following figures.

Figure 1 DJI UAVs’ foreign market share in different price-ranges

Figure 2 DJI UAVs’ domestic market share in different price-ranges

Take the medium-priced Inspire 1 as an example. Inspire 1 is an aerial UAVs that supports 4K shooting released by DJI in 2014. It is the world’s first self-contained 4K camera and the world’s first transform-able aerial UAVs, which represents the world’s small aircraft. With the highest level of the rotary wings manufacturing, its price is only 19999 Yuan. Even similar UAVs which rush into the market can’t supply with such a low price.

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2 International Data Group (IDG), it is the first US technology information service company to enter China.
For example, the consumer UAVs system, the Gimbal, which sells for an average of $20,000-30,000, however hand-held pan-tilt system Ronin of DJI is priced around $3,000. The competitive pricing makes it difficult for peers to compare. In contrast, due to the lack of price competitiveness, the U.S. top UAV company 3D Robotic, which once ranked the top 10 in the world, has stopped selling UAVs and transformed to provide software and services of UAVs to other enterprises. To root in the increasingly competitive global consumer UAVs market, DJI has always emphasized pricing to different levels of UAVs to enhance competitiveness and laid a solid foundation for further expanding their foreign market share.

C. “High Flying” Strategy
In order to meet the increasing demands of users of consumer UAVs and ensure the sustainable competitiveness of consumer UAVs, DJI has implemented the “High Flying” strategy, from the safety, entertainment, intelligence and endurance to advance UAVs continually.

1) Improving security: Both consumers and government attach great importance to the safety of UAVs. “Did your UAV blow up today?” This is a tacit greeting between the UAVs enthusiasts. It is not difficult to see that they express the importance of safety in a humorous way. Consumer UAVs are products that rely heavily on technological innovation and quality reliability. With the rapid development of the industry, the flight safety and reliability of products are also improving. But like auto-driving, the current technology is far from guarantee safety. Security involves a wide range of topics, from production source to sale, and then to departmental supervision. But it is incumbent for DJI to constantly break through the technological shackles and control from the source. Until now, DJI has improved product safety from the following two aspects mainly:

2) Enhancing entertainment: The entertaining product means that it is pleasant for common consumers to manipulate. With the development of technology and amusement, consumers are no longer satisfied with fundamental material needs, but are interested in more sensory and spiritual consumption. DJI UAVs not only achieve the basic goal of enriching people’s outdoor activities, but also satisfies consumers’ spiritual needs. DJI makes manipulating UAVs much more interesting than before. Furthermore, DJI expands the contents of cultural performances, and enriches audience’ sensory experience.

3) Improving intelligence: Products intellectualization is a popular trend in various industries, including the industry of UAVs. One of the critical technologies for “smart” is to enable UAVs to perceive the surrounding environment through vision equipment. It not only models the three-dimensional space where it is located, but also gives the UAVs a “smart” function such as voice identification, face identification and image identification. The development of intelligence and product entertainment complement each other. As the product continues to advance towards intelligence, the operation is simplifying and becoming more entertaining than it used to be.

4) Promoting endurance: A research report of EV Tank pointed out that endurance time of current consumer UAVs are generally less than one hour. Insufficient endurance means that the execution of tasks will be greatly limited, and the maximum functional advantages of UAV will be restricted. Now there are two prevailing direction to that: on the one hand, it can create new UAVs models, such as solar-drive UAVs, to achieve long-endurance flight by solar energy technology; on the other hand, great efforts should be made in chip optimization to reduce unnecessary energy consumption output so as to expand battery capability. Once DJI makes a new breakthrough in the endurance capability will further expand the market of consumer UAVs.

D. “Global Flying” Strategy
“Global Flying” Strategy refers to the globalization strategy of DJI. Based on the international market, DJI not only arranged limited resources reasonably to seize global opportunities but also made global selection and deployment, setting global strategic goals. Just as the core idea of Frank Wang, DJI’s founder, the global brands of China must be rooted in the world.

Since it has been established, DJI has positioned itself as an international enterprise, committed to creating internationally competitive consumer UAVs to meet the needs of consumers all over the world. In addition, in the developing process of the DJI, it actively enrolled international talents who are professional in scientific research, innovating UAVs technology, developed many world-class products independently, applying a large number of patents, and making consumer UAVs of DJI win the dominant position in the international market. The “Global Flying” Strategy which based on global perspective mainly includes the following four aspects: based on the global market, building an international R&D team, leading the industry standard, products differentiation.

1) Based on the global market: DJI has attached great importance to the international market at the very beginning. And on this basis, it built its global enterprise organization and corporate culture. Through extensive international market survey, they are sensitive and prompt to the trend of the UAVs market, which make DJI closer to the market and consumers and acquire deeper understanding of the consumers’ preferences at the first impression as well as getting feedback timely. The global vision of DJI makes its UAVs more international and accepted widely in global market. At present, customers of DJI come from more than 100 countries and regions in the world.

• Building an international enterprise culture

International enterprises cannot be separable from international enterprise culture. DJI combines the corporate values that the East and West believes in common with the prevailing innovations values in the field of science and technology, creating a new “third party” international corporate culture that not only

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3 Gimbal: the support platform of the camera and the Gimbal is the supporting device for installing and fixing the camera.

4 EV Tank: internet data and information center
avoids cultural conflicts but also facilitates international product innovation.

With the slogan ----"The Future of Possible", DJI always adheres to the concept of innovation and originality, advocating the value of "passion and sincerity", and learns from and absorbs western enterprises’ operation ideas which pursue perfection in the field of technology to form a unique corporate culture. The corporate culture of DJI is based on the global market and rooted in the company's operation and product’s innovation.

- Conducting international market survey

In order to ensure that DJI UAVs can perfectly meet consumers' imagination, it must be more sensitive to market preference. Before creating a new UAV, DJI will conduct extensive international market researches, designing the next product according to the characteristics and habits of consumers, as well as the feedback from former users to better meet the needs of global customers.

For example, customers in some European and American countries pay more attention to quality, design of UAVs, and they pursue excellent sensory experience. While this is not suitable in Asia and other regions.

2) Building an international R&D team: Talents are the core parts of DJI’s competency, and also an important driving force for its innovation. Moreover, having an international R&D team is the foundation for DJI’s innovation in the international market. Since its establishment, DJI focus on scientific and technological innovation. By enrolling high-tech talents, DJI is committed to building an international R&D team, promoting the formation of a new talent ecosystem adapted to scientific and technological innovation.

DJI has been trying to maximize the advantages of industrial clusters and academic resources in the Pearl River Delta regions (including Hong Kong and Macao) of China and attracts the world's best scientific and technological talents to gather here. As a technology-intensive company, DJI concentrates on the competitiveness of its products. DJI has more than 8,000 employees, 25% of whom are domestic and abroad that are engaged in R&D projects to ensure its competitive advantage. DJI has also set up its own R&D organization in Silicon Valley, America, inviting former Tesla R&D team executive, Darren Liccardo, and former Apple senior engineer, Rob Schlub, to join in DJI’s R&D team. They have also enhanced their innovation capabilities through strategic partnerships, mergers and acquisitions. For example, DJI acquire partial shareholding in Hasselblad and cooperate with Axon, a global leading provider of police technology, to realize sharing of technology through the establishment of strategic partnerships.

In addition, DJI emphasizes the selection and cultivation of professional innovative talents. At present, DJI is making every effort to create one of the world's most enjoyable robot competitions for college students -- Rob Masters, which aims to cultivate engineering and technical elites. It would set off a national technology boom and make Shenzhen the "Silicon Valley of China". To enroll excellent international talents into DJI’s R&D team, so as to better promote product innovation and maintain the leading position in the industry.

3) Leading the industry standard: DJI is committed to popularizing consumer UAVs and is determined to lead the industrial standard of consumer UAVs worldwide. The rapid development of DJI UAVs is closely related to the company's R&D power. At present, DJI has been ranked first in the industry for its most technology patents in the world. As shown in the figure below, though the number of DJI’s applying and disclosing patents have been fluctuating from 2014 to 2017, the overall level has remained at a high level in the industry. In 2016, 874 patents were applied, while 605 patents were issued that year. Until 2017, the company's applied patents reached 916. Up to mid-April 2018, the number of published patents also reached 288, such a great number of applying and disclosing reflects the company's strong R&D capabilities.

Figure 3 the number of patent application and disclosure for DJI

In 2014-2017, DJI applied for a great deal of patents which is related to unmanned aircraft fuselage, components, equipment, and also continued to pay attention to the important field of UAVs about agricultural UAVs, express UAVs, shooting UAVs. The number of the patents which are mainly about invention and utility is increasing, indicating that DJI is taking the lead in innovation. We can conclude that DJI is becoming the Pioneer in the global market of consumer UAVs.

DJI always insists on the principle of independent innovation and possess a series of core technology now: the flight control system, cloud platform, camera lens, etc. After completing integration platform of these systems, the DJI UAVs are more advanced than other competitors’ (including UAVs enterprise of the Silicon Valley).

4) Product differentiation: Due to different preferences of consumers all around the world, DJI implemented the product differentiation strategy. In order to meet different market demands, international consumers can choose a proper one from DJI UAVs according to their own needs. DJI strives to achieve product differentiation and diversification, and then aims to produce differentiated products in terms of price, function, volume and function, meanwhile enriching the types of products[5].
As shown in figure 6, DJI UAVs can be roughly classified into junior and middle range and senior range according to their price and function. The former two ranges are mainly Spark and Mavic series. Spark is the cheapest and lightest among the three series, which can meet daily shooting needs. In terms of the stability, it is as good as the mainframe. Functions like palm takeoff, the identification of motion, remote control through gestures, charging by USB, which are very suitable for beginners to use. The Mavic series adopt folding system, which is the most portable UAVs among the three series. Besides, it is a kind of UAVs integrated with portable volume and best picture quality in DJI UAVs, which can meet daily and even professional needs at the same time. It is also the most price-competitive UAVs among the three series. The Phantom series currently has only four generations. It possesses the fastest maximum climbing and descending speed and its maneuverability is the best. When taking photos, it can reach the designated height and come down to the ground more quickly to save time. Phantom 4 which is the best it can reach the designated height and come down to the speed and its maneuverability is the best. When taking photos, it can reach the designated height and come down to the ground more quickly to save time. Phantom 4 which is the best.

Figure 4 Product classification

In conclusion, high-tech companies should set a strategy of innovation. DJI insists on the “Four Flying” Strategy oriented products innovation, and eventually stands out from the intense international competition while acquiring the largest share of the domestic and international consumer UAVs market. Brief content of “Four Flyings” strategy of DJI is listed below conclusively:

- "Desirable Flying” strategy--Based on human desires and needs for sky exploration, DJI closely follows the national policy guidelines, conforming to the trend of international technological progress, creating demand for consumer UAVs, expanding the consumer UAVs market, managing to increase the added value of UAVs, leading the manufacture of consumer UAVs;

- "Accessible Flying” strategy--In order to enhance the applicability of UAVs to common consumers, DJI is committed to simplifying the operation of the UAVs through innovation and further reducing the size of the UAVs. Besides DJI enhance the price competitiveness through each differentiated pricing of hierarchical UAVs;

- "High Flying” strategy--For the purpose of meeting the developing needs of numerous consumers, DJI continues to improve the safety of UAV’s manipulation, and keep up with the trend of intelligence to intelligent UAVs. Besides DJI emphasizes the entertaining ability of the UAVs to make playing them more interesting and joyful, while continuously enhancing the endurance of UAVs;

- "Global Flying” strategy--DJI has established a globalization strategy from the very beginning based on the international market, building a global enterprise organization, establishing an international corporate culture, manufacturing international UAVs based on extensive international market research. At the same time, DJI has enrolled the best talents from all over the world, formulated an international R&D team, and cooperated with other high-tech enterprises in the world to guarantee the power of innovation. DJI attaches great importance to the research of UAVs technology and has obtained a large number of patents, leading the consumer UAVs industrial standards, providing consumers with more choices through product differentiation, and enabling consumers to choose the proper ones according to their own situation.

High-tech companies like DJI should never quit innovation. DJI have insisted on “Four Flyings” strategy-oriented products innovation and eventually achieves acquires the biggest share in the international consumer UAVs market. We have reasons to believe that the “Four Flying” strategy-oriented products innovation will definitely enable UAVs to enter and enrich international customers’ lives, and create the miracle of consumer UAVs in the future. Let’s wait and see.

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