I ISSUE BRIEF

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Up in the Air!

Policy Overview of the Indian Drone Industry

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Issue Brief

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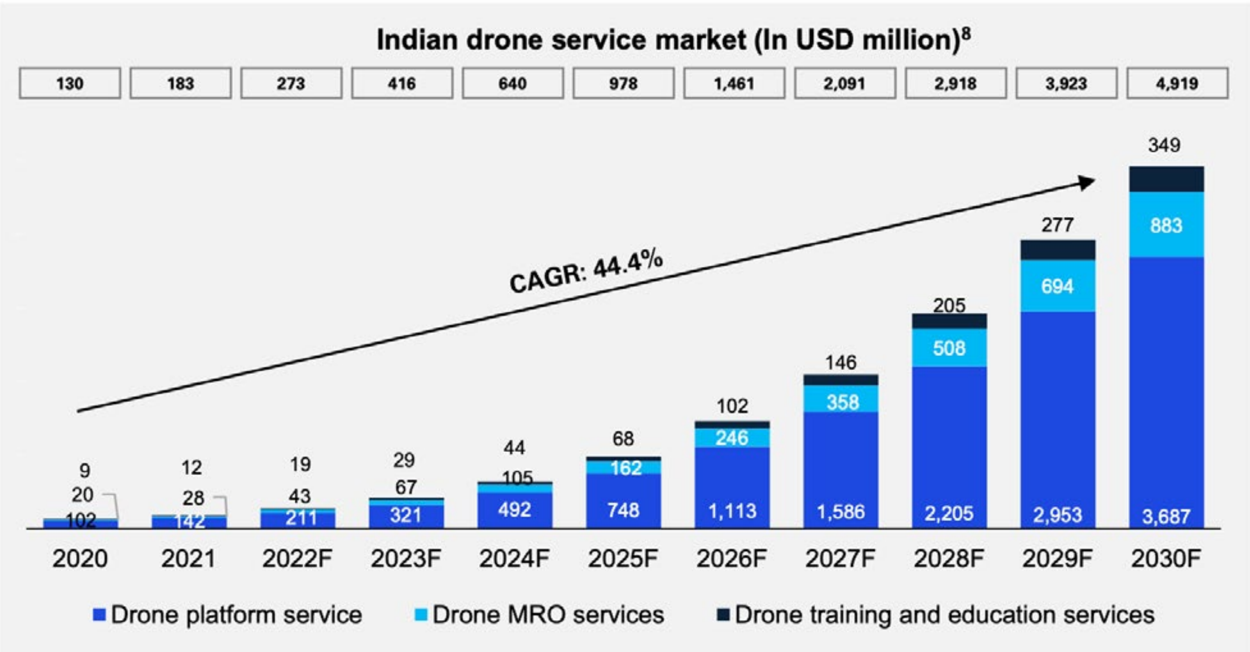
II INTRODUCTION

Perhaps nothing exemplifies the delicate balances that are crucial for successful growth of any industrial sector than the Indian drone industry, today. Caught between the disruptions and innovations of the fourth industrial revolution, risk and possibilities of an emerging nation in an increasingly globalizing world, policy regulation and liberalization, and, economic growth and inclusion—the drone industry, both in India and globally, is a relatively nascent phenomenon, which most commentators believe gained prominence not before 2018, at least commercially (Edulakanti & Gonela, 2024, p. 20; Kapustina, Izakova, Makovkina, & Khmelkov, 2021). From being notified in the National Industrial Classification as late as 2022, to projections of having a turnover of USD 30 bn by 2030 – the drone industry in India is being leveraged as one of the many which will underwrite the story of her global ascendancy and a policy overview of it is timely (NASSCOM, 2022, p. 3; PMO, 2022; KNN, 2022).

Equal to its steep and impressive manufacturing record are the trends and projections of its service market which is made up of maintenance, repair, and overhaul (MRO), drone platform services and training and education services, growing with a compound annual growth rate (CAGR) of 44.4%, and reaching ~5 bn USD till 2030. Further, naturally, another reason why the industry is on the national 'radar' is due to its employment generation potential with over a lakh jobs across its manufacturing and service segments (PIB, 2022)



Source: India's Emerging Drone Industry (KPMG, 2022, p. 4)

Though drones, or rather, unmanned aerial vehicles (UAVs), have been known since the early 1900s, their commercial or non-military deployment is rather new. Significantly, its usage in the 2010s in photography and filming gained ground. However, coupled with security and military concerns, it imposes novel policy limitations, and is one of the reasons why publicly available data of the total shape and size of the industry is wanting. Estimates indicate that only ~24% of the total UAVs produced are strictly for civil and commercial usage, the rest being classified as either strictly military or 'dual-use' products. Notwithstanding this paucity of data, we are aware that India ranks as one of the topmost nations in the world as an importer of UAVs, and her ambition to become a global drone hub also has motivations of strategic autonomy (Faraz et al., 2021). The heavy deployment of drones in the recent India-Pakistan skirmish further emphasized the motivations for India's strategic autonomy (Kumar & Vishwanathan, 2025; Singh, 2025).

Apart from such strategic concerns and an impressive growth trajectory (which nevertheless seems dwarfish in relation to the size of the Indian economy), it is the application of drones and UAVs across other sectors as capital or intermediate goods that gives it such an importance in our national agenda. It has the potential to offer significant reduction of costs and liabilities across areas of planning surveys and mapping, construction, earthwork management, agriculture, industrial asset management, urban planning and management, retail, healthcare, disaster management, B2C, etc.—a list only limited by the existing use-cases with the potential for significant expansion (KPMG, 2022; PIB Technology, 2025; Edulakanti & Gonela, 2024; Kapustina, Izakova, Makovkina, & Khmelkov, 2021). An estimate of the unit cost savings it has across some industries by revolutionizing the processes are listed in Table 1.

Areas	**Existing Processes**	**Potential Drone Benefits**	**Saving Details (approx. values)**
Planning surveys and mapping	• Ground-based manual data collection • Manual analysis and single-point decision-making.	• Automated analysis and collaborative decision-making • 10x faster and 10000x more data points on a digitised base for better plans.	• Existing cost: INR10-12 thousand per sq. km • Potential cost: INR6 thousand per sq. km • Cost Savings:45 per cent.
Construction monitoring	• Excel-based progress tracking without visual verification.	• Automated object recognition, counting and progress tracking on drone maps • 80 per cent faster and improved transparency and on-site governance.	• Existing cost: INR2.5 thousand per km for road construction survey • Potential cost: INR1.5 thousand per km • Cost Savings:40 per cent
Earthworks management	• Manual data collection and reporting • Paper-based volumetric tracking without visual verification.	• 30x faster data collection and 350x more data points than with traditional (Global navigation satellite system) GNSS survey • 4x faster turnaround and end to end tracking.	• Time consumption:15-30 days for surveying 100-acre job site • Time Benefits: 20 mins to survey 100- acre job site • Cost Savings:90 per cent.
Agriculture crop monitoring and spraying	• Manual applications – unsafe, in-efficient and limited access to skilled labor • Erroneous, single point-decision making.	• 10x faster turnaround, efficient and cost saving • Automated analysis and collaborative decision making.	• Existing cost: INR1500-1800 per acre for spraying • Potential cost: INR300-400 per acre • Cost Savings:400 per cent.
Industrial asset maintenance and sustainability	• Erroneous, unsafe, and infrequent manual inspections • Ad-hoc manual patrolling with no visual evidence.	• Automated diagnostics from safe and frequent aerial inspections • Real-time, centralised view of inaccessible and remote assets.	• Existing cost: INR90- 100 thousand per chimney inspection using crane • Potential cost: INR50 thousand • Cost Savings:50 per cent

Source: KPMG, 2022

Embedded strictly in the "design-follows-function" approach, there are a number of models which are in the market today, with the broad distinction between them being aerostatic lifts (lighter than air) and aerodynamic lift (heavier than air), with models such as blimps and balloons in the former, and fixed wings, Vertical Take-offs and Landing (VTOLs), multi-rotors and helicopters in the latter (Wackwitz & Bodecker, 2025). Again, arguably, these models are limited only by their existing use-cases and have significant potential for growth. In what proceeds, we will present an overview of the policies that have been propounded and are in vogue, and which have a significant bearing on the Indian drone industry. Given its nascence, although judgement is barred on the impact of policy on the industry and the market, we will nevertheless point towards some pressing issues which will govern its analysis in the future.

II OVERVIEW OF THE POLICY DEVELOPMENTS

The first tranche of policy measures that were undertaken by the central government to promote the Indian drone industry came out in a bundle from the latter half of 2021 to early 2022, in the form of the following:

1. Passing of the Drone Rules of 2021[1]
2. The UAS Traffic Management (UTM) Policy framework being passed on October 2021
3. Drone Airspace map publication, which opened up 90% of the Indian airspace for drones flying up to 400 ft
4. DigitalSky Platform for the ease of access in permissions and certifications for drone usage
5. The drone certification scheme, which made it easier for drone manufacturers to obtain type certification (Ministry of Civil Aviation, 2022)

By 2022, the Drone (Amendment) Rules were also notified, which further relaxed the process of pilot licensing to be issued from any Remote Pilot Training Organization, rather than Directorate General of Civil Aviation (NASSCOM, 2022, p. 7).

Whereas the general tenor of these policy measures was a certain liberalization that would impact the ecosystem in all terms possible, there have been more direct interventions in the supply and demand side of the drone ecosystem by the central government (Ministry of Science and Technology, 2023).

I BOOSTING THE MANUFACTURING AND DRAAS (‘DRONE-AS A SERVICE’) ECOSYSTEM

One of the earliest schemes that the central government had initiated in the first tranche of policy measures aiming to boost the supply side of the drone industry was the PLI scheme for drone and its components manufacturers, running from FY 2021-22 to 2023-24 and with a financial outlay for INR 120 cr. It has been reported that roughly 23 manufacturers of both the drones and its components were the beneficiaries, and a total of 98.32 cr has been disbursed hitherto (Ministry of Civil Aviation, 2022; Ministry of Civil Aviation, 2022; MINISTRY OF CIVIL AVIATION, 2025). Though there has been no official statement on the renewal of the scheme, many speculate that in the aftermath of the India-Pakistan skirmish from early this year, there has been a strong case for the renewal of the PLI for drones being deliberated by the government, with an updated budgetary outlay (Kashyap, 2025). Some maintain that this renewal will be significantly different from the last time, with a heavier focus towards building R&D and testing capacities (Chatterjee & Khan, 2024).

It must also be mentioned that another major step taken by the central government in sync with the PLI was the drone import policy in 2022, which banned the import of foreign drones in completely built-up, semi knocked-down or CKD forms, apart from drone components, thus shielding the industry domestically (Ministry of Science and Technology, 2023; NASSCOM, 2022). At the same time, the General Authorization for the Export of Drones (GAED) by the DGFT seeks to further ease the import-export of drones in India due to their earlier categorization as 'dual-use' in the Special Chemicals Organisms Material Equipments and Technology List (SCOMET) of ITC HS, in a blanket fashion (Ministry of Commerce & Industry, 2023).

Another policy aimed to augment the DrAAS ecosystem from the supply side, announced in the budget of 2022-23, was the 'Drone Shakti' mission (Nirmala Sitharaman, Minister of Finance, 2022, p. 8), and focussed primarily on skill development. Under this component there are 6 drone related courses which are taught in the skilling policy infrastructure under short term courses—drone developer (software), drone manufacturing and assembly technician, drone monitoring and maintenance associate, drone operator (multi-rotor), drone service technician and Kisan drone operator—in 115 affiliated ITIs across 12 states (Skill Development and Entrepreneurship, 2023). Given that the courses have only begun from 2023-24 onwards, 26,729 students have been trained under the same, with 1096 being trained under the Craftsmen Training Scheme (CTS), and the rest under the Pradhan Mantri Kaushal Vikas Yojana (PMKVY 4.0) (Ministry of Skill Development and Entrepreneurship, 2025). Posed vis-à-vis almost 15000 ITIs in the country, and vis-à-vis concerns around the proliferation of short-term courses which do not have a strong correlation with wages in the Indian labour market, the skilling ecosystem may be suspected of underperformance (Ministry of Skill Development and Entrepreneurship, 2024; Sharma, Behera, & Mehrotra, 2025).

I CREATING A MARKET FOR DRONES

One of the significant strategies by the government to boost the drone industry has been to incentivize its application in various sectors. There are a number of individual projects where the state governments have taken a lead. Some of these are their use in urban development by the governments of Andhra Pradesh, Karnataka, and Tamil Nadu, along with the Chandigarh administration, with usages ranging from monitoring the infrastructure projects, property tax estimation, and building and zoning law violations; usage in forest administration by the government of Haryana, Maharashtra, Tamil Nadu in monitoring wildlife, green covers and forest fires; in transport by the Indian railways, NHAI, and the government of Maharashtra; in agriculture for assessing crop damage due to floods, deficit rainfall, and in the spraying of pesticides and fertilizers by the above-mentioned states; in oil pipeline monitoring by GAIL; in mining by the government of Jharkhand, etc. (PwC; and Drone Federation of India, 2020; HT Correspondent, 2025).

Apart from these individual projects, however, commentators have noted the stimulation of demand for drones by the central government schemes and projects. One such notable deployment has been in the Survey of Villages and Mapping with Improvised Technology in Village Areas (SVAMITVA) program, where drones are used to provide a highly accurate estimate of village Abadi (inhabited) lands, and which is currently operational in 31 states and UT's of India, utilizing INR ~250 cr for large-scale mapping using drones (Ministry of Panchayati Raj, 2025).

Another flagship scheme underway is the "Kisan Drone" component under Sub-Mission on Agricultural Mechanization, in which financial assistance upto 100% of the cost of drone, upto INR 10 lakh per drone, is provided for purchase and demonstration on the farmer's field under allied agencies such as State Agricultural Universities, ICAR, Krishi Vigyan Kendras, etc. Under the same, Farmer Producers Organizations (FPOs) are also extended a similar subsidy upto 75% of the costs, along with provisions for renting and purchase of drones in agricultural operations for rural entrepreneurs, Women, SC/ST tribes, and north eastern state farmers. According to the latest figures, 527 drones have been distributed to individual farmers, 1596 drones have been distributed to Custom Hiring Centers (CHCs[2]) and 296 drones have been distributed for demonstrations to various relevant agencies (Ministry of Agriculture and Farmers' Welfare, 2025).

Another much discussed scheme that has been recently announced and implemented is the "Namo Drone Didi" scheme, wherein 15,000 drones are to be provided to Women Self Help Groups, primarily linked to the Deen Dayal Upadhyay-National Rural Livelihoods Mission, and backed with a financial outlay of INR 1261 cr, from 2023-24 to 2025-26. Its main objective is to promote advanced agritech for improved efficiency, enhanced crop yield, reduced costs, and income boost by revolutionizing pesticides and fertilizer use processes. Under the scheme, 80% of the cost of the drone package upto INR 8 lakhs is provided to selected members of SHGs along with drone pilot training and drone assistant training[3]. As per the most recent record, 1094 drones have been provided by the Lead Fertilizer Companies, out of which 500 have been covered under the scheme. Moreover, training has been concomitant (Ministry of Agriculture & Farmers Welfare, 2025; Ministry of Agriculture & Farmers Welfare, 2024).

The top states where the drones have reached the SHGs are Andhra Pradesh, Haryana, Karnataka, and Uttar Pradesh, and in the distribution of the remaining 14,500 drones, the top 5 states intended for maximum benefit are—Uttar Pradesh, Maharashtra, West Bengal, Rajasthan, and Madhya Pradesh (Min. of Agriculture & Farmers Welfare, 2025).

II CONCLUSION

Though it is too soon to comment on the impact that the policies have had on the market and the industry, in general, the usage of drones in the Indian agricultural sector explains the contradictions that would need addressing for both the sectors to benefit, adequately. While one cannot ignore its positive effects, such as the reduction of the health vulnerability of the farmers, improved efficiency, etc., there exist downsides regarding its usage in fertilizer and pesticide operations—threats posed by the low volume spray that make it more concentrated (less water usage), the unit costs still on the higher side, or the possible job losses in terms of manual labour displacement (Beriya, 2022; Belton, et al., 2025). Moreover, according to the scant few empirical researches that exist, there are still huge bridges to be crossed in terms of their socio-cultural acceptability and in navigating the seemingly easy access of permissions which become terser in practice (Aggarwal, et al., 2023). Commentators have also highlighted lack of quality controls in government acquisition of drones (NASSCOM, 2022, p. 13).

In general, however, the few issues that emerge from understanding the policy developments around the promotion of the Indian drone industry that would need a vigilant eye are multiple. Firstly, there is the issue of over-reliance upon the government, at least in the civilian and commercial segment of the industry. Since it seems to be a major player in both the demand and supply side of the market, it is useful to reiterate those scholars who have studied the industrial policy of India, lately, and have warned against return of the ‘license-raj’, albeit in the form of favoring certain players and, ergo, suspicion of the promotion of inefficient and uncompetitive practices (Dhar, 2024). In an industry where the import of final drones is completely banned and where the government is also a major player in the market as a buyer, this cautionary value should increase multifold. Second, as we have noted above, is the issue of job losses and inadequate skilling and employment generation opportunities. As to whether the drone industry becomes a permanent player in the way economic activities are carried out, we will have to wait and watch.

ENDNOTES

1. Drone Rules are the overarching framework regulating the use and deployment of commercial and civilian purposes covering issues of type certification, registration and operations, airspace restrictions, R&D, training and licensing, offences and penalties, etc.

2. Units that provide small and marginal farmers with access to farm machinery, implements and equipment on a pay-per-use or rental basis.

3. Any other logistical support which may be required is also provided, such as financial assistance to purchase multi-utility vehicles for drone transportation, amongst others.

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