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A Comprehensive Analysis of the Global Drone Industry with a Special Focus on India

A Basic Roots Consulting Deck

The Evolution of Drones

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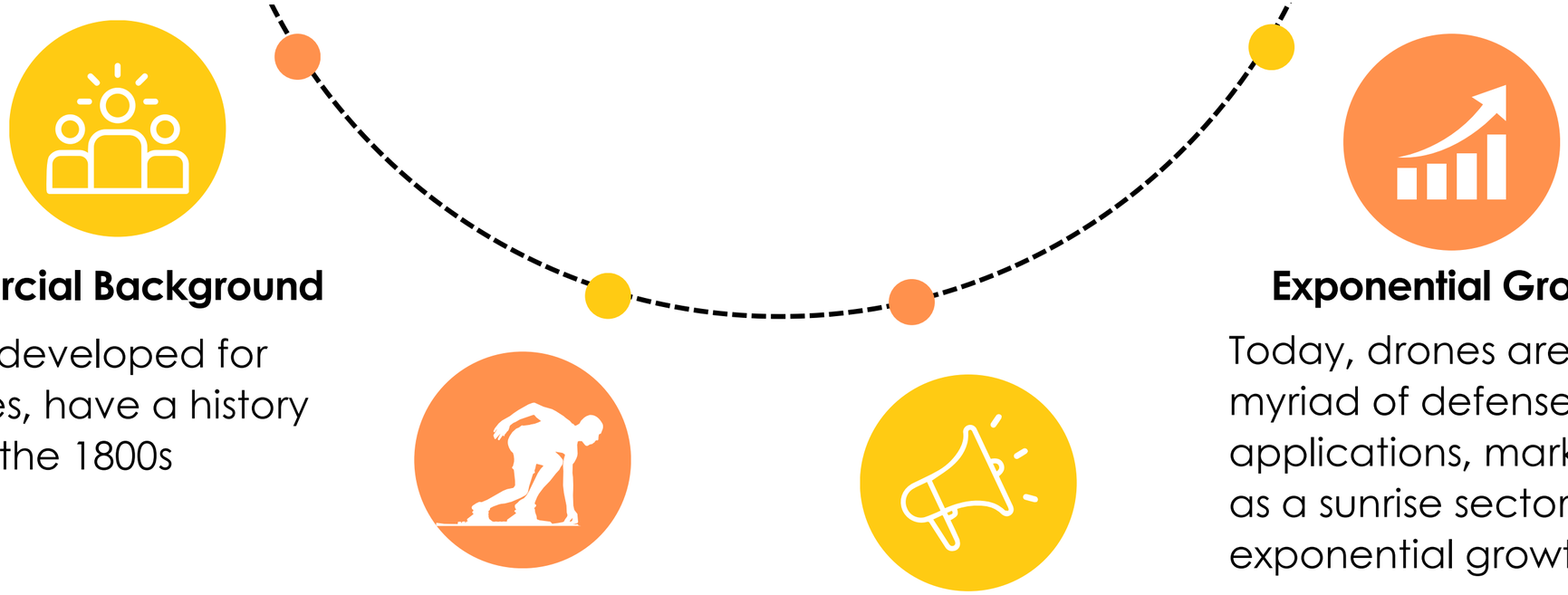

Historcial Background

Drones, initially developed for military purposes, have a history dating back to the 1800s

Military Origins

Initially used for training and reconnaissance, drones evolved to be used in surveillance operations and targeted strikes

Commercial Adoption

Despite early military advancements, commercial drone permits were not issued until much later, hindering the growth of civilian applications

Exponential Growth

Today, drones are utilized in a myriad of defense and civil applications, marking the industry as a sunrise sector poised for exponential growt

The Drone Value Chain

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Aircraft Hardware	
Components	**OEMs**
Batteries Payloads Sensors Motors	Cosumer UAV Commerical UAV

→

Operations			
Physical Infra	**Navigation**	**Operators**	**UAV Mitigation**
Landing Pads Verti-Ports Chargers Stations	AI Software UTM GPS Route Planning	Photography Mapping Inspection	UAV Guns Shields Lasers Nets

→

Services	
Support	**Data**
UAS Law Insurance Retail Consulting Training	UAS Mapping Image Processing

- In the last few years, several areas within the drone tech value chain have experienced notable growth
- The drone market in India is projected to become a $13 Bn market opportunity by 2030, up from $2.71 Bn in 2022
- India currently boasts over 200 drone tech startups, with over 13,000 drones registered in the country
- Investments in the drone segment totalled over $83 Mn from January 2016 to November 2023

Drone Segments by Application

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Drone technology, once limited to military and surveillance applications, has rapidly evolved to offer diverse solutions across industries. From aerial photography to precision agriculture, drones are revolutionizing how we work and interact with our environment

1

Consumer
Cinematography, Videography, Advertising, News

2

Mining & Oil
Surveying, Mapping, Pipeline Inspection, Stockpile Management

3

Defence
Surveillance, Security, Disaster Management, Troop Safety

4

Construction
Remote Monitoring, Topographic Mapping, Land Surveys

5

Agriculture
Tracking Crop Growth, Pest Tracking, Land Survey, Deployment of Fertilizer

6

Logistics
Food Delivery, Lab Sample Delivery, Organ Transportation

The versatility of drones due to their numerous benefits is crucial in unlocking their potential across various industries. Ultimately, the growth and adoption of drones in a particular industry is driven by the direct correlation between the benefits of drones and evolving nature of the use cases

Key Growth Drivers of Drone Adoption in India

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Make in India

Owing to the legislative push and the startup environment, India will produce the best-in-class drones and supply globally

Rapid Increase in Startups

The drone industry is expanding rapidly due to growth in sales and the number of startups in India have doubled in the past year

Reducing Cost of Labor

Drones will reduce the need of workers to work in risky environments and help to scope the work faster and deliver better quality output

Integration of AI

The drone services industry will complement data collection with AI/ML integrations to offer full-stack solutions

Micro Entrepreneurs

There will be many entrepreneurs who will start adopting drones and the future market ecosystem will help massify drone adoption in India

Regulatory Ease

Drone Rules 2021 & PLI schemes among other government-issued policies are encouraging the use of drones for commercial and civil purposes

The Indian Regulatory Landscape

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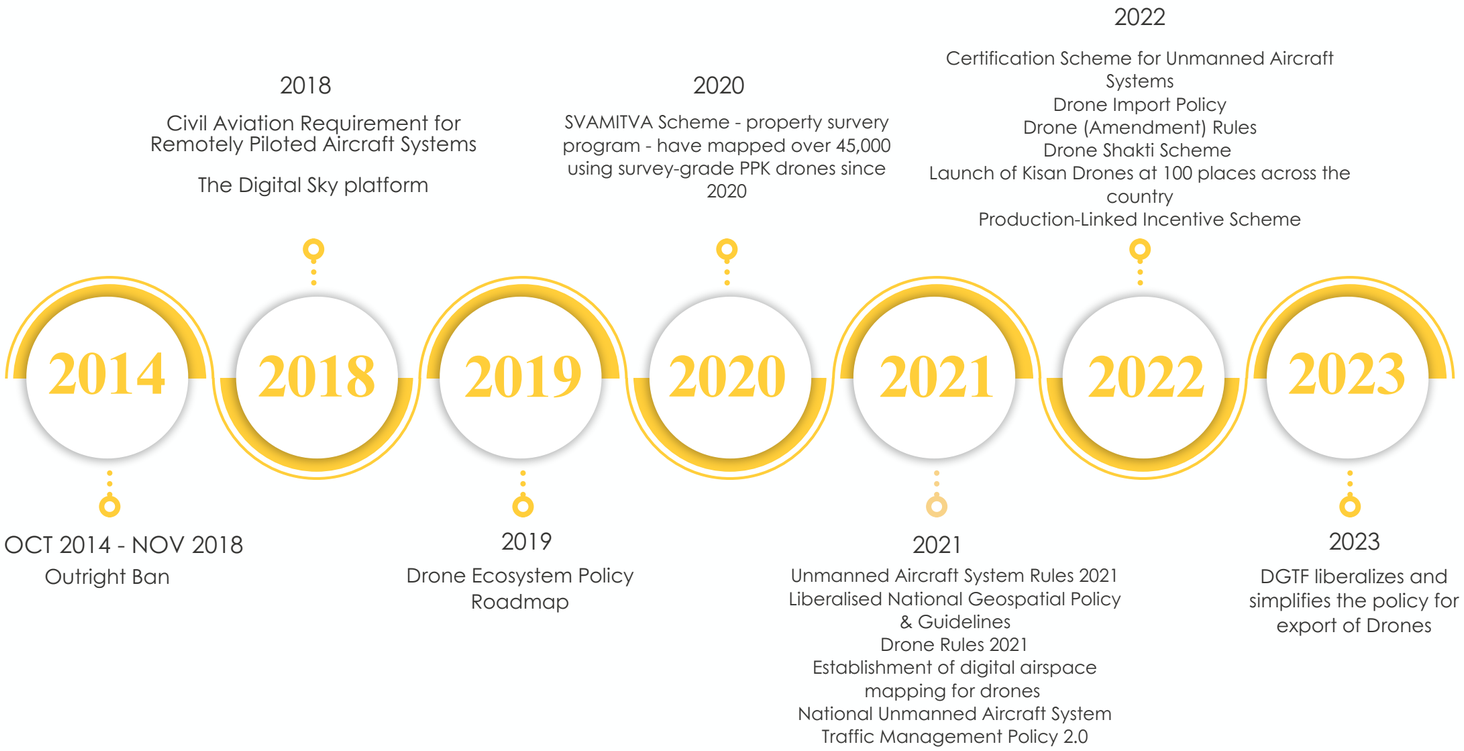

DIGITAL SKY

In India, drones are regulated by the DGCA under the DigitalSky system. All drones above the nano category must be registered with DigitalSky and display a Unique Identification Number. Operators need a UAS Operator's Permit (UAOP) and must use the No Permission No Take-off (NPNT) system, which requires permission before drone operations. Drones must have technology to prevent takeoff without granted permission.

UNMANNED AIRCRAFT SYSTEM RULES

The UAS Rules required startups, authorized manufacturers, and educational institutions to obtain DGCA authorization for R&D. A certificate of airworthiness was mandatory to ensure safety standards. Stakeholders needed about 25 permissions and approvals, with 72 fees. The UAS Rules continued to prohibit foreign entities from registering as authorized operators but allowed product delivery using medium and large UAS.

REGULATION SHIFTS SINCE 2021

India's drone regulations have been streamlined, reducing permissions from 25 to 5 and fees from 72 to 4 types. Foreign ownership restrictions on domestic drone companies are lifted, alongside the removal of import clearances. Drone corridors for cargo delivery are enabled, with a payload increase to 500 kgs. These changes attracted swift interest from international investors previously hesitant about entering the Indian market.

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Unlocking India's Drone Potential: Key Government Policies

Drone Import Policy

The import of foreign-made drones into India is prohibited, except for use in R&D, defence, and security purposes. This policy aims to bolster the “Make in India” initiative by promoting domestic drone manufacturing

1

Drone Airspace Policy

90% of Indian airspace is designated as a green zone, allowing drones to operate up to 400 feet without registration or security clearances for non-commercial use. This policy aims to simplify drone operations and promote their use in diverse sectors.

2

PLI Scheme

This scheme allocates INR 120 Cr over 3 financial years to incentivize domestic production of drones and drone components. It offers a consistent 20% PLI (Production-Linked Incentive) rate for all 3 years, ensuring stability and predictability for manufacturers.

3

Drone Shakti Scheme

Introduced in FY 2022-23 budget, this scheme aims to spur innovation and entrepreneurship in the Drone-As-A-Service (DrAAS) sector. Its goal is so enable startups to develop and provide drone-based services in various industries.

4

Market Size

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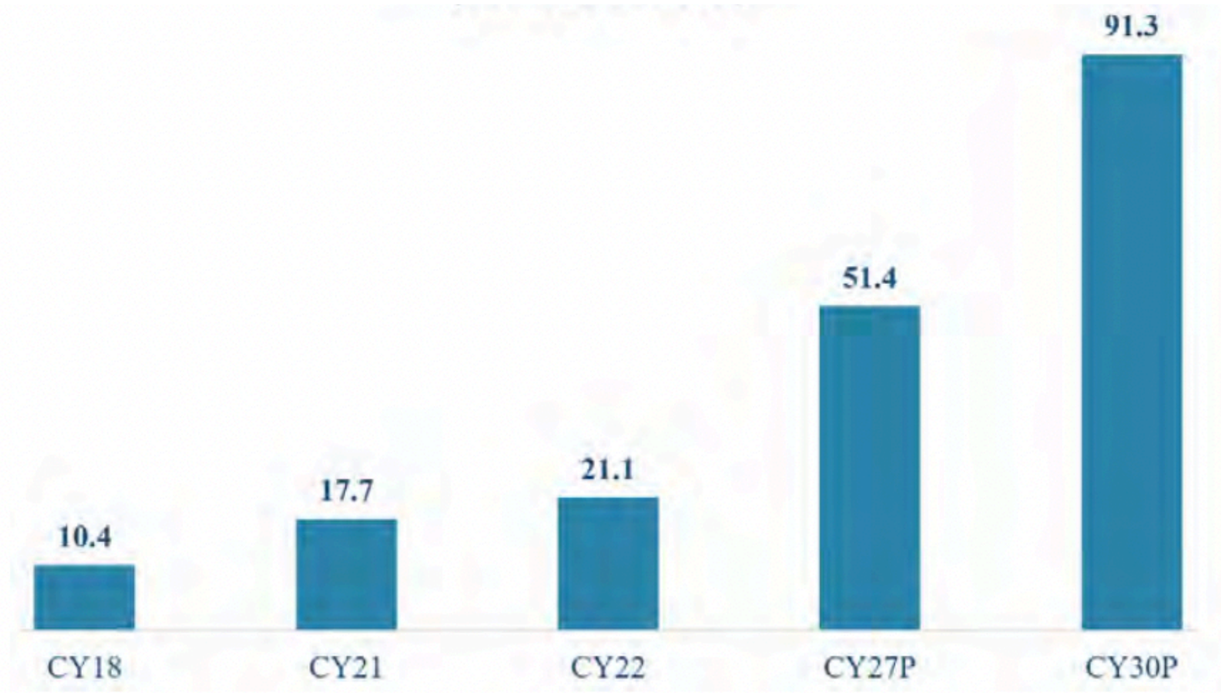
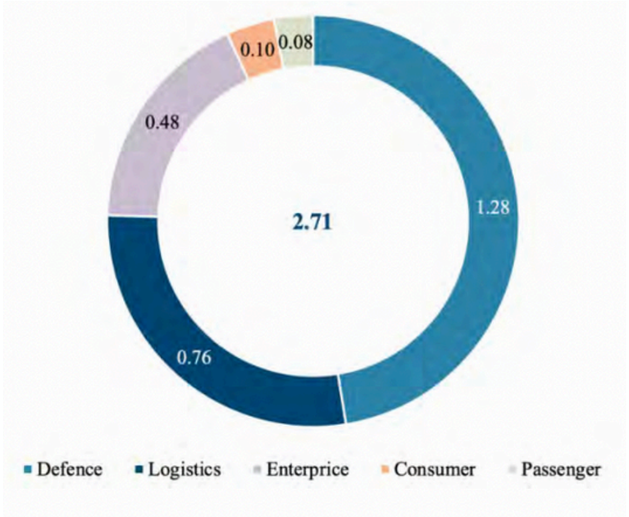
The industry has witnessed a significant growth at a CAGR of 19% over CY18-22 and is expected to grow even faster at a CAGR of 20% to be ~US$ 51.4B in CY27 and further leap to ~US$ 91.3B by CY30

With the global drone market poised for steady growth, drones are expected to be the disrupters of the future across industries

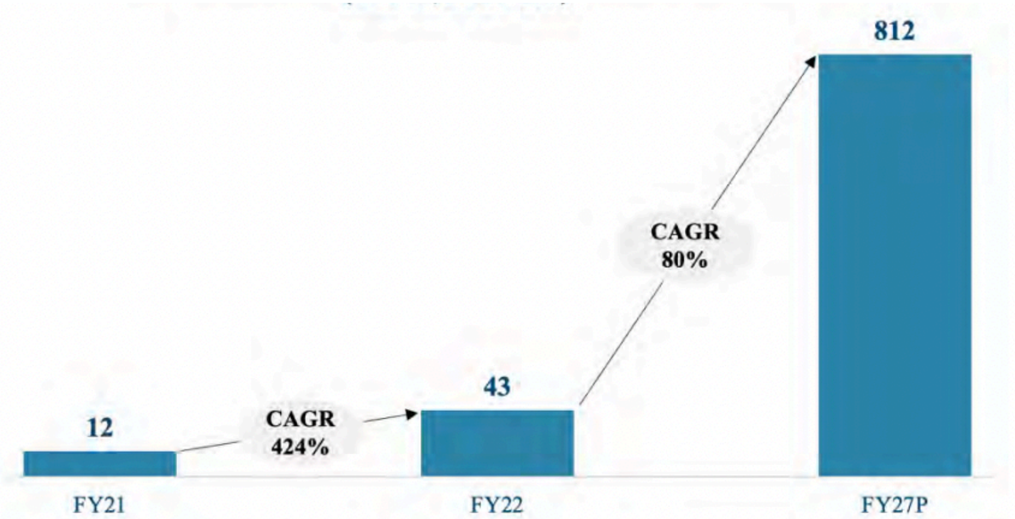


Global Drone Market Size
US$ Bn, CY18-30 Predicted

Indian Market Size and Growth



Indian Drone Market Size
US$ Bn, CY22



Indian Drone Market (Hardware & Software)
US$ Mn, FY21-27 Predicted

Story So Far

Due to numerous regulatory changes, India's drone sector is incredibly modest when compared to the rest of the world and accounted for less than 0.1% of the overall market through

Major Drivers

Major drivers are industry favorable policies, increased demand for monitoring and surveying, cost-effective data collection, and introduction of new use cases such as utilities and search and rescue operations

Looking Ahead

Now, India is experimenting, investigating, and putting drones to use in a variety of applications across industries like defence, enterprise and consumer

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The Latest Trends in Drone Technology

Enterprise Adoption

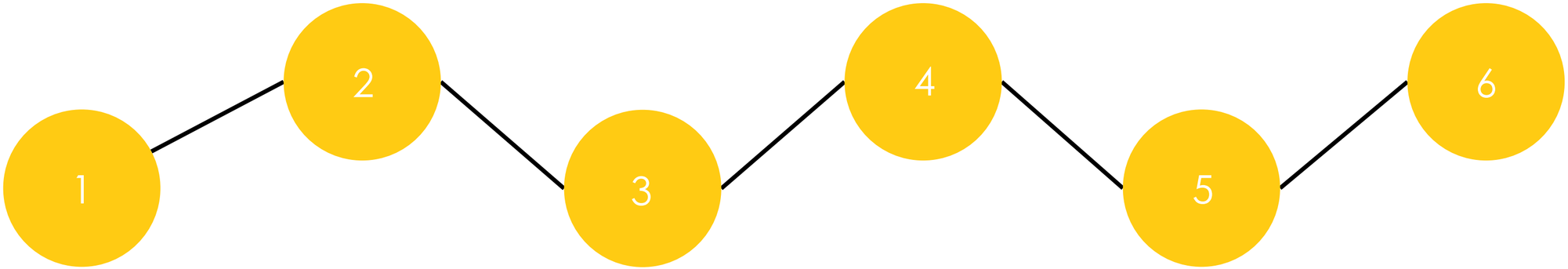
Technological advancements are making drones more enterprise-ready, particularly in industries like GIS, agriculture, utilities, and construction

BVLOS Operations

Beyond Visual Line of Sight (BVLOS) operations are gaining acceptance, allowing drones to travel greater distances and enhance operational effectiveness

Emerging Technology

Drone swarms and Drone-in-a-Box (DiB) concepts are emerging trends that could reshape the industry



Regulatory Easing

Aviation authorities are relaxing guidelines to allow for more commercial and recreational drone use, opening up new possibilities for businesses

Drone-as-a-Service

Businesses are increasingly adopting drone-as-a-service models, leading to higher operational efficiency and cost savings

Shifting Away from China

Rising anti-China sentiment and security concerns are leading countries to disassociate from drones made in China

Key Challenges to the Drone Industry in India

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Key Challenges

Lack of Funding:

- Emerging drone startups in India struggle due to limited funding opportunities and high initial costs for drone acquisition and infrastructure.
- Investor hesitancy arises from perceived risks and the absence of established business models in the drone sector.
- Funding is concentrated among a few startups, limiting financial resources for other emerging companies in the sector.

Limited Infrastructure:

- The Indian drone ecosystem is in its early stages and lacks essential infrastructure like landing pads and charging stations.
- There is a significant skills gap in areas such as operation, piloting, and maintenance, indicating a shortage of skilled labor in the industry.

Security Concerns:

- Drones pose security risks and raise concerns about data privacy, requiring careful management to prevent misuse.
- Gathering data for applications like aerial photography and surveillance presents challenges in implementing strong privacy and security measures.
- Robust protective strategies are essential to safeguard sensitive information from breaches or unauthorized access in the drone industry.

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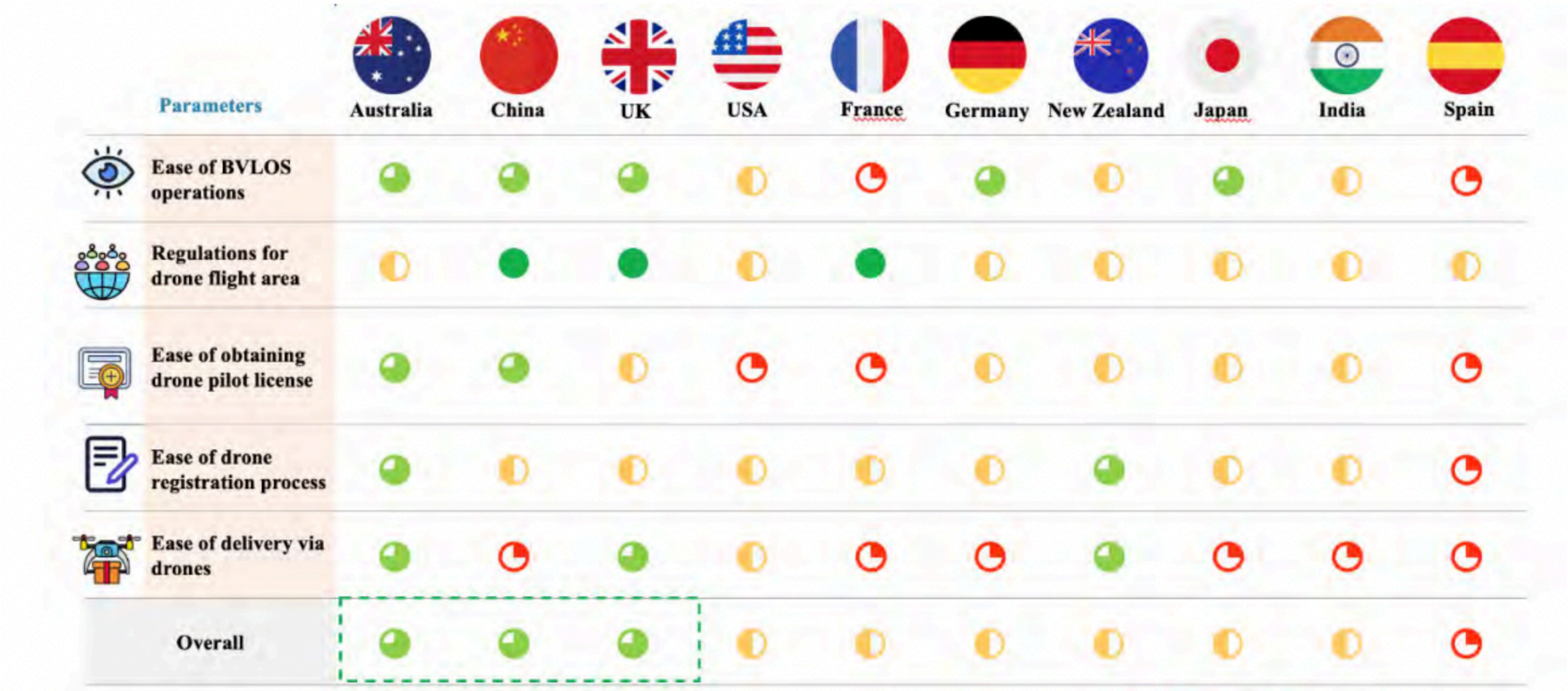
Navigating Global Regulations



Parameters	Australia	China	UK	USA	France	Germany	New Zealand	Japan	India	Spain
Ease of BVLOS operations	◕	◕	◕	◐	◔	◕	◐	◕	◐	◔
Regulations for drone flight area	◐	●	●	◐	●	◐	◐	◐	◐	◐
Ease of obtaining drone pilot license	◕	◕	◐	◔	◔	◐	◐	◐	◐	◔
Ease of drone registration process	◕	◐	◐	◐	◐	◐	◕	◐	◐	◔
Ease of delivery via drones	◕	◔	◕	◐	◔	◔	◕	◔	◔	◔
Overall	◕	◕	◕	◐	◐	◐	◐	◐	◐	◔

Landscape

Drone regulations have evolved alongside technological advancements, with nations developing extensive laws to govern their use

US Leadership

The United States, with the Federal Aviation Administration has been a leader in drone regulations, streamlining approval for commercial drones

International Variances

Regulatory frameworks vary significantly, with some nations allowing minimal regulations while others impose strict restrictions or outright bans on drone usage

Future Outlook

As the industry continues to grow, regulatory bodies are working to ensure a balance between innovation and safety ensuring steady growth

Our predictions: Future Trends & Forecasts for the Indian Market

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Liberalizing Legislation to Propel Market

Schemes such as Production Linked Incentive & SVAMITVA are encouraging the use of drones for commercial and civil purposes in addition to defence.

Micro Entrepreneurs to Adopt and Drive this Market

India is anticipating a drone revolution phase now, and there will be many entrepreneurs who will start adopting drones. The future market ecosystem will help massify drone adoption in India.

AI to become the leader of the Drone-Tech tech stack

As services across industries get standardized, we will see many new & emerging spaces evolve. This will complement data collection with Big data, ML; AI, Cloud and Analytics & BI to offer a full-stack solution.

Favourable policies, growing AI capabilities & increasing Drone-Tech based start-ups coupled with the Government's aim to turn India into a hub for drone technology are vital factors contributing to the growth of the industry.

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India's Drone Industry Startup Landscape

Organisation	Sector	Funds Raised	ARR	Investors
aereo	Surveying	$6.5M	$2M	grow, 3one4 CAPITAL
Garuda aerospace	Multi-Segment	$28M	$5.8M	sphiticap
SKYE AIR Elevating Delivery	Delivery	$5.7M	$55K	chiratae VENTURES
SKYLARK™ DRONES	Data Analytics	$4.1M	$521K	SOONICORN VENTURES, infoedge ventures
ideaForge® Create. Inspire	Multi-Segment	$53.8M	$24.5M	BLUE ASHVA CAPITAL, FLORINTREE

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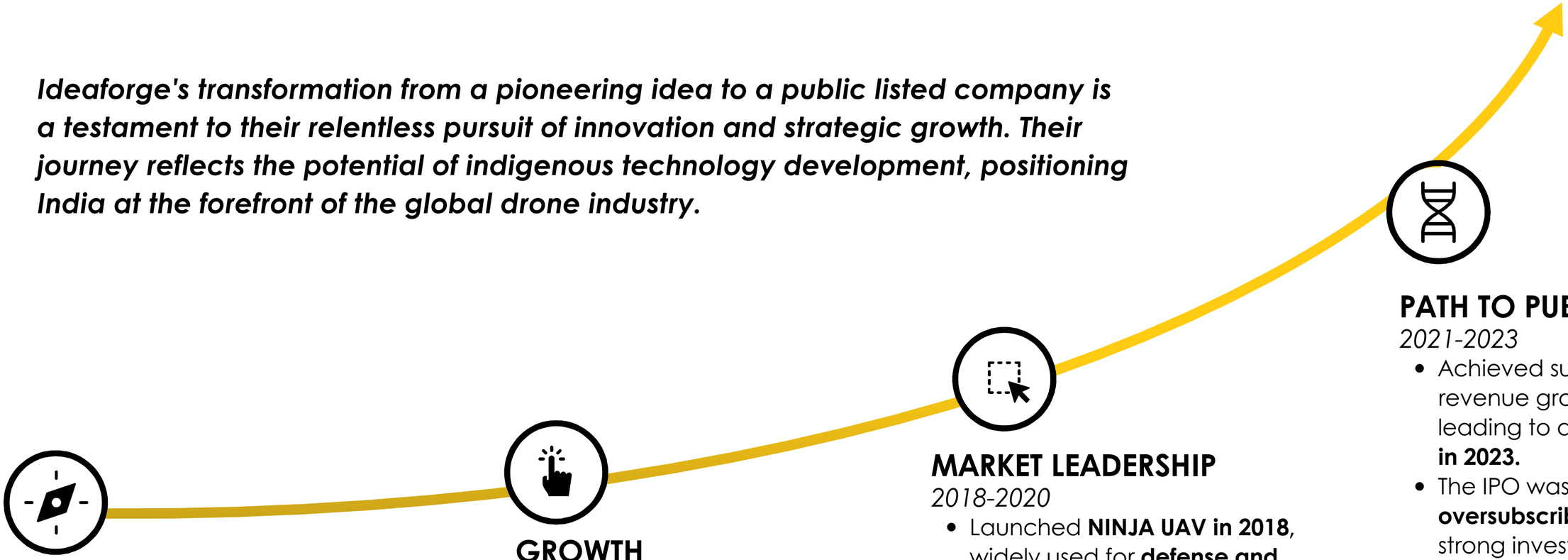
Ideaforge: A Journey from Innovation to IPO

Ideaforge's transformation from a pioneering idea to a public listed company is a testament to their relentless pursuit of innovation and strategic growth. Their journey reflects the potential of indigenous technology development, positioning India at the forefront of the global drone industry.



INCEPTION

2007-2012

- Founded in **2007** by IIT Bombay alumni Ankit Mehta, Rahul Singh, and Ashish Bhat, Ideaforge aimed to revolutionize UAVs in India.
- In 2010, they introduced **Netra**, a collaboration with DRDO, marking their entry into the defense sector.

GROWTH

2013-2017

- Significant **investment in 2013** led to expanded R&D and production capabilities.
- Launched the **Q Series in 2015**, setting new market standards with advanced, reliable UAVs, widely adopted by the Indian Army.

MARKET LEADERSHIP

2018-2020

- Launched **NINJA UAV in 2018**, widely used for **defense and industrial** applications.
- Introduced **RYNO** and **CYCLONE** series in 2020, expanding into **agriculture, logistics, and urban planning**.
- **Collaborations with government agencies and private enterprises facilitated large-scale deployments**, solidifying Ideaforge's position as a market leader.

PATH TO PUBLIC LISTING

2021-2023

- Achieved substantial revenue growth by 2021, leading to a successful **IPO in 2023.**
- The IPO was **oversubscribed**, reflecting strong investor confidence.
- The public listing marked a milestone, **enhancing Ideaforge's credibility and visibility in the global market**.