



The Evolving Defence Technology Industry Base and Opportunities in the Defence Electronics Segment

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SNAPSHOT OF MACROECONOMIC SCENARIO

Global Macro-economic Overview

As per the July 2022 update of the World Economic Outlook (“WEO”) published by IMF (International Monetary Fund), the global growth projection has been revised and expected to be 6.1% in CY 2021 and 3.2% in CY 2022. The lower growth in CY 2022 is primarily due to downward revision of US growth by 1.4% due to removal of the Build Back Better fiscal policy package from the baseline, as well as faster withdrawal of monetary assistance resulting in reduced household purchasing power. Another factor which affected the lower projection is persistent supply constraints. Also, pandemic-related interruptions associated with the zero-tolerance COVID-19 policy, as well as long-term financial hardship among property developers, have resulted in a 0.8-percentage-point drop in China. For CY 2023, global growth is forecasted to be 2.9%. It is expected that by the end of CY 2022, severe health outcomes in most nations will decrease to low levels, if vaccination rates improve globally, and medicines become more effective.

The persistent supply chain disruptions and high energy prices are projected to continue in CY 2022, and thereby, elevated inflation is expected to last longer than predicted in the previous WEO. Inflation is expected to increase in later half of 2022 due to supply-demand imbalances, reaching 6.6% to 9.5% globally, an increase of 0.9% over previous predictions.

The emergence of new variants of COVID-19 could potentially extend the pandemic and cause fresh economic consequences. Furthermore, factors such as supply chain disruptions, localized wage pressures, and energy price volatility contribute to a high level of uncertainty about inflation and policy directions. Risks to financial stability and emerging market as well as developing nations' capital flows, currencies, and fiscal balances may emerge if advanced economies raise policy rates, especially as debt levels have risen dramatically in the past two years. As geopolitical tensions continue to escalate, other global threats may develop, and the on-going climate emergency implies that the risk of major natural disasters remains high.

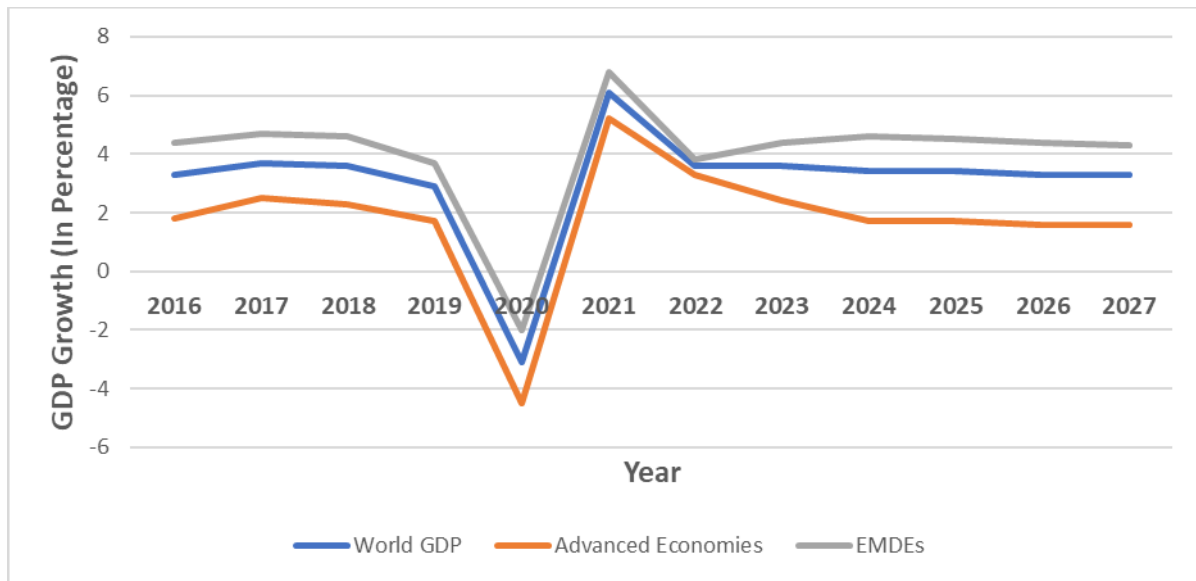
However, the Ukraine-Russia war has meant an upturn in the defence industry sector with countries committing more resources, announcing new procurements and an increase in their defence expenditures especially in Europe. Germany recently announced that it would substantially increase defence spending and Chancellor Scholz has promised an injection of €100 billion through a “special fund” that will be invested from 2022. Countries such as France, Italy, the Netherlands, Portugal, Spain and Sweden have proclaimed their intention to spend more in line with NATO and EU

targets, and countries that already meet the 2% target – such as several Baltic states and eastern NATO allies – will spend more in future.

Global GDP Growth

The growth of advanced economies, and EMDEs at constant prices are mentioned in the table shown below:

FIGURE 1: WORLD GDP GROWTH



Notes: Data for CY 2016-2020 is actual; data for CY 2021-2026 is estimated. Aggregate growth rates have been calculated using GDP weights recorded for 2020 at constant prices. CY (Jan-Dec)

After the rebound in 2021, global growth is expected to gradually moderate largely due to the reduction in private consumption, fading investment and withdrawal of macroeconomic assistance.

As per data from the world bank, up to 2020 globally countries were spending on average 2.4% of their GDP on defence activities. With the increasing instability globally especially with the aggressive stance of Russia and China to their neighbours, this is expected to increase in the future.

Global Inflation

Over the last 12 months (August 2021 to August 2022), all items consumer price index increased 8.5 percent after rising 1.3% in June. There is a possibility of recession becoming a possibility as soaring inflation and rising interest rates dents consumption driving a decrease in oil prices. Brent crude has already fallen to \$88.50 a barrel, a seven-month low dating back to before the Russian invasion of Ukraine. It was the first time Brent had dropped below \$90 a barrel since February 2022. However, these figures remain highly uncertain and sensitive to geopolitical outcomes.

In many nations, the recovery of global demand and activity since mid-2020, combined with rising food and energy costs as well as supply disruptions, have driven headline inflation to decade peaks. Core consumer price inflation, which excludes food and energy, has also risen globally, owing in part to rising housing and property prices in several nations. As inflation has risen, central banks have begun to reverse their accommodative monetary policies.

Recent pricing pressures in Emerging Markets and Developing Economies (EMDEs) that may drive inflation above goal ranges may not necessitate a monetary policy response—as long as the pressures are transient and inflation expectations remain well-anchored. In Emerging Market and Developing Economies, the market experienced a growth inflation due to increase in food, energy, and core components. Around 2/3rd of EMDE experienced double-digit food inflation in CY 2021.

Low-income nations are projected to see increased aggregate and food price inflation, aggravating food insecurity, and the rising risk of poverty. Attempts to regulate food costs in many nations through price subsidies or the re-emergence of protectionist measures could drive world prices higher and prove self-defeating. Moreover, long-term supply disruptions, longer-term expenditure commitments, commodity and housing price shocks, and a de-anchoring of inflation expectations might lead to greater inflation than the baseline forecast.

Step Taken by The Government Across the World

As compared to the Global Financial Crisis that took place in the year 2008, it is noted that governments across the global markets took timely interventions to curb the economic downturn. The Global Recession was caused due to the collapse of the banking sector while the economic downturn induced by COVID was primarily due to a disruption in the supply side factors. The supply and demand are gradually reaching equilibrium as the lockdowns start to abate around the globe.

The steps taken by a few leading countries are mentioned in the following paragraphs:

US: The key economic policy responses adopted by the U.S are:

- On 12 August 2022, US House Democrats passed the Inflation Reduction Act of 2022 committing \$370 billion dedicated to curbing harmful emissions and promoting green technology.
- On 11 March 2021, President Biden signed the “American Rescue Plan”. The rescue plan is valued at 8.8% of the U.S GDP (US\$ 1,844 bn). The plan was to provide US\$ 1,400 to eligible families; it also extended unemployment benefit programs and assistance to families, communities, and businesses.
- President Trump signed a coronavirus relief and government funding bill in December 2020, worth US\$ 86 billion. The funding was a part of

the Consolidated Appropriations Act 2021, which amounted to 4.1% of the US GDP.

- The plan included enhanced unemployment benefits of US\$ 300 weekly and federal enhancements for the unemployed.

India:

- On 22 May 2022, India unveiled its \$26 Billion Inflation Plan that includes lower fuel taxes and import levies. As part of India's plan to ease pressure on consumers, the federal government slashed levies on pump prices of gasoline and diesel, waived import tax on coking coal, which is used to make steel, and increased subsidies on fertilizers and cooking gas.
- The fiscal support measures were categorized into two measures; above the line measures and below the line measures. Above the line measures allocation was about 3.5% of GDP and below the line measure allocation was about 5.3% of GDP. The support was announced on March 26, 2020.
- Above-the-line expenditure mainly focused on healthcare as well as social protection including in-kind transfers & cash transfer to low-income households.
- Below-the-line measures primarily focused on credit facilitation and building up investor confidence to drive investment demand. In below-the-line measures, both fiscal and monetary tools were used in tandem.

UK:

- In May 2022, a £15 billion package was announced in support of households. An Energy Profits Levy on the profits of the oil and gas sector was also announced, which is estimated to raise £5 billion in its first 12 months.
- In March 2022, relief was provided on fuel and energy purchases.
- The U.K Fiscal Policy was adopted on March 11, 2020 in six tranches. The fiscal stimulus package was noted to be around \$37 billion.
- Additional funding of £48.5 billion was provided for National Health Services, Charities and Social Workers.
- Measures to support businesses accounted for £29 billion
- Tax holidays for small scale businesses and entrepreneurs were incorporated.

France:

- In July 2022, France's National Assembly permitted billions of euros in new measures to assist households deal with high inflation. The proposed laws are a part of a brand new €20 billion package deal aimed toward preventing inflation.
- A value of \$8.7 billion was invested on programs to upgrade the healthcare facility

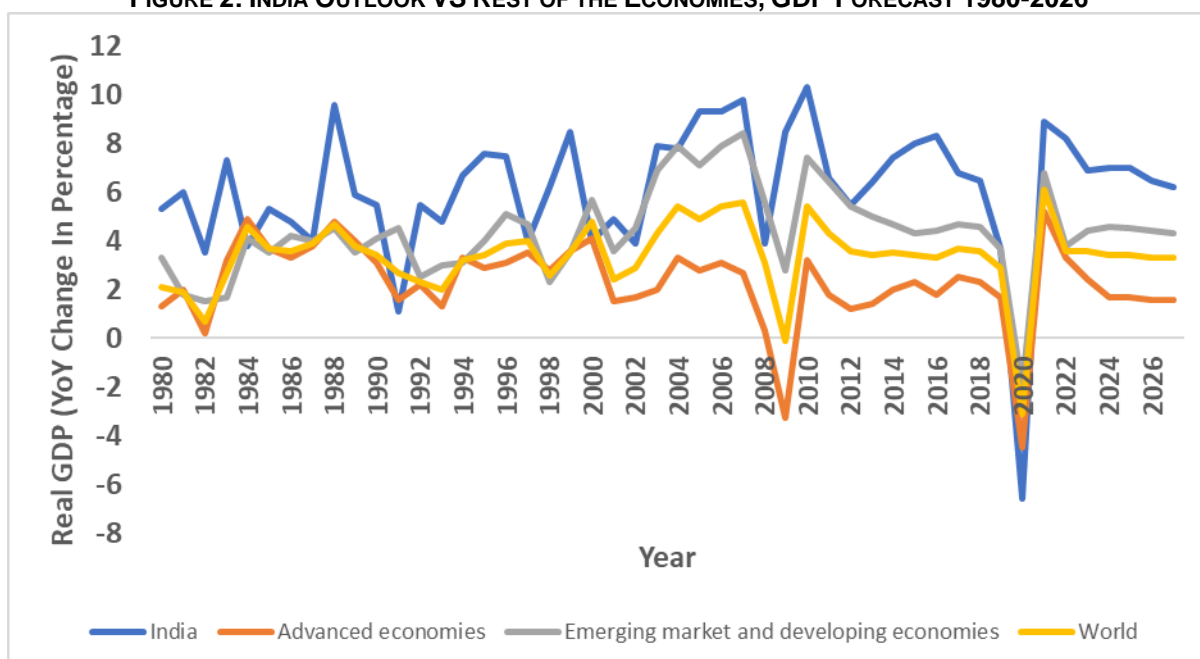
- Roughly \$26 billion was allotted in the favour of work sharing wage support.
- Facilities like postponement of utilities and rent was introduced for medium as well as small scale retailers
- Bailout loans for businesses were also incorporated

Indian Economic Outlook Relatively More Positive

One of the key drivers for post pandemic recovery is the increased consumer demand from countries like China and India that have a huge customer base. Import substitution policies is expected to drive investment demand in countries like India. For instance, Make in India/ Atmanirbhar Bharat is anticipated to drive domestic manufacturing in India.

India has taken measures to shore up its economy in a very adverse economic and geopolitical climate. India has raised interest rates to combat inflation, and the World Bank has revised India's growth prospects downward for FY 2022-23 to 7.5% and for 2023-24 to 7.1%. However, lower corporate taxes, the production-linked incentive (PLI) scheme and India as a potential beneficiary of supply chain diversification will catalyse and sustain domestic demand. Additional offshoring of demand – especially in the electronics sector, fuelled by increasing global defence budgets and digitalisation of militaries is expected to ensure that several industry sectors in India will remain buoyant. Rising global wages in other parts of the world is also likely to enhance India's status as a destination for offshore manufacturing. Despite inflation, and an anticipated decline in consumer demand in the short term, industry and services is expected to perform well.

FIGURE 2: INDIA OUTLOOK VS REST OF THE ECONOMIES, GDP FORECAST 1980-2026



Note: Real GDP growth of different regions. Actual data used till CY 2021. Forecasts from CY 2022 to CY 2027. All IMF data are CY except India GDP shown for FY

Indian Macro-economic Overview

In FY 2020-21, India's economy experienced a plummet owing to the advent of COVID-19. In response to the fast-spreading pandemic, the government had taken several proactive preventive and mitigating measures, including the issue of public advisories tightening international travel restrictions, establishing quarantine facilities, promoting traceability of contacts for those affected, as well as various social distancing measures. To control the spread of Covid-19 while ramping up India's health infrastructure, the government instituted a rigorous 21-day nationwide lockdown beginning March 2020 under the Disaster Management Act of 2005, with later extensions and relaxations. The lockdown measures put in place to stop the spread of the Covid-19 pandemic in India had a wide-ranging impact on business, employment, manufacturing, trade, and services. The GDP had contracted by 7.3% in 2020-21 due to the COVID related lockdowns and restrictions. GDP growth was forecasted to exceed 9% by organisations such as the International Monetary Fund. However, the resurgence of Omicron combined with the Russian invasion of Ukraine aggravated surging inflation and supply shortages. The confluence of increasing product pricing and disruption of logistics and trade routes has resulted in growth expectations being reigned in. However, the growth is still expected to be buoyant in FY 2023-2024 due to the Indian economy being primarily driven by domestic demand of goods and services. Moreover, companies have continued to report a steady net profit to sales over the 2022–2023-time frame. Also, the government's capital spending share is increasing even as it is slashing revenue expenses driven by record tax collection. The Indian market has also performed exceptionally with respect to foreign exports and will continue to play a pivotal role in the economic recovery as the manufacturing sector continues to explore increasing means of resiliency and cost efficiency to combat Chinese offerings.

Last year, the Indian military purchased \$3.5 billion in weapons from overseas through emergency and fast-track procurement authorities. India spent \$10.73 billion of its \$16.41 billion capital procurement fund last year on weapons from domestic defense companies. With India preparing a new list of additional banned foreign-made defense material, the Make in India initiative will be bolstered even further. It is expected that 25% of the \$12 billion budget meant for the procurement of new weapons and associated equipment would go toward private sector orders during fiscal 2022-2023. The government also reserved 25% of its \$800 million defense research and development budget for new R&D proposals by private industry, startups and academia for the FY22-23 time period.

Steps Taken By Government of India

The government launched a unique and comprehensive economic package worth Rs 20 lakh crore (equal to 10% of India's GDP) under Atmanirbhar Bharat initiative to combat the pandemic.

The package included deregulation of the agricultural sector, new PSU policy, change in definition of MSMEs, increased FDI limits in defence and space sector,

commercialization of coal mining, Production Linked Incentive Schemes (PLIs), new power tariff policy, revamping of Viability Gap Funding scheme for social infrastructure and development of Industrial Land/ Land Bank, and Industrial Information System, as well as incentivizing States to undertake sector reforms.

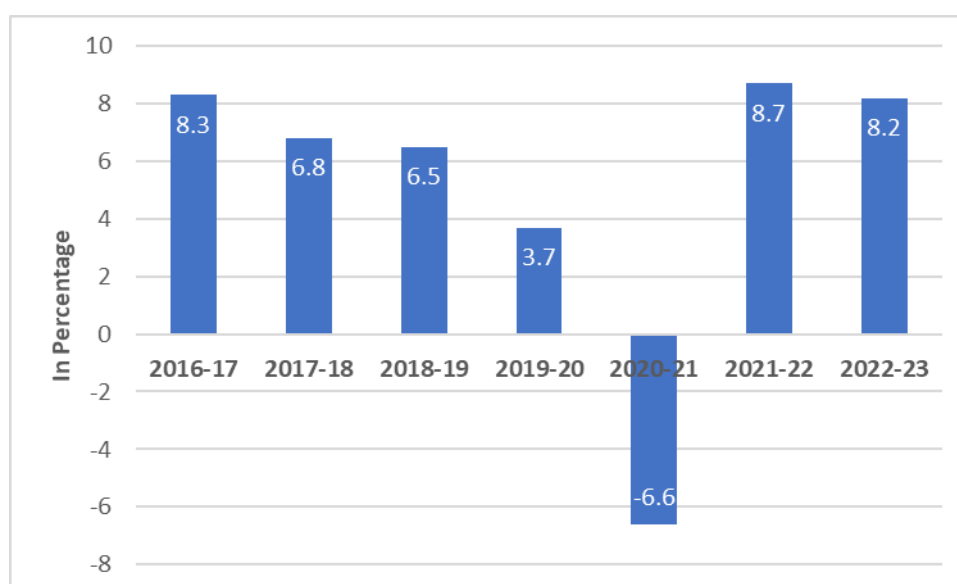
Other steps included a one-time special festival advance of Rs 10,000 (interest-free) for central government employees, in addition to a cash payment in lieu of the Leave Travel Concessions (LTC) scheme. Moreover, a payment of Rs 1.46 lakh crore was earmarked to boost the manufacturing of ten Champion Sectors through Production-linked incentives. Another key step was the launch of Emergency Credit Line Guarantee Scheme (ECLGS) 2.0, and 50-year interest-free loan to states.

The Indian government is also considering spending an additional Rs 2 trillion (\$26 billion) in the 2022/23 fiscal year to cushion consumers from rising prices and fight multi-year high inflation. India’s retail inflation rose to an eight-year high in April, while wholesale inflation rose to at least a 17-year high. The new scheme is expected to push the budget deficit for the current year to 6.8% of gross domestic product, from the originally budgeted 6.4%

India Real and Nominal GDP Growth and Outlook

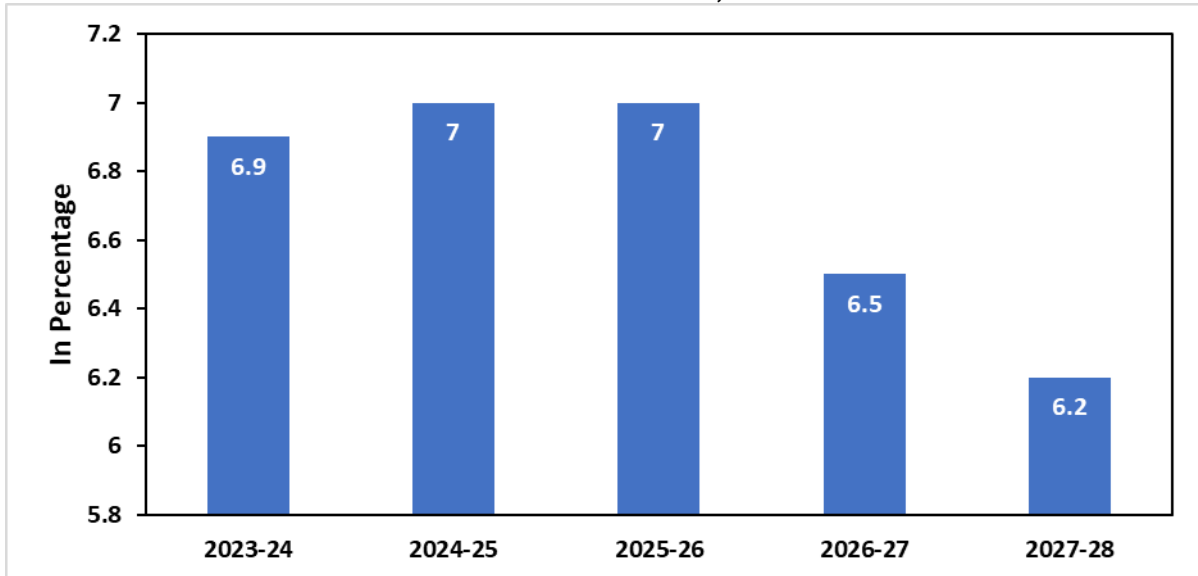
The real GDP is expected to grow by 8.2% in 2022-23. Real GDP at Constant Prices in Q1 2022-23 is estimated to attain a level of ₹ 36.85 lakh crore, as against ₹ 32.46 lakh crore in Q1 2021-22, showing a growth of 13.5%.

FIGURE 3: INDIA REAL GDP, 2016-2022



Source: NSO

FIGURE 4: INDIA REAL GDP FORECAST, FY 2023- FY2027



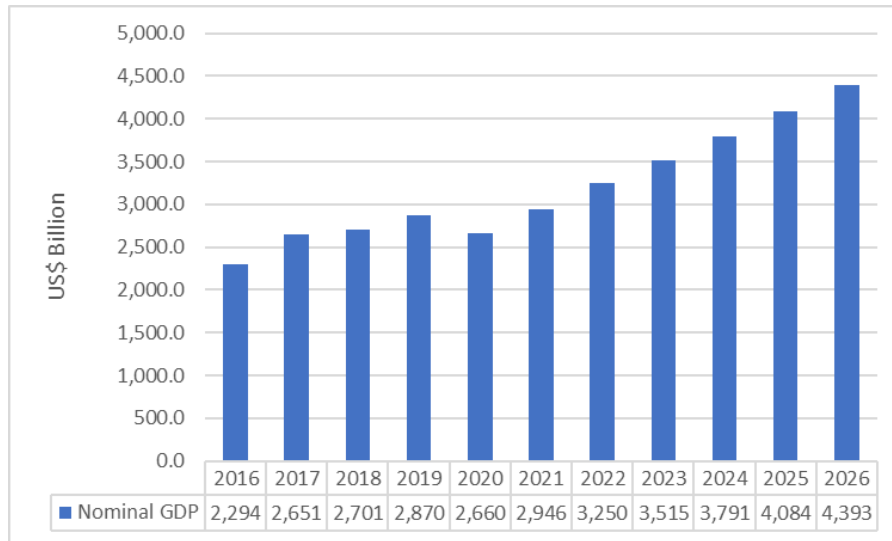
Source: IMF

The IMF has forecasted the Indian real GDP growth to moderate to around 8.2% in FY 2022-2023. In the medium term, till 2026-2027, the growth is expected to range from 6.9% to 6.5%.

The Government of India has stated recently that real GDP expanded by 8.4% in July-September 2021, 5.4% in October-December 2021 and 4.1% in January-March 2022. This is due to improvement in agriculture and manufacturing sectors. Growth has been estimated at 6.9% in 2023-24 and 7.0% in 2024-25, reflecting an improving investment outlook with private investment, particularly manufacturing, benefiting from the Production-Linked Incentive (PLI) plan, as well as increased infrastructure investment. In 2022-23, Real GDP or Gross Domestic Product (GDP) at Constant (2011-12) Prices in Q1 2022-23 is estimated to attain a level of Rs 36.85 trillion, as against Rs 32.46 trillion in Q1 2021-22, showing a growth of 13.5% as compared to 20.1% in Q1 2021-22.

It is estimated that manufacturing, mining & quarrying, construction, trade, hotels, communication and public administration, transport, defence, and other services are expected to register high growth in FY 2022-23. For the fiscal years 2022-23 (FY22), government consumption expenditure and overall investment are expected to surpass the pre-pandemic levels of FY20. However, household spending and consumption have not yet rebounded to that level. For FY22, the government's final consumption expenditure (GFCE) is estimated to be Rs 17.1 trillion, up from Rs 15.9 trillion in FY21, as well as Rs 15.4 trillion in FY20. Private final consumption expenditure (PFCE), which is a proxy for household spending & consumption, is predicted to reach Rs 80.8 trillion in FY22, up from Rs 75.6 trillion in FY21 and Rs 83.2 trillion in FY20.

FIGURE 5: INDIA NOMINAL GDP, (IN USD BILLION) 2016-2026



Source: World Bank, Note - India GDP CY 2016-26

The India Nominal GDP is expected to reach USD 3250 Billion in CY 2022, and it is expected to reach USD 4394 Billion in CY 2026, according to the World Bank.

According to Government press release, the nominal GDP, or GDP at current prices, for the year 2021-22 is anticipated to be US\$ 2946.1 billion. The nominal GDP growth rate is projected to be 19.5% in 2021-22.

India as economy has made rapid progress since the 2000s, which led to reduced absolute poverty. It is estimated that over 90 million people escaped poverty in the period CY 2011-2015.

Improvement in Global Investment and Ease of Doing Business Ranking

The World Bank's annual report on the Ease of Doing Business (EODB), published in 2020 placed India at 63rd position among 190 countries. India ranked at 100th position in 2018 and then moved up to 77th position in 2019. In 2020, India ranking further improved to 63rd position.

TABLE 1: INDIA'S EASE OF DOING BUSINESS RANKING, CY 2018, 2019, 2020

Parameter	Ranking 2018	Ranking 2019	Ranking 2020
Starting a Business	156	137	136
Dealing with Construction Permits	181	52	27
Getting Electricity	29	24	22
Registering Property	154	166	154
Getting Credit	29	22	25
Protecting Minority Investors	4	7	13
Paying Taxes	119	121	115
Trading across Borders	146	80	68
Enforcing Contracts	164	163	163
Resolving Insolvency	103	108	52

Source: World Bank

The country has improved across parameters like starting a business, getting electricity, registering property, dealing with construction permits, paying taxes, trading across borders, and resolving insolvency parameters in 2020 compared to 2019. According to the World Bank, India's Distance to Frontier (DTF) score increased to 71.0 from 67.23 in the last year.

The improvement in rankings is due to the Central Government's measures such as demonetization and the implementation of the Goods and Services Tax, the successful implementation of the Insolvency and Bankruptcy Code, and the Make in India initiative, which is aimed at attracting foreign investment. The measures in turn boost the private sector, particularly manufacturing, in addition to improving the country's total competitiveness.

GLOBAL & INDIAN DEFENCE INDUSTRY

Global Defence Spending

Global spending touched USD 2.07 trillion in CY 2021, which was an increase of 6.69% over the corresponding period in 2020. The five largest spenders, accounting for 62% of the total global spend, were India, China, United States, Russia and the United Kingdom. The rise in geopolitical tensions, such as the ongoing dispute between the US and China, was the primary driver of this surge in spending.

In 2021, the United States reached the highest military spending with US\$ 800 Billion which constituted 38.5% of the total military spending worldwide in 2021. As of 2021, the US military expenditure accounted to 3.5 percent of the US GDP. All the Department of Defence's everyday routine work, as well as war spending, international military assistance, nuclear weapons, and other Pentagon-related spending, are included in its military spending.

China's military expenditure accounts for the second-highest position in the world and accounted to US\$ 293.30 billion in 2021, i.e., 14% of global military spending. Its military expenses include personnel expenses, construction, and maintenance of facilities, running expenses, military training, and costs for equipment. Additionally, these expenditures cover active military members, and militia & reserve requirements in terms of logistic support. A large amount of spending was towards funding social welfare activities associated with retired officers, kindergartens for children of military personnel, schools, and training personnel competent for both military as well as civilian services. A part of this funding was also used for supporting national participation in emergency rescues and disaster relief efforts and economic construction.

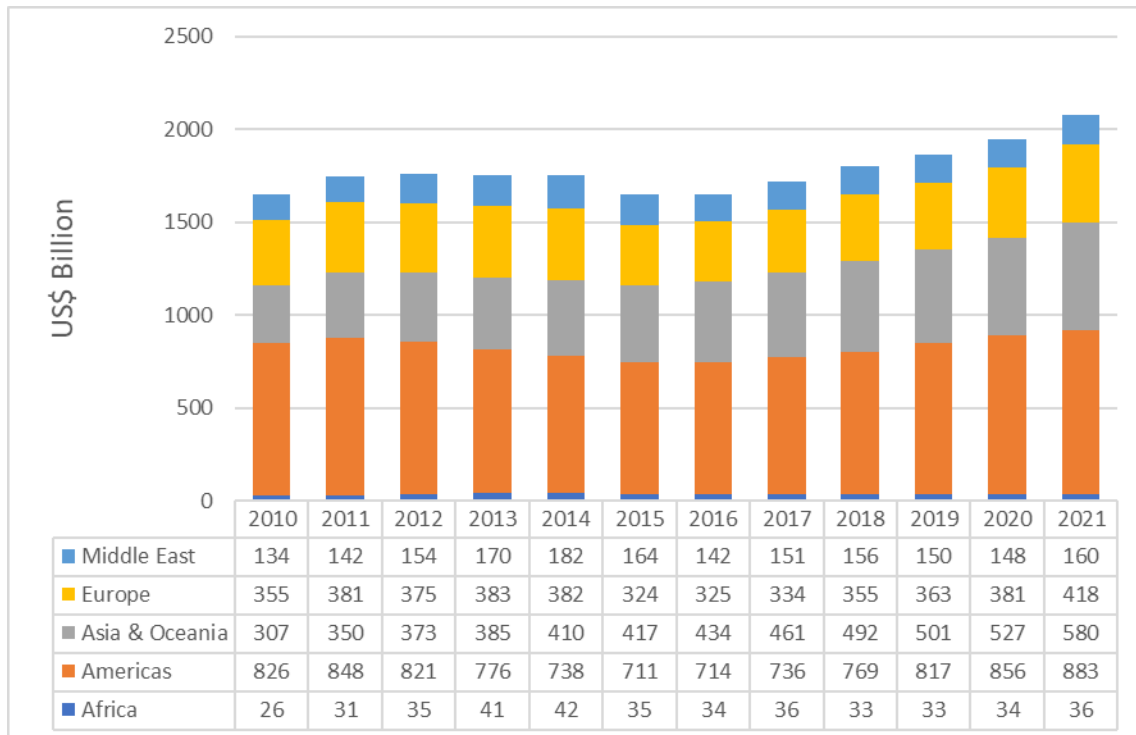
India's military spending in 2021 was US\$ 76.6 billion (3.7% of global military spending), ranked third globally and up 5.0 per cent from 2020. This rise is attributed to India's existing tensions with Pakistan and increasing border tensions with China.

In 2021, Russia's military spending increased by 6.7 per cent to US\$ 65.9 billion (3.2% of global military spending).

In 2021, the Americas accounted for 42.5% of world total expenditure, while Asia and Oceania accounted for 27.9% of total global expenditure. In 2021, Europe contributed 20% of worldwide military spending, making it the third-largest spender. Africa has the smallest regional contribution of military spending, accounting for only 1.7% of worldwide military spending. Based on the limited statistics available for this region, military spending in the Middle East is anticipated to have accounted for around 7.7 percent of global spending in 2021. Israel is expected to get to work on a number of projects that had been delayed for a significant amount of time as new budgets have been approved. With tensions continuing to rise with Iran, Israel's defense

establishment “is committed to safeguarding a strong, stable, fortified Israel and ensuring that Iran does not develop an existential threat to Israel. The budget increase would go toward purchasing various types of manned aircraft, intelligence-gathering drones and unique munitions needed for a possible attack against Iran’s nuclear program, which would target numerous heavily fortified underground sites.

FIGURE 6: GLOBAL DEFENCE SPENDING CY 2010-2021



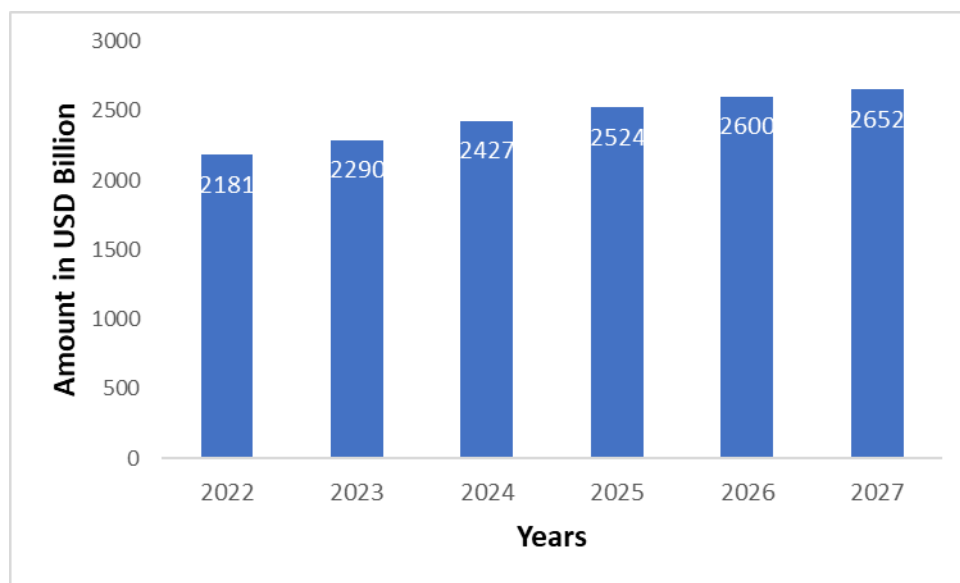
Notes: Figures for Middle East (ME) are estimates as noted by SIPRI. The years are calendar years.

The Global Defence spending grew at a CAGR of 2.13% between the years 2010 and 2021. Four of the top five spenders were permanent members of the UN Security Council, notably Russia, China, the United States, and the United Kingdom. India is a non-permanent member of the UN Security Council and is noted to be the third highest spender globally. Over the last few years, the rivalry between the United States and China has caused a paradigm shift in international affairs. It influences strategic debates as well as real-world political, military, and economic processes, and it is likely to boost military spending. Additionally, Chinese claims of territories in India, the South China Sea, and the Asia Pacific (APAC) increased insecurity among the affected nations.

In Europe, a higher number of NATO members met the Alliance's guideline aim of spending at least 2% of GDP on their military in 2020, compared to just nine countries in 2020. Further, spending on defence is expected to increase with the ongoing conflict between Ukraine and Russia. In 2022, Global military expenditure has already surpassed \$2 trillion per year, and looks set to rise further as European countries beef up their armed forces in response to Russia’s invasion of Ukraine. After a brief period

of declining military spending between 2011 and 2014, outlays have increased for 7 consecutive years. In the wake of the full-scale invasion of Ukraine, several European governments have pledged a spending overhaul to boost their forces' capabilities. Europe was already on an increasing trend, and this trend will accelerate and intensify fueled after Russia's 2014 annexation of Crimea raised the perceived threat level at the same time as the U.S. administration under Donald Trump increased pressure on NATO allies to spend more on their armed forces. European nations from Sweden to Spain have pledged to increase defense budgets, early indications are that modernizing and upgrading weapons systems will be a key priority. As such this will create new demand for underlying subsystems and components such as defence electronics, cable harnesses, etc.

FIGURE 7: GLOBAL DEFENCE SPENDING FORECAST: CY 2022-2027 (IN \$ BILLION)



Source: Frost & Sullivan Analysis

The Global Defence spending is expected to grow at a CAGR of around 3.99% between CY 2022 - 2027. The expected increase is based on a review of global GDP forecasts, as well as the expectation of ongoing political tension for the next two years. Any increase in geopolitical uncertainty because of rising tensions between the United States and China, India and China, India and Pakistan, Russia and NATO, China and Taiwan, Ukraine, Israel and Palestine, is likely to result in significant upsides to the forecast.

Geo-Political Context

The United States and China are becoming increasingly competitive. China's increasing military prowess is reshaping the Western Pacific power balance. As a result, the US is fortifying Pacific alliances, the most recent of which is the Australia-UK-US security pact (AUKUS). Russia and Turkey are shown demonstrating more

competence and readiness to project influence abroad, this was evident from the S400 deal.

The largest consumers of Chinese COVID-19 vaccines are Indonesia, Brazil, Turkey, and Mexico with net debt payments to China increasing by 62 percent in 2020. In order to flourish in the post-pandemic economy, developing countries may increasingly turn to China for technical, financial, as well as scientific assistance. Economic tensions are escalating because of geopolitical conflicts. During the pandemic, Japan, and India implemented protectionist laws. Western corporations in sensitive sectors such as technology are having growing difficulties doing business in China, & Russia as well as Western countries are prohibiting investment in vital sectors from geopolitical competitors.

The Russia-Ukraine war is hitting Eastern European countries very severely. The multiple spill over effects are propelling the region to another recession, with risks of instability and insecurity. The European council granted Ukraine and Moldova candidate status and has also sent Georgia positive signals regarding membership: it should be granted candidate status once a number of priorities will have been addressed.

In the Southern Mediterranean and across the Middle East, many countries are highly dependent on Russia and Ukraine for food and energy. Disruptions of trade flows caused by Russian invasion have already put huge pressure on them. Oil and gas producing countries are of course benefiting from high energy prices but in many other, rising commodity and food prices as well as reduced subsidies combined with severe droughts in some countries, may result in catastrophic hunger among the poorest and provoke new waves of social unrest, internal displacement and migration.

The resulting ripple effects are threatening the supply of key food resources like wheat and raising the possibility of a global famine. Simultaneously, disruption to the flow of electronics, raw materials, and parts supplies emanating out of China and other locales has seriously impeded global trade positions, forcing companies to recalibrate and in some cases, wholly reconsider their long-standing supply chain and partner ecosystems.

Geopolitical challenges and risks

US and Russia- Ukraine Crisis

- A new \$3 billion US package will send fresh military hardware to Ukraine and will allow Ukraine to acquire air defense and artillery systems, munitions and radars.
- US announced that it would send around 3,000 troops to Eastern Europe on 2nd Feb 2022.
- The Government introduced sanctions targeting prominent Russian government officials and business leaders, luxury property of elites, and luxury

asset management and service companies key to Russian attempts to evade sanctions.

- Sanctions were introduced to restrict the Russian military's ability to obtain technologies and other items it needs to sustain its aggression and project power. This effectively cuts them off from obtaining U.S.-origin items or foreign-made products derived from certain U.S. technology or software.
- The US has barred Russia from making debt payments using the \$600m it holds in US banks, making it harder for Russia to repay its international loans. Russia's central bank assets have been frozen, to stop it using the \$630bn (£470bn) of reserves it has in foreign currencies.
- The tensions prevailing between US and Russia are not expected to ease unless Russia reduces the 125,000 troops stationed at Ukraine border.
- Russian President Vladimir Putin recognized the independence of rebel region in Eastern Ukraine
- The possibility of a full scale war in Ukraine has escalated the possibility of widespread energy shortages and global economic chaos.

Disruption by China

- China is openly challenging US military supremacy in a number of areas, including state-of-the-art weaponry' like hyper-sonic technology.
- China is also threatening Taiwan, which might become a flashpoint for confrontation in 2022.

India's border issue with China

- India's membership in the Quad continues to upset China, and China may possibly embark on fresh adventurist actions at many more sites along the Sino-Indian border, forcing India to respond.

The Taliban's return and the consequences for India's security

- The Taliban's comeback to power in Afghanistan has resulted in a significant shift in the balance of power in India's periphery.
- Afghanistan's developments have fuelled the ambitions of a number of 'anti-state militant groups' across the region.
- The Tehrik-e-Taliban Pakistan (TTP) in Pakistan has gained momentum and is expanding its sphere of influence to include neighbouring Asian countries, particularly Kazakhstan.
- In Indonesia, the Jemaah Islamiyah is apparently becoming more active.

North Korea

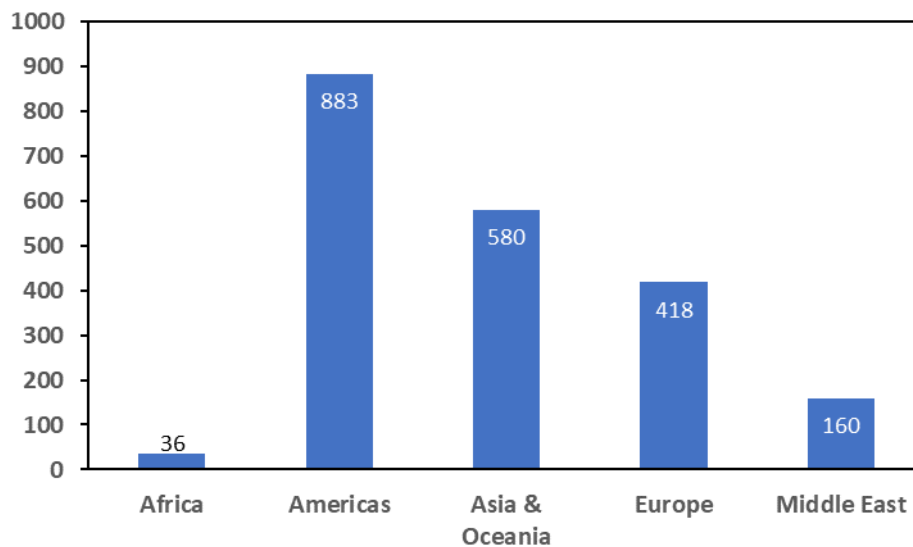
- Small-scale military and cyber provocations by North Korea, in addition to continuous weapons and missile tests, pose major concerns. This is because incident has the potential for greater and potentially unmanageable escalation.
- North Korean weapons have the ability to reach US territories and potentially the US mainland, which is also a cause for concern.
-

Middle Eastern silent war

- The unrest in Middle East is considered to have been triggered by the Arab spring, where multiple nations went into a turmoil.
- The failed state of Iraq allowed terrorist organizations to flourish, which then went into Syria trying to establish an Islamic Caliphate, which was successfully stopped by the US.
- Iran and Saudi Arabia have been in tension since the Iran revolution, where the democratic leader was thrown out of power and religious leaders took over.
- The depleting oil issue is also a matter of concern for countries like UAE, which is now opening its diplomatic doors to countries like Israel for high tech investments.
- The focus is now on Yemen, which is occupied by Houti group and Al-Queda.
- Major installations in UAE have been subjected to missile and UAV bombing from Yemen.
- US has extended its support to UAE to counter any future threats.

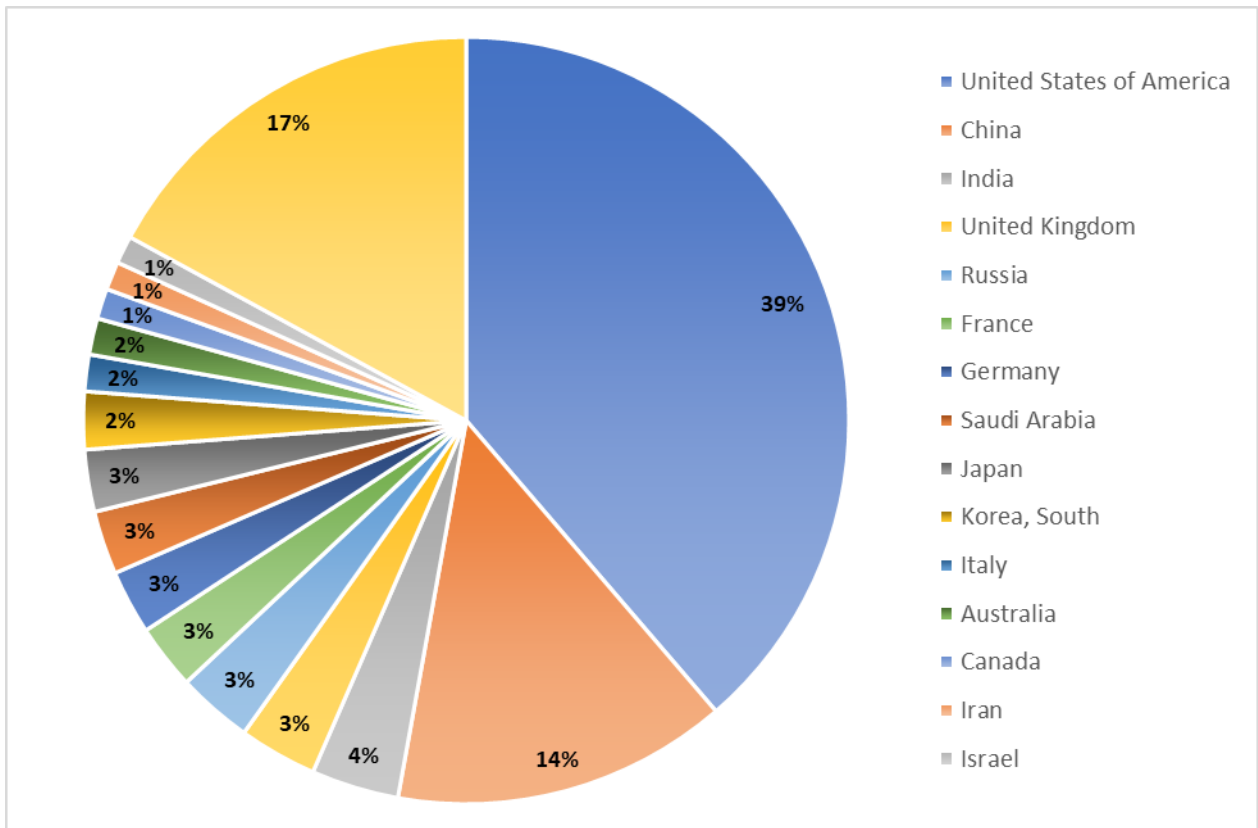
Key Region and Country Wise Defence Expenditure for CY 2021

FIGURE 8: REGIONAL DEFENCE SPENDING, 2021 (IN \$ BILLION)



Source: SIPRI

FIGURE 9: THE SHARE OF THE WORLD MILITARY EXPENDITURE OF THE 15 COUNTRIES WITH THE HIGHEST SPENDING IN CY 2021



Source : SIPRI

SIPRI indicates India is among the top 3 largest military spenders in 2021, which accounted for 3.7 per cent of world military spending. The country's defence spending grew by 5% between 2020-2021. The main factors influencing the growth of the expenditure is the ongoing conflict with Pakistan over Kashmir and the standoff with the Chinese in the North.

Israel as one of the key military spenders globally

In 2020, Israel's defence budget was approved for USD 21.7 Billion, which was an increase of 5.9% above the previous year. In 2021, military spending of Israel totalled USD 17.8 billion. In 2022, Ministry of finance intends to allot a defence budget of USD 17.95 billion. This new budget will assist the Israel Defence Forces to maintain its Defence dominance in the face of escalating threats, as well as defend the State of Israel's and other government ministries' interests. It will allow the IDF to proceed with its multi-year Momentum programme as India and Israel entered a strategic partnership in the year 1950, post which an immigration agency was set up in Mumbai by Israel. It was then converted to a trade office and a consulate. The two countries will be celebrating 30 years of bilateral ties in the year 2022. India is noted to be Israel's third largest trade partner with bilateral trade in segments including IT, telecom, agriculture, and pharmaceuticals. Several Indian software companies have been expanding their presence within Israel.

As of September 2019, the cumulative FDI from India to Israel was noted to be USD 118 Million. Israel's direct FDI into India is noted to be USD 254.66 Million. Israel's increased focus in safeguarding their defence security to face growing threats is poised to serve as a driver for their defence expenditure. India is also noted to be the largest recipient of Israel's arms exports, accounting for roughly 43% of the total export market share between CY 2016-20. The signing of the impending defence cooperation agreement is expected to bolster trade within this segment.

India is amongst the top 3 Defence spenders in the world.

Position in top Defence Spending	Country	Defence Expenditure in 2021 USD Billion	Defence Expenditure in 2020 USD Billion	Defence Expenditure as a percent of GDP (2021)	Percentage of Growth over 2020
1	US	800	778	3.5%	2.8%
2	China	293	258	1.7%	13.6%
3	India	76.5	72.9	2.4%	4.9%

Indian Defence budget accounted to around 2.4% of the total GDP. The size of defence forces, modernization program, and the escalated border tensions are fuelling the growth in defence budget. The Indian defence budget is divided into 4 main components, namely capital outlay (for new big-ticket acquisitions and modernisation), defence pensions, revenue (for smaller acquisitions of spares, maintenance costs), and miscellaneous, i.e. other administrative expenses.

Global Defence Industry and its Trends

Great power competition, modernization of armed forces, and new policy changes are driving the demand for Defence products.

Great Power Competition

The most significant shift in US defence strategy in the last two decades is captured in the 2018 National Defence Strategy. NDS is released every 4 years and is expected to be released in early 2022. The 2018 NDS reflects a change away from the counterterrorism emphasis of the "Global War on Terror" and shift toward "Great Power Competition."

The resurgence of power struggle has shifted the focus of US military force deployments around the world, putting a greater emphasis on deployments to counter Russian as well as Chinese military capabilities and less emphasis on deployments that serve other reasons.

In the Indo-Pacific area, the Department of Defence is engaged in activities aimed at competing strategically with China in the South and East China Seas. They also include a variety of activities aimed at strengthening the military capabilities of US allies in the region, particularly Australia, the Philippines, South Korea, Japan, and New Zealand. The activities also improve the ability of these countries' forces to work effectively with US forces and activities aimed at improving the military capabilities of emerging economies and security partners like Vietnam.

The emergence of great power competition with Russia, as evidenced by Russia's seizure and announced annexation of Crimea in March 2014, as well as Russia's current actions in eastern Ukraine, has prompted a renewed focus in US defence planning on strengthening military capabilities to counter potential Russian aggression in Europe. Electronic warfare systems have been used by both Russia and Ukraine in recent months to locate, disrupt and jam electronic and GPS signals from weapons and drones. Although both countries have made use of the technology, Russia in particular has invested in a wide range of equipment — from tactical close-range systems to ones that can supposedly disrupt enemies dozens of kilometers away. As such chances are high that global defence expenditure post-war may go high. Recently, Germany has announced increased defence expenditure pledging 100 billion euros — \$113 billion — into the country's notoriously threadbare armed forces. This is going to provide the impetus to the other European Union countries that are expected to follow suit. This is going to impact Indian defence expenditure too and hence Indian government will have no choice but to increase its defence expenditure too.

Modernization of Armed Forces

The increase in defence budget has accelerated the modernization programs across countries. These are in terms of new equipment and upgradation of older equipment. The Global programs are focussed on increase of air missile defence systems and unmanned platforms in countries where their assets are relatively in the mid-life stage. In countries like India the prioritization is on modernization of air assets which includes fighters and rotary platforms. The Indian defence market has been primarily an import dependent market; however, the increased focus on self-reliance in defence is expected to create more opportunities for the domestic industry in the future.

Technology Trends

In future battles, technological superiority will become increasingly important. With the impact of new and developing technologies during the last two decades, particularly in the sectors of electronics, miniaturization, materials, and computation, warfare has already undergone rapid changes. This has had a significant impact on the creation of more adaptable systems in a variety of applications, from communications to sensors and guided weaponry. Computing technology has also made its way into systems across every warfare capacity, giving modern warfighting a new dimension.

5G, Quantum Technology and Electronic Warfare are noted to be some of the key technology trends within this market. 5G technology plays a crucial part in the future battle network with the potential to connect millions of transceivers within a given region simultaneously. In 2021, Verizon, an American wireless network operator, and Lockheed Martin (American aerospace, arms, defence, information security, and technology corporation), signed a new partnership to work on 5G. It promises continuous high-speed data connectivity, considerably better intelligence, surveillance, and reconnaissance (ISR), quick and swarming unmanned vehicles, secure command and control, more efficient logistics, and widespread usage of augmented reality and virtual reality technologies.

Modern warfare has made significant progress in the areas of communications, and surveillance. Military Signal Intelligence (SIGINT) platforms are attempting to cover the spectrum from HF to Ka band, often with a large dynamic range. Machine learning can be used to improve EW technologies. The Russia-Ukraine war is showcasing cyber and electronic warfare and their consequences for connectivity and communications. Both Russia and Ukraine have been employing cyberattacks and jamming to disrupt each other's forces on the battlefield. The U.S. is supplying Ukrainian troops with tactical communications equipment as well as electronic warfare kit. This threat in the future will drive demand for upgrades to communication equipment and electronics.

Impact of COVID 19 on Defence Industry

The Defence industry is a critical sector that can withstand economic downturns. The geopolitical circumstances, political position, and national strategic plans have a larger effect on defence spending rather than the economy. The impact of COVID on the defence sector was minimal from a defence budgetary perspective, however the defence manufacturing companies did feel the pressure due to supply chain related issues.

Negligible Effect of COVID 19 on Defence Spending

Defence spending trends demonstrate that it is influenced by a variety of factors, including GDP growth, regional security climate, geopolitical challenges, technology obsolescence, and new policy changes. This is evidenced by a 2.6 percent increase in global Defence spending to USD 1.98 trillion in CY 2020. India's defence budget has also increased in the last two years despite the COVID economic impact due increase in global and national geopolitical uncertainty because of Chinese aggression.

Resilience of Defence industry

COVID-19 has not had a considerable effect on Indian military spending. As per the Standing Committee Defence, Demand for Grants, 2021-22 (19th Report), allocations continued to increase despite some initial COVID-19 related supply-side shocks. The industry continued to be buoyant as several high value contracts which would see significant participation from the indigenous industry, such as C-295 procurements, and additional Main Battle Tanks orders were signed. With policy changes that further greater domestic participation, and several Indian defence companies having shored up indigenous Research, Development, testing and Evaluation (RDTE), the industry has been made resilient through as steady supply of orders and indigenous industry capability development.

On the international stage, national security threats continue to evolve, and the military is continually developing and deploying new technologies. Technologies like Hypersonic missiles, which are far faster, less detectable, and more difficult to intercept than standard long-range ballistic missiles are being developed by countries like China. As a warfighting area, space will be a new arena that will necessitate superior satellite, communications, and resilience capabilities. Countries like the US have established Space forces to ensure securitization of space resources. Other areas that will continue to be emphasized and updated in a fast-changing environment include electronic warfare, cybersecurity, nuclear deterrent, and autonomous/unmanned systems.

Countries are always racing to keep ahead of their competitors and address perceived threats. Military spending, which includes constant defence investments by China,

Russia and North Korea as well as Iran's pursuit of nuclear weapons, shows no signs of slowing down, and is expected to compel ongoing defence spending by the US and its allies.

Worst of supply chain and program disruptions are behind us

Due to the pandemic-related lockdowns, defence manufacturers experienced early supply chain and delivery delays. For instance, in 2020, due to supply chain interruptions caused by the COVID-19 epidemic, the Ministry of Defence (MoD) had extended the delivery period associated with existing capital acquisition contracts by four months.

The business landscape is changing with governments favouring indigenous supplier and domestic capability

The ongoing appeal for "ATMA NIRBHAR BHARAT" has contributed to the momentum for achieving self-sufficiency. Streamlined as well as transparent procurement procedures, 'Make in India' programmes, and production policies have all helped to boost demand for Indian products over the years. The Indian defence sector has evolved with a diverse product mix and market, mostly catering to the needs of the Armed Forces. India is poised to achieve its promise as an emerging defence manufacturing base, buoyed by recent export accomplishments.

Impact of Russia Ukraine War on Defence Industry

The war is having immediate effect on the defence industry with changes to military spending patterns. For decades, defense spending has been a steady, predictable business. The Ukraine war has required leadership teams to abruptly adapt their operations and strategy to a new set of priorities. NATO members in addition to other non members such as Sweden and Finland have announced broad expansion of military budgets for new procurements.

In the weeks following Russia's invasion, Congress approved its largest-ever defence spending bill, while U.S. allies in Europe pledged to dramatically ramp up their defence spending to counter the Russian threat, measures that will bring lucrative new contracts to the arms industry. Germany has already pledged more than \$110 billion into the armed forces. Poland, Sweden and Italy, have announced they will increase their defense budgets.

Even though many countries have their own defense industrial base, they don't make everything they need themselves. So there is likely to be ample opportunities for defence electronics from contractors the world over.

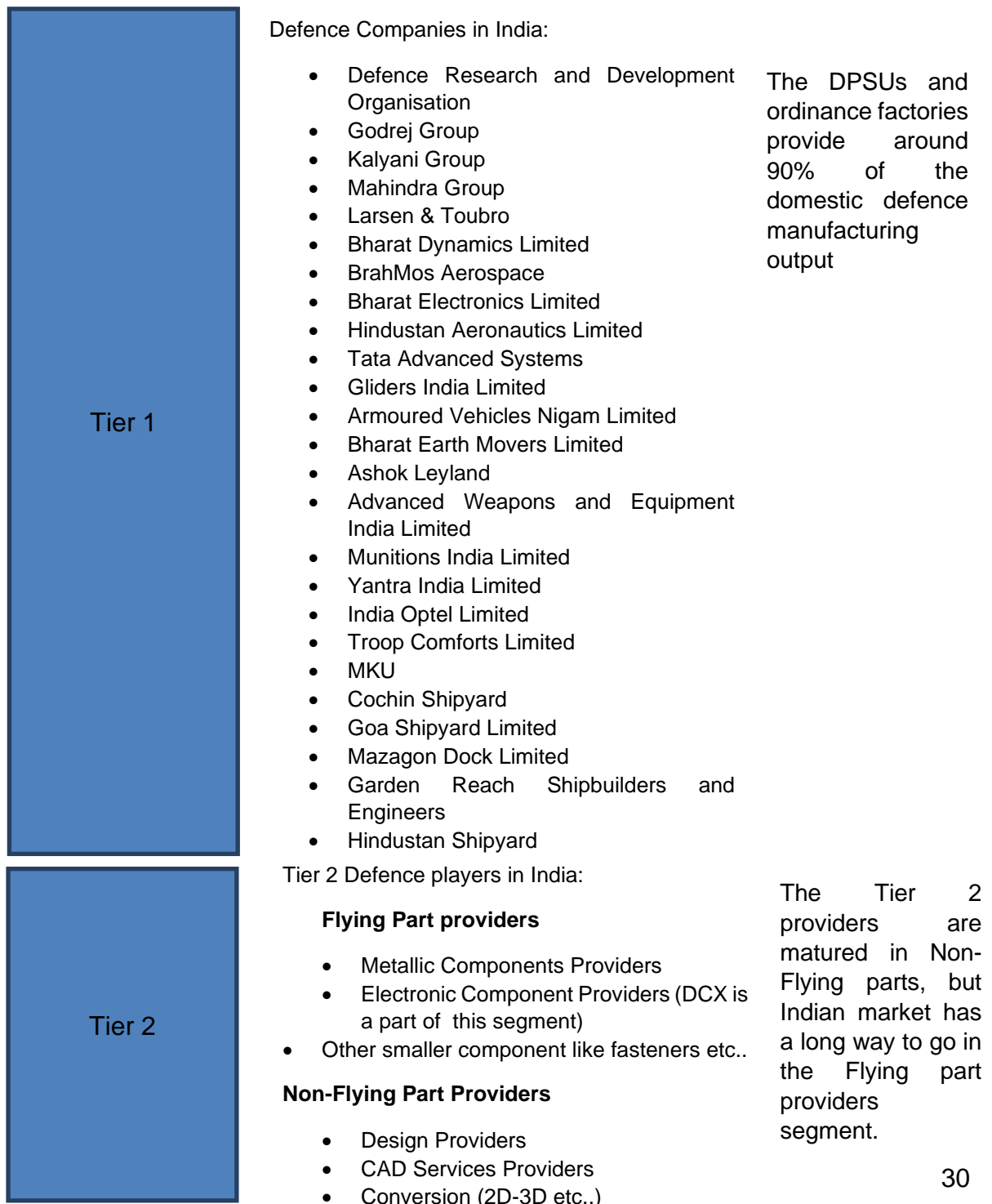
To modernize their armed forces for the next generation of threats, the US and the European Union (EU) are rethinking which technologies and systems to prioritize. In

response, leading aerospace and defense companies are accelerating development of integrated and autonomous systems, precision-guided missiles and missile defense, cyber and digital capabilities, and hypersonic weapons.

Indian Defence Industry

The Indian Defence Industry is a mix of DPSUs, large private players, and smaller but niche suppliers such as DCX. The DPSUs are a part of the Tier-1; the other major private players in Tier 1 and Tier 2 are shown in figure below. There are roughly 16 public sector undertakings under the administrative control of the Department of Defence Production, MOD.

Tier 1 Tier 2 and Tier 3 classification for DPSUs



The DPSUs fuel the growth of Tier 2 and Tier 3 companies. Whilst the origin of Indian DPSU was tied India's ambitions to indigenize production of major defence platforms, the path taken had several drawbacks. DPSUs were driven to cover the entire spectrum of defence manufacturing, including development of platforms, and production of all tiers of subsystems and components. This led to inefficiencies within the system and a lack of specialization, due to which India lagged behind on the development of several key "critical technologies" (jet propulsion and naval engines for example), and the development of air and land platforms. The current political dispensation seeks to address these deficiencies, by containing the focus of DPSUs to platform development, whilst leaning on several private defence companies to fulfil tier 2 and tier 3 roles. Several DRDO projects such as Design & Development of Integrated Active Circular Antenna, DSP Design for FMCW Radar, Wideband antenna and RF front end for transceiver module, etc., could lead to product production plans with a high involvement of indigenous private companies.

Policy and Regulations Affecting Industry and Company

The defence manufacturing industry in India is an integral segment of the country's economy. With increased national security concerns, the industry is set to grow substantially. The ongoing territorial conflicts between India with China and Pakistan over the ownership of the North-Eastern State of Arunachal Pradesh, and the Northern State of Kashmir have led to the requirement of enhanced border security forces.

India is noted to be among the top importers of defence equipment over the last five years to gain technological advantages over competing countries such as Pakistan and China. The GOI has taken many measures to stimulate 'Make in India' operations through policy support programmes in order to modernize its armed forces and minimize reliance on overseas defence acquisition. As a result, India is working achieving self-sufficiency in defence manufacturing due to the introduced the Aatma Nirbhar Bharat initiative which is poised to boost indigenisation in the Defence sector.

The 'First Positive Indigenisation' List, which includes 351 new items to be indigenised, was notified in December 2021 as part of the government's 'Atma Nirbhar Bharat Abhiyan' initiative to encourage indigenization in the defence industry.

In March 2022, the Ministry of Defence (MoD) notified a "Second Positive Indigenisation List" of over 107 items that would be banned for import beyond the time indicated against them. These 107 products of Defence equipment should be manufactured through indigenous sources. The list comprises 49 products that will be barred from being imported after December 2021. It also includes 21 items that are to be banned after December 2022, as well as 17 items which are to be banned in the exports segment after December 2023. Additionally, 13 other items are to be barred after December 2024, while eight items are to be manufactured domestically after December 2025. Helicopters, Air Borne Early Warning and Control (AEW&C) systems, Next Generation Corvettes, Medium Power Radar for Mountains, Tank Engines, MRSAM Weapon Systems, and other complex systems, sensors, simulators, weapons, and ammunition are among the items on the 'Second Positive Indigenisation List,' which are designed to meet the needs of the Indian Armed Forces.

This second list will be adopted in stages, beginning in December 2021, and ending in December 2025.

This list gives ample opportunities to 'start-ups' and MSMEs through this initiative. The Ministry of Defence, the Defence Research and Development Organization (DRDO), and Service Head Quarters (SHQs) will take all necessary steps to ensure that the timelines set forth in the 'Second Positive Indigenisation List' are met, thereby facilitating an environment for Indian Defence Manufacturers to build world-class infrastructure and contribute to the Government's 'Make in India' vision of making India self-reliant in defence sector.

The Third list was released in August 2022 to boost self reliance and includes a fresh list of 780 components and subsystems which will only be procured from domestic industry after a ban on their import starts under a staggered timeline of around six years. The Ministry of Defence has set specific timeline for import ban of the items, spanning a period from December 2023 to December 2028. The indigenisation of these items will be taken up through different routes under 'Make' category of procurement procedure. The indigenous development of these LRUs, sub-systems and components is meant to bolster the economy and reduce the import dependence of DPSU's. The decision looks to localise systems for Russian platforms like Sukhoi Su-30MKI, T-90 Tank and the Kilo-class submarines.

Legal and Regulatory Framework

Policy	Ministry of Defence	All Defence and Security Related Matters
Legislations and Procedures	INDUSTRIES (DEVELOPMENT AND REGULATION) ACT, 1951	Governs industrial licensing for manufacture of defence items
	DEFENCE PROCUREMENT PROCEDURE, 2016	Governs procedure for capital acquisitions in the defence sector
	FOREIGN DIRECT INVESTMENT POLICY & REGULATIONS UNDER FOREIGN EXCHANGE MANAGEMENT ACT, 1999 (FEMA)	Governs policy on foreign direct investment and regulations on foreign exchange
	OTHER ACTS (Indian Army Act, 1950; Indian Air Force Act, 1950; Indian Navy Act, 1957)	Statutory provisions and supplementary rules concerning government, regulation, administration, enrolment and discipline of the Army, Air Force and Navy
Regulators and Agencies	DEPARTMENT OF INDUSTRIAL POLICY AND PROMOTION, MINISTRY OF COMMERCE & INDUSTRY (DIPP)	Formulation and implementation of industrial policy, including the relevant FDI policies from time to time.
	DEPARTMENT OF DEFENCE PRODUCTION, MINISTRY OF DEFENCE	The primary agency dealing with the production of defence equipment in India.
	DEFENCE ACQUISITION COUNCIL, MINISTRY OF DEFENCE	Responsible for the purchases to be made for the Indian defence forces.
	DEFENCE OFFSETS MANAGEMENT WING, MINISTRY OF DEFENCE	Review the post contract status of all the offset agreements entered into by IOPs.

Since the advent of the Industries (Development and Regulation) Act, 1951, the defence sector was considered as one of the main domain of the Government. When

the sector officially launched, just 26% FDI was permitted. Most international original equipment manufacturers were reluctant in joining joint ventures because they lacked appropriate control over where they could settle and had no say over which industry they would collaborate with. Increases in the sectoral cap on defence investment boosts the industry growth.

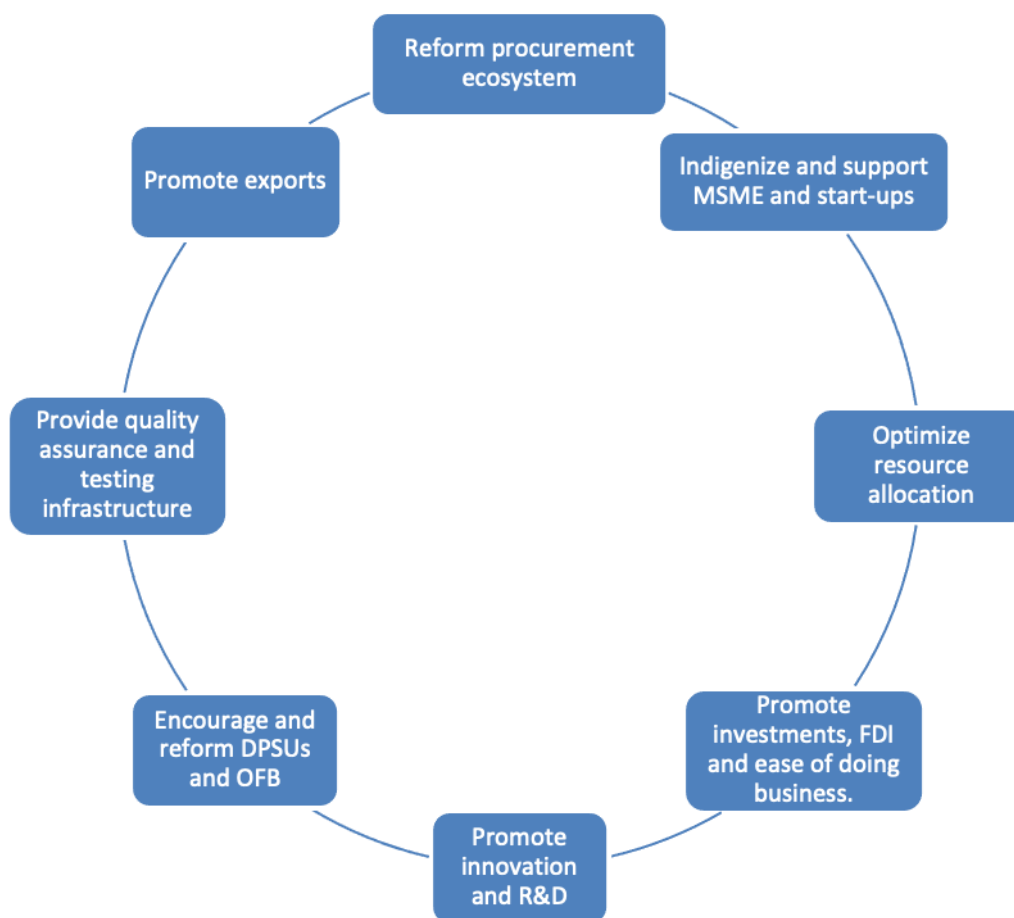
The FDI policy in the defence sector was increased from 49% to 74%. Some of the key developments in the policy are noted below:

1. The FDI in the defence sector is subject to scrutiny on the grounds of National Security and the GOI reserves the rights to review foreign investment.
2. Through the liberalised FDI policy, the government plans to attract foreign players to set up manufacturing units in India.
 - The Indian Defence segment plans to achieve a turnover of INR 1.75 Lakh Crore. Exports worth INR 35,000 Cr are aimed by the year 2025. -In 2019, the total defence industry in addition to aerospace and shipbuilding sector was estimated to hold a total net worth of INR 80,000 Cr.
 - The government has adopted the DPEPP 2020 (Defence Production and Export Promotion Policy 2020) that aims to propel indigenous defence production in India and increase exports.
 - The government has also adopted a negative imports list for defence equipment. It consists of a list of equipment which will not be imported into the country. The objective was to reduce the defence import bill.
 - The GOI has also inaugurated two defence industrial corridors in both Tamil Nadu as well as Uttar Pradesh to drive the “Make in India” initiative.

Regulations and Licensing Standards for the Indian Defence Sector

The Defence Production & Export Promotion Policy (DPEPP) 2020 reforms outline the quality standards imposed on defence production as well as exports. The policy lists goals including increasing the competitiveness of the Indian defence sector by propelling the dynamic and robust production. The aim of the DPEPP 2020 reforms is aimed at reducing imports dependence in India thus furthering the agenda for Atmanirbhar Bharat. India’s present import reliance is noted to be 15% of the global market value. The Defence Production and Export Promotion Policy 2020 is based on 8 pillars, i.e.

FIGURE 10: PILLARS OF DEFENCE PRODUCTION AND EXPORT PROMOTIONⁱⁱ



Increasing the market share for Indian Intellectual property and promoting R&D within the Indian defence infrastructure are also some of the objectives to be attained via the DPEPP 2020 reforms.

The Ordnance Factories (OFBs) and Defence Public Sector Undertakings (DPSUs) segment of the policy covers the various defence equipment manufacturing segments covered by the Indian government. It is pertinent that the organizations under this banner are reformed to prepare themselves for future collaborations with OEMs in the private sector. Some of the strategies proposed in the DPEPP 2020 include:

1. Ordnance factories are poised to be corporatized to make them competitive and to increase the percentage productivity.
2. DPSUs are to be positioned as system integrators to create a multi-tier domestic supply chain.
3. Maximum outsourcing from indigenous sources is to be done via mandating OFB/DPSUs
4. Disinvestment of DPSUs will be pursued.
5. Focus will be laid on modernization and technology upgradation programs in coordination with Services/ DRDO.

6. Innovating strategies are to be implemented by the government in order to promote the proliferation of Industry 4.0 amongst DPSUs. Tools like digital threading are to be used in order to incorporate Industry 4.0. Technologies like time stamping are also to be implemented via the use of blockchain technology and Artificial Intelligence.
7. A partnership model is poised to be formulated for the manufacturing and development of critical components as well as technologies in DPSUs/OFB to promote indigenous capabilities.

The OFB and DPSUs proposal is poised to address issues concerning with major source delay and stagnation in the manufacturing domain.

The implementation of defence equipment takes place after a cumbersome testing procedure. The QA (quality assurance) aspect of project implementation is undertaken by organizational reforms like DGQA and DGAQA. One of the key steps to be taken is the implementation of “Zero Defect Zero Effect” policy by the MSMEs which is expected to increase their quality standards. It would also help the industry with adopting self-certification standards and Green Channel route. The implementation of these schemes is also expected to bolster the Ease of doing Business within the Defence sector.

Barriers to Entry

The high levels of investment and access to the existing intellectual property, as well as the unique and bespoke facilities occasionally required, can create significant barriers for entry to new providers. This can make securing value for money and encouraging innovation difficult, as well as limiting the opportunity for serious competition at the top level.

Public Sector Driven- India has four companies including Indian ordnance factories, Bharat Electronics Limited (BEL), Hindustan Aeronautics Limited (HAL), and Bharat Dynamics Limited (BDL) among the top hundred popular arms producers of the world. These four companies are all government-owned and account for most of the domestic arms demand. Public policy was initially skewed towards public participation in defence, which led to DPSUs monopolizing several verticals of defence production and development. Their control over supply chains and reluctance to outsource used to be a major drawback for private players entering the industry (Note that this is poised for a major change with private sourcing a key policy feature of current defence policies).

Requirement of Key Technology Capabilities: Indigenous manufacturing is hampered by a lack of design capability in crucial technologies, insufficient R&D expenditure, and the inability to manufacture major subsystems and components. The interaction among production agencies (public or commercial), R&D, and end-users is poor. Several capabilities were monopolized by the DPSU, which hindered development of private R&D and innovation in defence.

Long Gestation Period: The establishment of a manufacturing base requires significant investment in both capital and technology, as well as a lengthy gestation time. It could take five to ten to even fifteen years for a factory to reach optimum levels of capacity utilisation by the time a unit begins production. More than 200 defence purchase proposals with a transfer of technology provision have been approved by the GOI over the last five years, with a total value of around Rs 4 trillion. Most of them are now in the early stages of processing. The long gestation period would require a strong financial backing for any new entrant.

Indian Market Industry - Brief

In the 1960s and 1970s, India built on its domestic defence production capacity with aid from countries such as the Soviet Union and the United Kingdom, largely through licence assembly.

While India purchased platforms and equipment, it also began building vital equipment such as missile systems on its own. The Defence Research and Development Organisation (DRDO) began developing indigenous missile systems in 1982-83. Short-range surface-to-air missiles like the 'Prithvi' and 'Akash,' as well as anti-tank guided missiles like the 'Nag,' were among them. The Prithvi missile system was first deployed in the Indian Air Force in 1994, followed by the Akash missile for the Indian army in the following year. The third-generation Nag underwent a user trial in October 2020, and the system is currently undergoing induction.

Apart from pursuing efforts to create indigenous missile systems, India and Russia signed an agreement in 1998 to develop the 'Brahmos,' a supersonic cruise missile system. This is the world's fastest supersonic cruise missile, capable of being launched from ships, submarines, or planes. In 2006, Brahmos was successfully inducted. The Aatmanirbhar Bharat Abhiyaan was created by the Indian government in response to the pandemic's economic impact. The word can be translated as "self-reliance" or "self-sufficiency," and it emphasizes the need of eliminating external economic dependence.

During the period 2015-19, India's arms imports amounted for approximately 10% of global totals. India's arms imports, on the other hand, plummeted by 33% between 2011 and 2016. Self-sufficiency in defence & security demands is crucial to India's ability to reduce its dependency on other countries for an emergency procurement.

India's border conflicts with Pakistan and China over regions including the Northern State of Kashmir and the North-Eastern State of Arunachal Pradesh, respectively, have increased demand for defence equipment in India. India is noted to be one of the key importers of defence equipment. The market competitiveness has been growing due to the tense geo-political environment.

The MOD has undertaken some measures to promote India's "Make in India" defence manufacturing agenda. Foreign direct investment (FDI) limitations in the defence sector have been lifted to 74%, up from 49% 2020. 68% of capital procurement budget under the Union Budget 2022-23 to be earmarked for domestic industry to promote self-reliance & reduce import dependency. The Defence Procurement Procedure (DPP) 2016 has been revised to form the Defence Acquisition Procedure (DAP) 2020, which is focused on increasing Indian defence sector self-reliance.

The government is actively encouraging the involvement of the private sector in defence acquisition to allow the domestic industry to manufacture high-tech weapons and equipment. The Ministry of Defence (MoD) established the Innovations for Defence Excellence (iDEX) awards in April 2018, and they are an important step toward creating an environment that fosters research, innovation, and technological

development. MSMEs, research and academic institutions, and start-ups have been given an opportunity by iDEX to contribute innovative solutions to the armed forces.

Technology Trends and R&D

As the Indian military move towards increased situational awareness, stealthier operations, and more lethal weapon systems, several major trends govern the nature of defence equipment related demand.

- Expanding Chinese Electronic Warfare capabilities are a concern to India. China has demonstrated GPS jamming capabilities over the past few years. The demand for jam resistant communication and situational awareness solutions is thus on the rise.
- Economic pressures are driving many commercial and governmental operators within the military toward purchase of Commercial off the Shelf (COTS) products. These products have a favourable cost-to-performance ratio. Militaries are finding it difficult to improve the capability of its existing systems by relying solely on evolutionary upgrades achieved through its standard practices which they were not designed for. Advances in COTS hardware are thus enabling new opportunities for a hardware support model that facilitates continuous deployment of warfighting capabilities.
- Several countries are in the process of modernizing their armed forces by improving the capability of their dismounted soldiers with improved situational awareness solution including blue force tracking capabilities. Increasingly these modernization programs have a requirement for the integration of tactical unmanned solutions that can extend the forces intelligence capabilities.
- Maintaining connectivity links whilst on the move as part of maneuver brigade operations is driving the adoption of based tracking and communication capability as a norm in many nations.

The Defence Research and Development Organisation (DRDO) conducts defence research, with a focus on sophisticated technologies such as nanotechnology, artificial intelligence (AI), photonics, cyber technology, and quantum computing. The high R&D spending trend is projected to continue, boosting the defence manufacturing business. Artificial Intelligence and Robotics will be important in a variety of defence applications. Unmanned systems are anticipated to dominate future warfare systems. AI can provide a variety of options for military applications at the strategic, operational, and tactical levels, including autonomous unmanned systems, intelligence, data analysis, information processing, training, warfare simulation, defence, offence, and command information warfare, to name a few. The DRDO has a dedicated AI laboratory called the Centre for Artificial Intelligence and Robotics (CAIR). CAIR is working on a project to establish a Multi Agent Robotics Framework, which will provide India's military forces with a team of robots. CAIR has also created a tool called Network Activity Analysis (NETRA) that can track internet traffic. It can analyse audio traffic travelling through software including Skype and Google Talk in real time and intercept

conversations containing the terms attack, bomb, and blast. Recently, the Indian Army set up a quantum laboratory at the Military College of Telecommunication Engineering (MCTE) in Mhow, Madhya Pradesh. India and Russia have agreed to invest Rs 5,000 crore in a joint venture in Amethi, Uttar Pradesh, to manufacture roughly 6 lakh AK-203 rifles. Furthermore, the agreement extends military technology collaboration from 2021 to 2031. India and Israel have teamed up to develop cutting-edge defence technology such as artificial intelligence, drones, and robots. The Bilateral Innovation Agreement was signed between Israel's Directorate of Defence Research and Development (DDR&D) and India's DRDO. In September 2020, BEML Ltd. was awarded a contract by the Ministry of Defence to provide 330 High Mobility Vehicles to the Indian Army. This order for the Pinaka project is valued at INR 842 crore. Pinaka is a multi-barrel rocket launcher which was developed domestically for the Indian Army and manufactured in India by a consortium of public and private defence companies. Moreover, the Defence Research and Development Organisation (DRDO) stated in January 2021 that it will fund at least 30 start-ups every year to develop innovative solutions for the Indian military. Continuous development in technology disruptions and receiving orders for producing indigenous military products will boost Indian Defence production capabilities.

Effect of Geo-Politics on Indian Defence Spending

The constant tensions amongst India and its bordering countries have acted as a major drive for increase in Indian Defence spending.

The border confrontation with China compelled India to purchase smart air-to-ground weapons, rockets, missiles, GPS-guided artillery ammunition, air Defence systems, and assault rifles at a faster rate. Moreover, in 2020, India imported weaponry from the US, France, Russia, and Israel. According to the ministry, the capital budget allocation increased by 18.75 percent in FY 2020-21 and 12.6 percent in FY 2021-22.

Tensions associated with military conflicts between nuclear armed neighbours owing to the conflicts in Kashmir have increased the threat of terrorist action by Pakistan based militant troops.

The GOI has abrogated to abolish Article 370 of the Indian constitution which removes Jammu and Kashmir's special status, in August 2019, followed by the deployment of several army and paramilitary forces to the region.

At least forty soldiers were killed in an ambush in February 2019, on a convoy of Indian paramilitary forces in India-controlled Kashmir. The attack in Kashmir was the worst ever in the last three decades. India claimed to have performed airstrikes inside Pakistan against a terrorist training site. As a result, the deterioration in ties with China and Pakistan- resulting in emergency procurements, increased defence budgets.

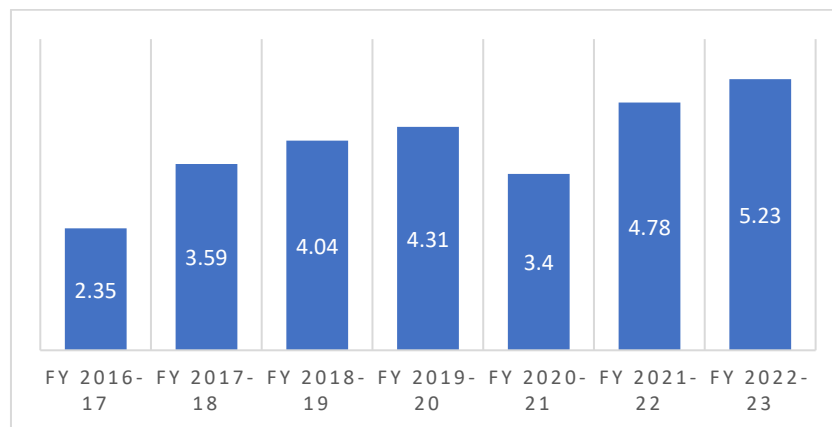
Before the Russia Ukraine war, India was navigating a difficult geopolitical landscape with the Chinese threat. Russia has been a source of strength in Indian military and foreign policy, but the war in Ukraine has diminished Russia. It has brought China and Russia closer, which is problematic for India. A 2020 report estimated that 90 per cent

of defence equipment, weapons and platforms presently used by the Indian Army had originated from Russia. Nearly 86 per cent of the defence equipment currently in military service in India had origins in the former Soviet Union. As such the Indian military cannot fully operate effectively without Russian-supplied equipment and will continue to rely on Russian weapons systems in the near and middle term. However, in the last decade, its reliance on Russian weapons has reduced and it has gradually bought more equipment from other countries - noticeably from France, but also from Israel and the US and, to a lesser extent, the UK.

Indian Defence Budget Brief and Forecast

India's Defence budget outlay for the financial year 2022-23 is INR 5.25 L Cr the annual budget representing a 10% increase over the budget of INR 4.78 L Cr in 2021-22. The Indian Defence Budget has experienced a CAGR of 14.3% between the period FY2017 to FY 2023.

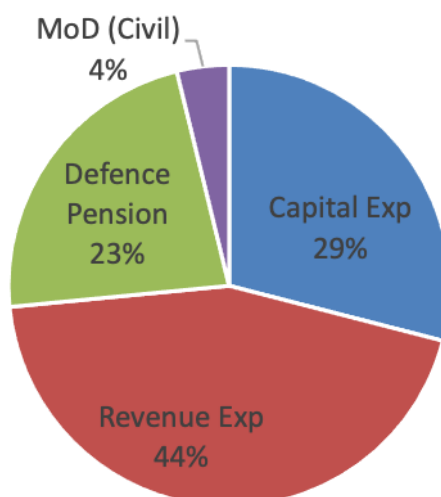
FIGURE 11: DEFENCE BUDGET GROWTH FY 2017- FY 2023 (LAKH CRORE)



Note: Value of Defence budget in INR Lakh Crore

The defence budget has 4 main components: MoD (Civil), Capital Outlay on Defence Services, Defence Services Revenue and Defence Pensions, and not all of it is available to the defence industry participants. Examination of the allocation for different code heads for defence budget of FY 2023 (INR 5.25 Lakh Crore), and their description is as below:

FIGURE 12: FY 2023, DEFENCE BUDGET BREAKDOWN



Source: <https://www.livemint.com/budget/news/budget-2022-rs-5-25-lakh-cr-allocated-for-defence-focus-on-domestic-players-11643717126430.html>

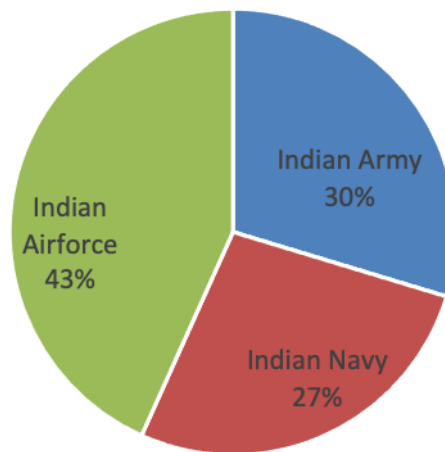
TABLE 2: DEFENCE BUDGET COMPONENTS DESCRIPTION

Code Head	Description	Analysis
Revenue Expenditure	Defence Services Revenue comprises revenue expenditure of all the 3 services, in addition to the expenditure of Ordnance factories, and Research and Development (R&D). The major heads are pay and allowances of serving personnel, transportation, works, stores, special projects, repairs and refits, and miscellaneous expenditure.	The revenue component amounts to INR 233000 Cr / 44% of the total allocation in FY 23 ⁱⁱⁱ .
Capital Expenditure	The Capital Outlay on Defence Services encompasses all the acquisitions expenditure of the three services in addition to the capital acquisition of ordnance factories, R&D, DGAQA (Director General Quality Audit), and prototype development under the Make procedures.	The allocated capital expenditure amounted to INR 152369 Cr / 29%. in the defence budget FY 23

Code Head	Description	Analysis
MoD (Civil)	MoD (Civil) deals with the expenditure of the civilian personnel in defence services.	The allocation is not available to the defence industry, and amounted to INR 20100 Cr / 4% in FY 23 budget
Defence Pensions	Defence Pensions is allotted for pension and allowances of retired personnel	This allocation is not relevant to the market, amounting to INR 119696 Cr/ 23% in FY 23 budget

Capital Outlay Indian Defence Spending Across Forces

FIGURE 13: DEFENCE BUDGET CAPITAL OUTLAY ACROSS FORCES FY 2022-2023



Source: www.idsa.in

TABLE 3: CAPITAL OUTLAY ALLOCATION ACROSS FORCES (IN INR CRORE)

Capital Outlay (INR Cr)	FY 2022-23	FY 2021-22	YoY Growth
Indian Army	32,015	36,481	-12.24%
Indian Navy	47,590	33,253	43.11%
Indian Airforce	55,586	53,214	4.46%
Total Outlay	1,35,191	1,22,948	9.05%

Note: Source: MINISTRY OF DEFENCE

The capital outlay for Indian Army has witnessed a reduction of around 12 percent compared to the previous fiscal. In the previous fiscal Indian Army could spend 25,377 Crores as compared to the allocated budget of 36,481 Crores. The modernization programs across the Indian Army have been slow especially because of policy

paralysis on way forward for several high value programmes such as the Boyevaya Mashina Pjehoty (BMP) replacements.

The capital outlay for Indian Navy experienced a 43% increase owing to the threats in the Indian Ocean Region (IOR). Indian Navy was able to spend around 90% of the capital outlay allocation for the previous fiscal, which is the highest amongst the three forces.

The Indian Air Force retained the largest share of the capital outlay accounting to around 43%, and grew at 4.5% compared to the previous fiscal.

Modernization drive in India including Major programmes of the Indian Army, Navy and Air Force

India has begun a comprehensive military modernization program that includes the purchase of new rifles, combat aircraft, ammunition, carbines, and artillery, rotary-wing aircraft, and force multipliers such as electronic warfare suites, network-centric warfare, and air-Defence systems, among others.

Military modernization programs are poised to account for USD 130 Billion in the coming 5 years.

The Indian Army has lagged in terms of modernization, and numerous projects are planned to be completed in the coming three to seven years. The Abhay Infantry Fighting Vehicle (IFV), Arjun MKIII, and TATA Kestrel are the three key indigenous defence platforms being developed by the Indian Army. At present, the T-72 and the T-90 tanks, both procured from Russia and assembled in India, are the mainstay of the Indian Army. However, chunk of this arsenal consists largely of T-72 tanks which have lived their life and are under the process of being upgraded extending their life till 2022. A request for information was sent to 12 Main Battle Tank manufacturers to acquire 1,700 with partly local production to replace the T-72 tank. Additionally there is a RFI by the Indian Army on 23 June 21 for 1750 FICV (Tracked) in line with the Defence Acquisition Procedure (DAP)- 2020, under the 'Make in India' and 'Atmanirbhar Bharat' programs to replace the BMP-2. For air operations, 36 Rafale fighter jets were recently purchased, with intentions to purchase another 100 fighter jets under the strategic partnership concept. This is in addition to the 83 indigenous Tejas Mk1 A aircraft that will be purchased. Boeing has recently completed procurement of AH-64 Apache and Chinook helicopters for the IAF and Army. India's new aircraft carrier will be equipped with MiG-29K fighter jets. However, the Indian Navy is already hunting for multi-role naval fighters for INS Vikrant with the navy being interested in procuring a twin-engine aircraft. At present Boeing's F/A-18E/F Super Hornet and Dassault's Rafale-M are being considered.

By 2035, the Indian Air Force aims to have 42 squadrons and deploy 450 fighter jets at Pakistan's and China's borders, respectively. The Indian Air Force will also acquire a large number of stealthy swarm drones (ALFA-S), autonomous unmanned aerial vehicles (DRDO AURA), and unmanned aircraft to transition into a fully advanced

Network-Centric Force capable of sustained multi-role operations throughout the spectrum. The Indian Fleet has 43 vessels under construction as of 2020, including corvettes, aircraft carriers, frigates, destroyers, and conventional and nuclear-powered submarines, with a goal to develop a powerful navy of 200 vessels and 500 aircraft by 2050.

DCX works with space organisations like Indian Space Research Organisation, research organisations like Defence Research and Development Organisation, Indian Defence forces (Army, Navy and Air Force) and PSUs – Bharat Electronics Limited, Bharat Dynamics Ltd, Hindustan Aeronautics Limited and Mazagaon Dock yard Limited, Ordnance Factory Board. The modernisation programs of Indian Air Force, Indian Navy, and Indian Army as listed below could be expected to enhance the revenue opportunities for companies like DCX:

TABLE 4: INDIAN NAVAL PROGRAMMES

IN Programs	Description	Effect on Private Industry
Aircraft Carrier Program	<ul style="list-style-type: none"> The refitted and modernised former Russian ICBM Admiral Gorshkov, commissioned as INS Vikramaditya, is the sole aircraft carrier engaged in flying operations with MiG 29K fixed wing fighter. The modernisation has added a new dimension to the capabilities of the Indian Navy. The construction of a 37,500 tonne Indigenous Aircraft Carrier (IAC-1) is underway and set to be commissioned as INS Vikrant. INS Vikrant will have a combination of 30 aircraft, which includes MiG-29K fighters and AEW helicopters (e.g., Kamov Ka-31). 	INS Vikrant is the first carrier which has been built indigenously, and has benefited the entire supply chain. The likely commissioning of IAC 2 will have an even higher indigenous component, including defence electronics which will benefit the public sector shipbuilding units and private industry like L&T.
Projects 17 & 17A	<ul style="list-style-type: none"> Mazgaon Dock Shipbuilders Limited (MDL) has commissioned 4 ships of Project 17 stealth frigates that are capable of carrying 2 advanced multi-role helicopters. The 7 stealth frigates with advanced features and 	The Indian navy programs have achieved a significant level of indigenisation and manufacturing by DPSUs. This bodes well for the entire defence

IN Programs	Description	Effect on Private Industry
	<p>technology upgrades are a part of the Project 17A programme.</p>	<p>industry associated with the naval programs</p>
<p>Projects 15A & 15B</p>	<ul style="list-style-type: none"> • Project 15A involves the construction of additional Delhi-class guided missile destroyers that have stealth and advanced features. • Project 15 B involves similar calls of ships and will be constructed by MDL. 	
<p>Project 1135.6-Talwar Class</p>	<ul style="list-style-type: none"> • INS Tej, Tarkash, and Trikand were commissioned as Talwar Class stealth frigates with the replacement of Klub missiles with the BrahMos system. 	
<p>Project 28 ASW Corvettes</p>	<ul style="list-style-type: none"> • GRSE, Kolkata has indigenously designed and built 4 stealth Anti-Submarine Warfare (ASW) corvettes with minimised radar profiles for stealth capability. 	
<p>Carrier Borne Multi Role Fighters</p>	<ul style="list-style-type: none"> • The 4th generation MiG-29k is now the flagship fighter of the air wing of INS Vikramaditya. Initially, MiG-29K and the naval version of the Tejas were considered for the air wing of the under-construction IAC-1, Vikrant. However, the Indian Navy has begun the search for a Multi-Role Carrier Borne Fighter (MRCBF) for IAC-1. • Global manufacturers have responded to the RFI put out by the Indian Navy, answering questions on technical parameters, level of indigenisation and ToT agreements. Dassault, SAAB, MiG, Boeing, and Lockheed Martin were some of the 	<p>Neutral impact as the deal is slated for direct buying from foreign OEMS</p>

IN Programs	Description	Effect on Private Industry
	<p>manufacturers that have been served with the RFI to equip IAC-1, Vikrant, and IAC-2.</p> <ul style="list-style-type: none"> The aircraft under consideration are Rafale M, F/A-18 Super Hornet, and MiG-29K are twin jet engines, and Gripen is a single engine option. 	
Maritime Patrol and Recon	<ul style="list-style-type: none"> Boeing's Poseidon P-8I, Long Range Maritime Reconnaissance and Anti-Submarine Warfare Aircraft (LRMR & ASW) has been inducted. With an inventory of 12 P-8I aircraft, the Indian Navy is considering the possibility of acquiring 12 additional aircraft. The gap between surveillance and reconnaissance has been separated into Medium Range Maritime Reconnaissance (MRMR) and Short Range Maritime Reconnaissance (SRMR). 	Neutral impact as the additional acquisitions are likely to be sourced from foreign OEMs
Shallow Water ASW Crafts	<ul style="list-style-type: none"> Induction of 16 shallow water ASW crafts has been processed, and the ships will be built indigenously. 	The Indian defence shipbuilding is undergoing a transformation with a remarkable increase in capability and program fulfilment.
Amphibious Capability	<ul style="list-style-type: none"> The Indian Navy, to augment its amphibious capability, has inducted the Landing Platform Dock (LPD), with 5 landing ship tanks and a sealift capability of more than 3,500 troops. Multi-role landing platform docks are being considered with private shipyards, such as L&T and Reliance Naval and Engineering Ltd., in the running for the contract. 	Indigenous shipbuilding would also increase opportunities in C4ISR systems, heavy engineering, and EW which will benefit companies like Astra Microwave, L&T, DCX

IN Programs	Description	Effect on Private Industry
Fleet Support Ships	<ul style="list-style-type: none"> The Indian Navy has exercised the option for one follow-on ship offered in the 2008 order for fleet tankers from the Italian shipbuilder Fincantieri. The government has also approved the induction of 5 fleet support ships. 	and Paras Defence & Space Technologies Ltd

TABLE 5: INDIAN AIR FORCE PROGRAMMES

IAF Programs	Description	Effect on Private Industry
Advanced Medium Combat Aircraft (AMCA)	<ul style="list-style-type: none"> The HAL Advanced Medium Combat Aircraft (AMCA) is a fifth-generation fighter aircraft development programme. The design agency will be DRDO, and a private industry participant is expected to be hired in the early stages on in the programme. In comparison to previous projects, the inclusion of a private industry participant is a significant change. A total of four prototypes are planned, with the first flight scheduled for 2024-2025. Since the withdrawal from the Indo-Russian Fifth Generation Fighter Aircraft (FGFA) programme, this is India's only 5th generation aircraft programme. 	AMCA is conceived as a public-private partnership. The early involvement of private business contrasts with the previous model, in which DPSUs were solely responsible for product design and manufacture. The modification is expected to benefit all supply chain stakeholders who participate in the programme. Participation in futuristic programmes such as AMCA will also improve the competence of the home sector.
Tejas Mk I A Light Combat Aircraft (LCA)	<ul style="list-style-type: none"> The Cabinet Committee on Security (CCS) cleared the purchase of 83 LCA MK I A (LCA-Tejas) in a deal worth ₹48,000 crore (approximately \$7 billion) from the state-run Hindustan Aeronautics Limited (HAL). This is the biggest-ever contract awarded to HAL till date. The 	Private industry players which are a part of Tejas supply chain will also have a higher probability of being a part of future upgrades. For e.g. companies like Apollo Microsystems and DCX

IAF Programs	Description	Effect on Private Industry
	<p>order comprises 73 fighters and 10 trainers in the next 5 years. The MK 1 A includes upgrades to the Fire Control Radar, EW system, and overall has 40 modifications over and above LCA MK I. This is in addition to initial order of 40 LCA Tejas MK I that are under delivery.</p>	<p>are likely to benefit from the program.</p>
<p>Medium Multi-Role Combat Aircraft Global RFI</p>	<ul style="list-style-type: none"> India issued an RFI for procuring 110 fighter aircraft, a program which is often dubbed as MMRCA 2. Six global aviation majors having responded to the RFI for the program. The six firms involved in bidding for the contract are Boeing (F 18 and F 15), Dassault (Rafale), Lockheed Martin (F 21), Saab (Gripen), Eurofighter (Typhoon), and Russia United Aircraft (MiG-35). 	<ul style="list-style-type: none"> The opportunity impact on Indian private industry will be significant as the program is slated for Make in India. Indigenous companies like DCX, TATA, and L&T are likely to have significant revenue opportunities in the program
<p>LCA Variant</p>	<ul style="list-style-type: none"> After the current acquisition of 83 MK 1 a, there are further plans of inducting around 80 LCA Mark II. 	<ul style="list-style-type: none"> Increased revenue prospects for the private sector, as future variations will contain more indigenous content, and companies like DCX, which was mentioned earlier, will benefit from being first to market.
<p>MiG -29 and SU-30 MKI</p>	<ul style="list-style-type: none"> After the face off with China, India declared an emergency purchase of 21 MiG -29 and 12 SU-30 MKI from Russia. The MiG -29 are the existing airframes with Russia and the same will be upgraded to meet the same specifications of the current MiG 29 inventory. The SU-30 MKI 	<ul style="list-style-type: none"> Initial impact for private industry will be low; however increased opportunities in future as aircraft fall due for Maintenance Repair and Overhaul (MRO) since it is carried out in India. Future upgrade programs

IAF Programs	Description	Effect on Private Industry
	<p>order is to augment the loss of aircraft which India has suffered in the past due to accidents and incidents.</p>	<p>of SU-30MKI will likely involve players from defence electronics such as Tata Advanced Systems Ltd, L&T and DCX.</p>
<p>AEW&C Aircraft</p>	<ul style="list-style-type: none"> • The IAF currently operates IL 76 equipped with Phalcon radar and DRDO Netra aircraft, which uses ERJ 145 as the base platform. The total inventory of around 6 aircraft is woefully short of IAF's requirement. • In December 2020, the DRDO was cleared to modify 6 A320 from the national Indian carrier fleet for AEW role. The planned AEW equipment will be an advancement of the existing Netra radar. The program cost is expected to be \$1.5 billion. 	<ul style="list-style-type: none"> • The expansion of AEW aircraft program will benefit a host of supply chain constituents.
<p>Transport Aircraft</p>	<ul style="list-style-type: none"> • The C 295 program, a joint Tata and Airbus effort, is envisaged to manufacture 56 aircraft in India at a cost of \$2 billion. • Additionally, the AN-32 modernisation program will also be a part of the IAF's plans during the period. • The later part of the decade is likely to see an initiation of a new program to acquire medium aircraft for phased replacement of An-32. 	<ul style="list-style-type: none"> • Besides Tata, which is the JV partner, supply chain constituents are likely to benefit from the program. in India

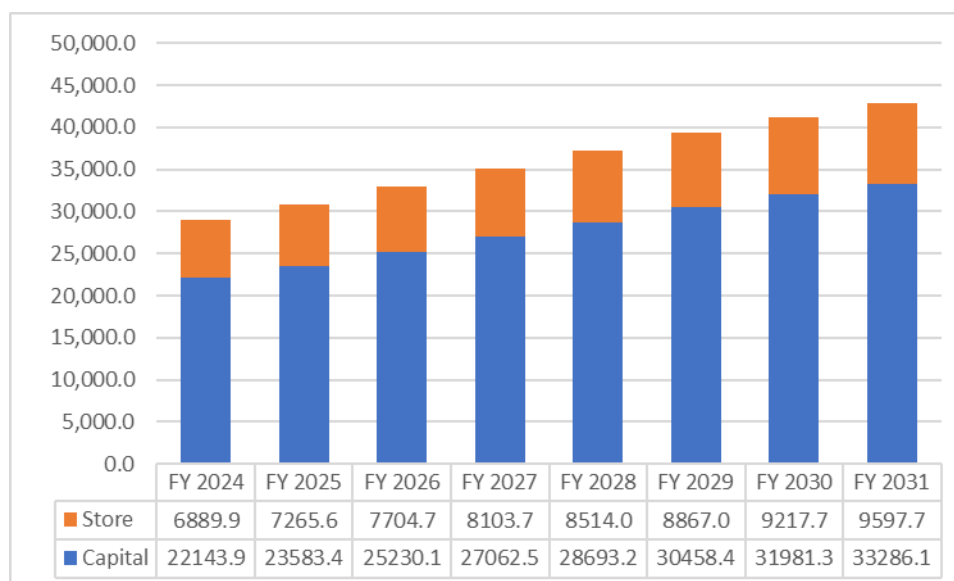
TABLE 6: INDIAN ARMY PROGRAMMES

IA Programs	Description	Effect on Private Industry
Network-centric Warfare	<ul style="list-style-type: none"> • Phase 1 of Shakti Artillery, Combat, Command and Control Systems (ACCCS) is completed, with 40% of artillery units equipped with advanced networks. • Tactical Command Control Communication and Information (Tac C3I) systems and Battlefield Surveillance System (BSS) are in the final test phase. EWS, Electronic Signals Intelligence (ELINT), and Air Defence Control and Reporting System (ADC&RS) are in the process of development. Bharat Electronics Limited (BEL) and the Defence and Research Lab at the Centre for AI and Robotics (CAIR) are developing these systems, and it will take 3-to-4 years to for induction of these systems. • The Indian Army also continues to acquire other required elements such as UAVs, weapon locating radars, thermal image intensifiers, night vision systems, and Long-Range Reconnaissance and Observation System (LORROS). 	<ul style="list-style-type: none"> • The C3I and Air Defence systems will require a multitude of surveillance and tracking radars which will benefit players like L&T, and Tata. Increase in contracts for private players would potentially benefit DCX in terms of wiring and harness orders.
Armour, Artillery and Air Defence	<ul style="list-style-type: none"> • The Armoured Corps and Mechanised Infantry deployed in the mountains need reinforcement. Roads have been upgraded so that the T-72 tank and the BMP-2 can be deployed in Ladakh. There is a need to procure a light tank for mechanised forces. A prototype based on the BAE System 	<ul style="list-style-type: none"> • A wide range of equipment acquisition programs spanning combat vehicles, tanks, artillery guns, and missiles are being pursued to upgrade the IA operational capability.

IA Programs	Description	Effect on Private Industry
	<p>Combat Vehicle 90 is being evaluated by the DRDO.</p> <ul style="list-style-type: none"> • T-72 tanks are being upgraded with night vision devices. The indigenous Arjun tank, heavier than the T-90, has a 120 mm gun that can fire APFSDS, HEAT, High Explosive and HESH and the LAHAT missile, which is a semi active laser homing missile with an 8 km range. • In 2019, the 155 mm Dhanush, Howitzer M-777, and the 155 mm self-propelled Vajra were inducted. The long-range Pinaka missile could be inducted in 2022 with user trials underway. • Arjun Mk II is undergoing trials with about 75 modifications. • With 700 BMP-1s in active service, an upgrade is planned for 1,600 BMP-2s with a more powerful 350 HP engine. • Trials for Precision Guided Munitions are being undertaken for artillery upgrades. The Hypersonic BrahMos missile is expected to be inducted by 2022. 	<ul style="list-style-type: none"> • The programs would include significant components of electronics, COMINT and SIGINT. This in turn serves as an opportunity for electronic component manufacturers like DCX.
Drones	<ul style="list-style-type: none"> • DAC have approved the procurement of new swarm drones, Guided Extended Range Rocket Ammunition, Area Denial Munition Type I and Infantry Combat Vehicle. 	<ul style="list-style-type: none"> • The programs would include significant components of electronics serving as an opportunity for electronic component manufacturers like DCX.

Forecast Defence Spending in India

FIGURE 14: DEFENCE SPENDING FORECAST, US\$ MILLION



Source: Frost & Sullivan

The capital and stores allocation are expected to expand to US \$ 33.28 Billion and US \$ 9.59 Billion, respectively by FY 2031. The CAGR for capital allocation is noted to be 6.00% and the CAGR for store allocation is 4.85% over the FY 2024 to FY 2031 time frame. Capital outlay is inclusive of capital expenses on coast guard and border roads, while stores include ammunition, spares and repairs.

Salient features of the forecast are as below:

- The IAF and IN are to share 70% of the total capital acquisition budget, while the Indian army is expected to account for 30% of the said budget. The lower cost of equipment and the slower pace of modernization are the two key factors that justify the lower value of the capital acquisition budget for the Indian Army.
- Aero Engines and aircraft account for 32% of the total cumulative market opportunity; big-ticket acquisitions are on the cards for the Indian market. India is posed to inculcate 200 fighter aircrafts in addition to unmanned assets, rotary, AEW and ISR.
- The Naval fleet for India includes the inculcation of submarine under Project 75 I (the Indian Navy's Acquisition of new diesel electric submarines, that has integrated Air Independent Propulsion) and IAC 2, is expected to account for the next major component at roughly 13%.
- Defence electronics and the weapons segment are expected to witness a major uptick in acquisition, since the Indian Forces have been upgrading their network centric capability and operational engagement.

Defence Exports of India

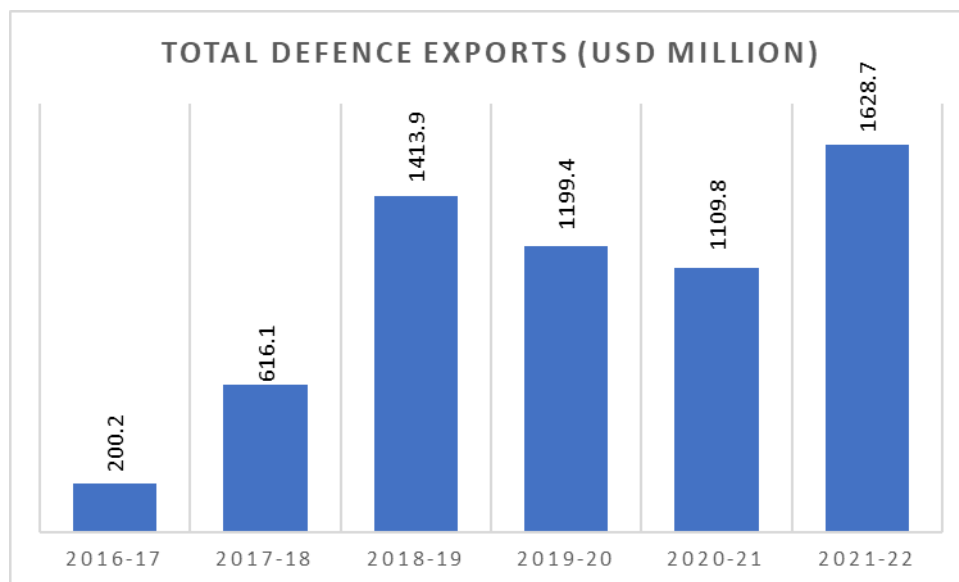
Due to the relaxation of export limitations and policy changes, Indian defence exports are expected to rise rapidly. This is supported by the expanding capabilities of Indian defence suppliers. In comparison to defence public sector entities, the private sector now dominates Indian defence exports, which is expected to drive income prospects. Organizations such as DCX are well positioned to capture the growth in Aerospace and Defence exports.

In a report published by (India Brand Equity Foundation) IBEF in November 2021, the GOI has set a target for US\$ 25.00 Billion for defence production by 2025. It includes US\$ 5 billion in exports. In the next five years, India aims to export military hardware products worth US\$ 5 Billion. Additionally, the value of India's defence exports in FY20 was US\$ 1231.9 million and this moderated to US\$ 771.8 Million in FY21. A dip in the exports for the year 2020-2021 is largely attributed to manufacturing disruptions and supply chain which have eased now.

As per SIPRI, India's cumulative weapon import value fell by 33% between 2011-2015 and 2016-2020. This is a strong indication that efforts to boost capabilities and sourcing from the local defence industry have paid off.

The defence exports from FY 2016-17 to FY 2021-22 are shown below:

FIGURE 15: INDIAN DEFENCE EXPORTS



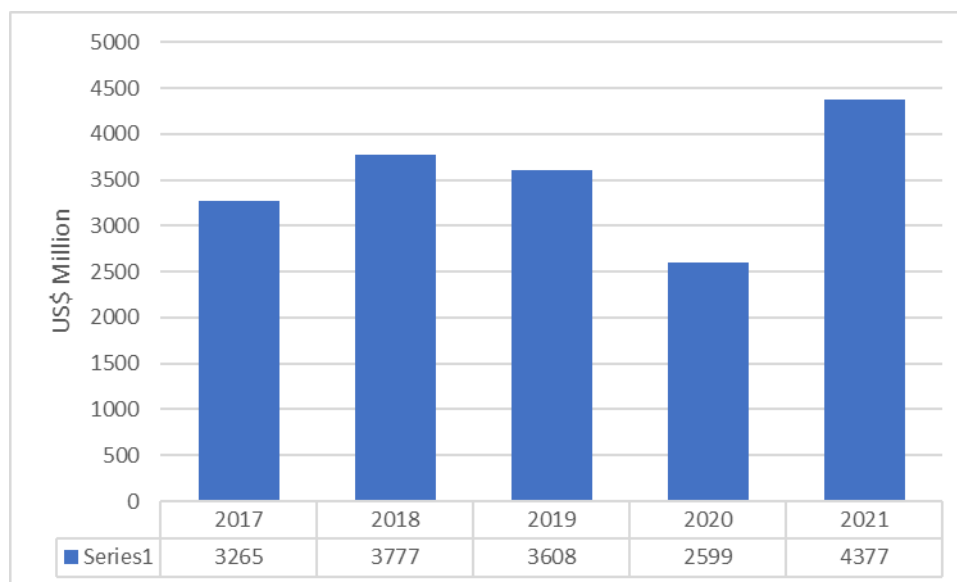
Note: The CAGR for Exports is noted to be 52.08%% between FY 2016-2017-FY 2021-22.

Export target countries are South Africa, Thailand, Azerbaijan, Singapore, Sweden, Seychelles, Indonesia, Estonia, The Philippines, Guinea, Lebanon, Qatar, Iraq,

Uruguay, Ecuador, Japan, Egypt, The US, Finland, Australia, France, Germany, the Netherlands, and Israel.

Historical Exports to Israel

FIGURE 16: HISTORICAL EXPORTS FROM INDIA TO ISRAEL, ALL COMMODITIES



Source: Indian Ministry of Defence

The CAGR for the exports from India to Israel between the years 2017-2021 is noted to be 7.6%. For the year 2020, the exports value witnessed a moderation owing to supply chain disruptions caused by the pandemic.

FIGURE 17: KEY SYSTEMS AND SUB-SYSTEMS EXPORTED/ PLANNED FOR EXPORT FROM INDIA(2017 TO CURRENT)

SI No.	Products	Platform
1	<ul style="list-style-type: none"> • Akash – Air Defence System • Dhanush – artillery gun • Milan 2T – ATGM • BrahMos – Cruise missile weapon system • Vajra – Self-propelled artillery gun • Advanced Towed Artillery Gun System • Bharat 52 – towed gun • Upgraded L-70 gun • Garuda 105 – light field gun • Wheeled Amphibious platform • Zu 23 upgraded gun • Upgraded Schilika Weapon System • 3D low level light weight Radar 	Land Systems

	<ul style="list-style-type: none"> • Weapon Locating Radar • Mine Protected Vehicles • Battlefield Surveillance Radar 	
2	<ul style="list-style-type: none"> • Anti-submarine warfare corvette • Torpedo Launchers • Advanced Offshore Patrol Vessel • Offshore Patrol Vessel • Fast Patrol Vessel • High Speed Patrol Boat • Landing Craft Utility • Fast Interceptor Boats • Torpedo Advanced Light • Inshore Patrol Vessel 	Naval Systems
3	<ul style="list-style-type: none"> • LCA Tejas • Dornier • Advanced Light Helicopter • Cheetal • Light Combat Helicopter • Brake Parachute 	Air Systems
4	<ul style="list-style-type: none"> • Transceivers • Handheld Radios • Jammers • Others 	Communications System

Recent exports to other countries

- India and Bangladesh signed their first defence contract under the \$500 million line of credit (LoC) under which India will supply defence gear.
- India has bid to a tender released by Royal Malaysian Air Force offering to sell 18 light-combat aircraft (LCA) "Tejas" to Malaysia. The solution being offered is attracting interest from other nations such as Argentina, Australia, Egypt, the United States, Indonesia, and the Philippines.
- In January 2022, BrahMos Aerospace received a contract, worth USD 374 Million from The Philippines Navy to export shore-based anti-ship missile system to them.
- Bomb suppression blankets, helmets, cartridges, and soft armour panels to Germany.
- Mine protected vehicles, soft armour panels, helmets, over-vests, and civil helicopter protection equipment to the United Arab Emirates (UAE).
- Weapon locating radar systems to Armenia.
- Export of radar components to Singapore.

- In September 2017, India secured a military export order for \$ 21.07 million for 40,000 pieces of components for artillery guns from the Government of the United Arab Emirates.
- Avionics have been exported to Malaysia for the Sukhoi Su-30MKM.
- One Fast Patrol Vessel and 11 Fast Interceptor boats were exported to Mauritius.
- India has sold domestically developed lightweight torpedoes to Vietnam and Myanmar.

The major initiatives of the export strategy are as exhibited in the Table below:

Initiative	Brief
Establish Export Promotion Body	<p>A specific export promotion/ facilitation body with participation from industry representatives. The role of the body would be to</p> <ul style="list-style-type: none"> (i) Render advice to government on various export related issues (ii) Increase awareness amongst the industry about various export facilitation measures (iii) Coordinate all export facilitation schemes of the government (iv) Promote exports through specific marketing efforts in targeted countries (v) Facilitate national and international trade shows <p>The organisation would be a main agency of Ministry of Defence in charge of staging defence exhibitions in India and overseas.</p>
Defence Export Steering Committee	<p>Steering committee under the Chairmanship of Secretary, Department of Defence Production with representatives of Armed Forces, DRDO, PIC Wing, Acquisition Wing, MEA, and DGFT. The functions would be to</p> <ul style="list-style-type: none"> (i) Take decisions on cases of export permissions, which are outside the purview or scope of subordinate authorities/committees particularly export of indigenously developed sensitive defence equipment. (ii) Monitor the progress in defence exports and suggest specific steps/strategy to boost exports

Initiative	Brief
Defence Diplomacy	<ul style="list-style-type: none"> (i) Contributes to building local operational capabilities and enhances inter-operability during UN peacekeeping missions (ii) Industry delegations from public/ private sector/ JVs of private and public sector would be included in bilateral meetings/ discussions with various countries so that the importing country gets due comfort while importing from India (iii) Industry delegations would be taken to target countries under the leadership of officials or DPSUs representatives (iv) Indian Embassies/ Missions abroad would be associated in making targeted efforts for promoting export of Indian defence products.
Export Financing	<ul style="list-style-type: none"> (i) Line of credit facility available in Ministry of External Affairs would be leveraged suitably to promote defence exports from India. (ii) Possibilities for financing of defence exports through EXIM Bank. (iii) Buyer's Credit facility of Department of Commerce would also be leveraged. (iv) Separate strategy to finance the exports to weaker countries would be worked out in consultation with MEA, EXIM Bank, DPSUs, private sector and other financial institutions.
Use of Offset Policy	<ul style="list-style-type: none"> (i) Offset Policy to be reviewed and aligned towards final integration of weapons/systems in India and promoting export of such systems from India (ii) Policy to be reoriented towards acquisition of critical technologies required for high end weapons/platforms so that the same can be leveraged for export
Issue of NOC	Revision of policy to issue NOC and End User Clearance certificates including provision of 'in principle' clearance to the industry, so that it can explore export opportunities
Online and Time Bound Clearance	A web-based system to be developed to receive applications for NOC online and convey the NOC to the companies

Initiative	Brief
Export of Indigenous Developed Sensitive Systems	Defence Export Steering Committee will take appropriate decisions regarding exportability of item with/ without modification or degradation.
Implementation and Review	Finalization of procedure and constitution of Defence Export Steering Committee etc. should be completed within 3 months

Indigenous Industry Drivers

The Indian Aerospace and Defence segment is expected to account to around USD 70 Billion by the year 2030. The overall growth of this market is steered by the increased investment in modern infrastructure and government's efforts to drive indigenous development of aerospace and defence products. Between 2016-2020, the defence manufacturing sector grew at a CAGR of 3.9%. India's defence manufacturing sector recorded increased production to US\$ 11.85 billion in FY22 from US\$ 10.9 billion in FY21.

Government's present objective is to enhance the value of defence production to USD 25 Billion by 2025. An additional exports target of USD 5 Billion has also been set by the GOI. In FY 2020-2021, it was noted that the defence exports moderated by 60% to USD 771.76 Million from USD 1231.89 Million (FY 2019-2020), this was due to pandemic related delays.

The Indian Defence private sector has also witnessed a substantial growth owing to the instating of government reforms. In FY 2021-22, FY 2020-2021 and FY 2019-2020, it was noted that the private players in the Indian defence sector accounted for 70%, 86% and 88% of the exports generated respectively. The private sector's exports stood at INR 72.71 billion in FY2020-21 and INR 80.07 Billion in FY 2019-20. India's defence exports for 2021-22 were estimated at \$1.63 billion . The private sector accounted for 70% of the exports, while public sector firms accounted for the rest with the share of public sector going up from previous years.

Policy changes that reduce program delays and accelerate acquisition are poised to be instated into the Indian Defence environment. The industry is on the cusp of change owing to MoD's objective of doubling defence production by the year 2025. In the same period, the MoD also aims at increasing the defence exports by 5 folds through increased involvement of private players as well as the privatisation of Ordnance Factory Board. Government-to-government deals like leasing and waiver of offset requirements are expected to be promising.

Atmanirbhar Bharat Initiative

The Indian government's Atmanirbhar Bharat Abhiyan, which translates to "self-reliant India," is an effort to boost indigenous production and industry in the aftermath of COVID-19's expected economic impacts. Reforms and policy easing have been announced for many industries, including the defence industry. The following are the primary ways to increase self-reliance and promote the indigenous defence industry:

Reform	Description	Benefit to Indigenous Industry
Negative Import List	The first negative list for defence imports includes short-range surface-to-air	This initiative accelerates domestic industry in order to

	<p>missiles, towed artillery guns, offshore patrol vessels and cruise missiles. Ministry of Defence notified in the 'Second Positive Indigenisation List' that it had banned up to 107 defence items, to ensure a greater self-reliance. The list includes helicopters, Air Borne Early Warning and Control (AEW&C) systems, Next Generation Corvettes, Medium Power Radar for Mountains, Tank Engines, MRSAM Weapon Systems, and other complex systems, sensors, simulators, weapons, and ammunition items across Land, Air and Naval Platforms. The 3rd Positive Indigenisation List includes 780 strategically important Line Replacement Units/Sub-systems/ Components which will only be procured from domestic industry.</p>	<p>incentivize the production of the specified items.</p>
<p>Domestic Procurement Budget</p>	<p>The Indian Ministry of Defence (MoD) announced to allocate a funding worth 68% of the capital procurement budget for the defence sector to promote the cause of Atmanirbhar Bharat.</p>	<p>Concerns about capital availability for domestic procurement are addressed.</p>
<p>Corporatization of Ordnance Factory Board ("OFBs")</p>	<p>There had been reports of inefficiency in the board's operation, which necessitated corporatisation of Ordnance Factory Board in order to</p>	<p>The corporatization of Ordnance Factory Board's (OFB) is projected to provide long-term benefits, such as enhancing the quality and</p>

	<p>manufacture high-quality items while maintaining proper accountability for the goods, which were weaponry delivered to the army. Additionally, if the quality and quantity of items increase, the turnover will increase, and the key plan being promoted, Make in India, will receive a positive response, which will be beneficial to the economy in the short and long term.</p>	<p>delivery rate of defence items, but it is also likely to raise the prices of most products being manufactured in the short term. This change would provide small businesses more autonomy while also improving accountability and efficiency.</p>
FDI Norms	<p>India's foreign direct investment (FDI) policies were revised in 2020 to enable investments of up to 74 percent in the defence manufacturing industry under the automatic route, up from 49 percent previously. The increase in the Foreign Direct Investment becomes a catalyst for the foreign players to develop India as International manufacturing hub.</p>	<p>FDI has a positive capital advantage, as well as the potential for transfer of technology.</p>

Few Recent Developments of 'Make in India' Programs

- DRDO performs maiden launch of domestically designed and developed new generation Surface to surface missile like "Pralay". It follows the desired quasi ballistic trajectory and it reaches the said target with a high degree of accuracy guidance, validating the control as well as mission algorithms.
- The Indian Air Force (IAF) and the Uttar Pradesh Expressways Industrial Development Authority (UPEIDA), Defence PSUs-Bharat Earth Movers Limited (BEML), Naini Aerospace Ltd and Hindustan Aeronautics Limited (HAL) during the Aero Indian2021 for indigenization programme
- The Government of India has sought out the replacement of aircraft fleet for the defence forces including Cheetah and Chetak helicopters with Naval Utility

Helicopter, indigenous Light Utility Helicopter (LUH) developed by HAL under the “Buy (Indian-IDDM)” project. HAL has also manufactured the Russian built Ka-226T as “Buy & Make (Indian)”.

- DAC accepted the proposal of Indian Air Force (IAF) for Ground Hubs and GSAT-7C Satellite for real-time connectivity of Software Defined Radios (SDRs) accounting for INR 2,236 Cr. The project envisions the complete development, launch and design of satellites in India. It is expected to enhance the ability of our Armed Forces to communicate beyond Line of Sight (LoS) among one another in all circumstances in a secure mode.

Defence Acquisition Procedure (DAP)

The Defence Acquisition Procedure (DAP) aims to ensure timely acquisition of military equipment platforms, and system that meet the requirements of the Armed Forces in terms of capabilities, quality standards and performance, while making the best use of budgetary resources available. DAP would ensure the highest level of public accountability, probity, fair competition, transparency, and a level playing field while permitting the same. In addition, the DAP will persistently pursue self-reliance in defence equipment manufacture and procurement, with the goal of developing India as a worldwide defence manufacturing hub.

The Defence Acquisition Procedure has also introduced several new provisions in addition to existing ones, which aim to boost the indigenous industry, such as:

Capital Acquisition schemes are broadly classified as, ‘Design and Development (D & D)’ ‘Buy and Make’, ‘Buy’, ‘Leasing’, ‘Make’, and Strategic Partnership Model (SPM).

Buy (Indian – IDDM)	Buy (Indian-IDDM)’ category refers to the acquisition of products from an Indian vendor that have been indigenously designed, developed and manufactured with a minimum of 50% Indigenous Content (IC) on cost basis of the base contract price i.e. total contract price less taxes and duties	
Buy (Indian)	‘Buy (Indian)’ category refers to the acquisition of products from an Indian vendor which may not have been designed and developed indigenously, having 60% IC on cost basis of the base contract price. Vendors eligible in ‘Buy (Indian-IDDM)’ category will also be permitted to participate in this category with indigenous design and a minimum of 50% IC on cost basis of the base contract price.	Advantage for Indian vendors who may use a foreign design, if they meet the IC requirements on cost.

Buy and Make (Indian)	‘Buy & Make (Indian)’ category refers to an initial acquisition of equipment in Fully Formed (FF) state in quantities as considered necessary, from Indian vendor(s) engaged in a tie-up with a foreign Original Equipment Manufacturer (OEM), followed by indigenous production in a phased manner involving Transfer of Technology (ToT) of critical technologies as per specified range, depth and scope from the foreign OEM. Under this category of acquisition, a minimum of 50% IC is required on cost basis of the Make portion of the contract less taxes and duties. Acquisition under this category can also be carried out without any initial procurement of equipment in FF state	Indian vendor remains in lead; incentive for foreign OEMs to have a joint venture with Indian companies while facilitating Transfer of Technology
Buy (Global – Manufacture in India)	Buy (Global - Manufacture in India) category refers to an outright purchase of equipment from foreign vendors, in quantities as considered necessary, followed by indigenous manufacture of the entire/part of the equipment and spares/assemblies/sub-assemblies/Maintenance along with Repair and Overhaul (MRO) facility (only in cases these are part of the main contract) for the equipment, through its subsidiary in India/through a Joint Venture/through an Indian Production Agency (PA) (with ToT of critical technologies as per specified range, depth and scope to the Indian PA), meeting a minimum of 50% IC on cost basis of the Base Contract Price. Indian vendors will be permitted to participate in Buy (Global - Manufacture in India). Acquisition under this category can also be carried out without any initial procurement of equipment in FF state	
Buy (Global)	‘Buy (Global)’ category refers to outright purchase of equipment from foreign or Indian vendors. In case of procurement through foreign vendors, Government to Government (G2G) route/Inter Government Agreement (IGA) may also be adopted, for equipment	

	meeting strategic/long term requirements. An Indian Vendor participating in this category would be required to meet minimum 30% IC, failing which such vendor would be required to discharge offsets as applicable in the case.	
Leasing	Leasing has been introduced as another category for acquisition in addition to the existing 'Buy' and 'Make' acquisition categories as it provides for an innovative technique for financing of equipment/platforms. Leasing provides means to possess and operate the asset without owning the asset and is useful to substitute huge initial capital outlays with periodical rental payments. Leasing would be permitted in two sub categories i.e. Lease (Indian), where Lessor is an Indian entity and is the owner of the asset, and Lease (Global).	Leasing is useful way to substitute huge initial capital outlays with periodical rental payments
Make and Innovation	Acquisitions covered under the Make and Innovation including Innovation in Defence Excellence (iDEX) and Technology Development Fund (TDF) categories refer to equipment/system/sub-system/assembly/sub-assembly, major components, or upgrades thereof, to be designed, developed and manufactured by an Indian vendor/processed by the Services through their internal organisations, such as Base Workshop/Dockyards/ Base Repair Depots etc. with or without participation of Private industry	It provide a focused, structured and significant thrust to development of defence design and production capabilities in the country
Design and Development (D & D)	Design and Development (D&D) cases progressed by DRDO/DPSUs/OFB for acquisitions of equipment/system/subsystem/assembly/sub-assembly, major components, or upgrades thereof, to be designed, developed and manufactured by an Indian vendor	This process will help in translating the existing indigenous technological capability into systems, and also in implementing

		'Make in India' with indigenous technology through Indian industry.
Strategic Partnership Model (SPM)	Acquisitions under the Strategic Partnership model refer to participation of private Indian firms along with foreign OEM in 'Make in India' in defence and play the role of a System Integrator by building an extensive ecosystem comprising development partners, specialised vendors and suppliers, in particular, those from the MSME sector. Strategic Partnerships will seek to enhance indigenous defence manufacturing capabilities through the private sector over and above the existing production base.	Development of Indian defence manufacturing eco-system.

Defence Offsets

Though India has pursued defence offsets aggressively since enacting an official policy in 2005, previous policies did not focus on technology and R&D capability transfer from foreign to Indian defence businesses. The Defence Acquisition Policy 2020 seeks to address these shortcomings by moving the focus away from "components" and toward "technology investments" as well as "platform export." The DAP 2020 has extended avenues for extending offsets, providing foreign businesses direct credit for transferring vital technologies to the Indian economy. Though certain essential technologies, like electromagnetic rail guns, and hypersonic flight-related technology were formerly only available to DPSUs and DRDO, the large number of innovations utilised in defence equipment are now available to private entities.

Another significant improvement in India's offset policy is the abolition of "offset banking," which allowed foreign corporations to claim credits for undertaking regular business activities in the country. The government has attempted to strike a compromise between the interests of foreign investors in the country by allowing them to permit their vendors to discharge offsets on their behalf. To give the Indian industry greater chances, the baseline indigenous component mandates for Buy (Indian) and Buy (IDDM) categories have been enhanced by 10%. Overall, the new adjustments are aimed at encouraging indigenous firms' technological advancements while also reserving a larger opportunity share for them in military contracts, hence driving the expansion of India's defence industry.

The main objective of the Defence Offset Policy is to leverage capital acquisitions to develop Indian defence industry by augmenting capacity for R&D related to defence products and services, encouraging development of synergistic sectors like internal security and civil aerospace and fostering development of internationally competitive enterprises.

India signed as many as 21 defence offset contracts worth USD 5.67 Billion between 2016-2019. As of December 2021, the defence ministry has imposed a fine of roughly 1 Million Euros on the Missile maker MBDA for their delay in fulfilling the offset obligation under the Rafale aircraft deal. The offset obligations were a part of India's contract in 2016 to procure 36 Rafale jets at a cost of INR 59,000 Cr. Roughly 50% of this contract value was to be invested in India between September 2019 and 2022.

Details of OEMs with Offset contracts have been shown in the Table below.

TABLE 7: OEMS WITH OFFSET CONTRACTS

Sl No.	OEM Name	Offset Contracts Description
1	Airbus Defence and Space S.A.	Procurement of 56 Transport Aircraft with Associated Equipment
2	BAE Systems GCS International Limited	145 X 155 mm 39 calibre Ultra-Light Howitzers (M777A2)
3	Dassault Aviation	36 AIRCRAFT PACKAGE SUPPLY PROTOCOL OFFSET CONTRACT (RAFALE EH/DH)
4	Elbit System Ltd	Thermal Imaging Fire Control Systems (TIFCS) for T-72 Tanks
5	Elbit System Ltd	Radio Sets (RS) Tadiran
6	Elbit System Ltd	12.7MM STABILISED REMOTE CONTROL GUNS (SRCG) AND AMMUNITION WITH TOT
7	Elbit System Ltd	Upgrade Medium Lift Helicopters
8	Elbit System SAR and Data Links-Elisra Ltd	Search and Rescue Equipment (SAR)
9	Elbit Systems Electro Optics ELOP Ltd	TISK
10	ELTA Systems Ltd	Air Route Surveillance Radar (ARSR)
11	ELTA Systems Ltd	12 x Recce pods(Su-30)
12	ELTA Systems Ltd	06 SETS of RADAR AMDR-2D
13	ELTA Systems Ltd	Medium Power Radar (MPR)

14	Fincantieri - Cantieri Navalli Italiani S P A	Fleet Tanker (Option)
15	Fincantieri - Cantieri Navalli Italiani S P A	FLEET TANKER (MAIN)
16	Israel Aerospace Industries (IAI)	Two Troops Heron UAV (Indian Army)
17	Israel Aerospace Industries (IAI)	UAV HERON
18	Israel Aerospace Industries MBT Missiles Division	Air Defence Fire Control Radars
19	Israel Aerospace Industries MBT Missiles Division	Augmentation of Barak System Repair Facility
20	Israel Aerospace Industries MBT Missiles Division	HAROP
21	James Fisher Ltd	Defence Deep Submergence and Rescue Vessel (DSRV)
22	Lockheed Corporation	Martin C-130J Aircraft (Option)
23	Lockheed Corporation	Martin Indian Navy 24 MRH
24	Lockheed Corporation	Martin C-130J-30 Aircraft (Main)
25	MBDA	MICA for M2000
26	MBDA	36 RAFALE FIGHTER WEAPONS PACKAGE SUPPLY PROTOCOL (RAFALE EH/DH)
27	MBDA UK LIMITED	New Generation Close Combat Missile
28	Nexter Munitions	20 MM Ammunition and associated equipment for ALH (WSI)
29	Nexter Munitions	20 MM Gun Ammunition (Indian Air Force)
30	Pilatus Aircraft Ltd	Basic Trainer Aircraft Pilatus
31	Qinetiq Target Systems Ltd	MEAT

32	Rafael Defence Systems Ltd	Advanced	SPICE-2000 (OPTION)	NGPGM	Weapon	Systems
33	Rafael Defence Systems Ltd	Advanced	BARAK 1 SAM			
34	Rafael Defence Systems Ltd	Advanced	Medium Altitude EO/IR Recce System for Jaguar			
35	Rafael Defence Systems Ltd	Advanced	Spice 2000 Weapon Systems			
36	Rafael Defence Systems Ltd	Advanced	Medium Altitude EO/IR Recce System for Jaguar Option Clause			
37	Rafael Defence Systems Ltd	Advanced	Barak 1 (Option)			
38	Rafael Defence Systems Ltd	Advanced	164 LDPs			
39	Rafael Defence Systems Ltd	Advanced	SDR GLOBAL LINK NETCOR			
40	RosoboronExport		KAMOV 28 MID LIFE UPGRADE			
41	RosoboronExport		80 Helicopters Mi-17V-5			
42	Russian Corporation Russian Federation	Aircraft "MIG"	Extension of service Life and Upgrade of MiG-29			
43	TEXTRON CORPORATION	SYSTEMS	SENSOR FUZED WEAPONS (SFW)			
44	Thales Air Systems SA		Low Level Transportable Radar (LLTR)			
45	Thales Belgium S.A		Procurement of 70 MM Rockets and Associated Equipment for ALH(WSI) for Indian Army			
46	Thales Belgium S.A		Procurement of 70 MM Rockets and Associated Equipment for ALH(WSI)			
47	Thales Aeroportes	Systemes	UPGRADE OF MIRAGE 2000 AIRCRAFT			
48	The Boeing Company		CH-47F(I) Chinook Heavy Lift Helicopters			
49	The Boeing Company		P-8I Main			
50	The Boeing Company		C-17 Globemaster III Aircraft			
51	The Boeing Company		P-8I Training Solutions			

52	The Boeing Company	AH-64E APACHE ATTACK HELICOPTERS (OPTION CLAUSE)
53	The Boeing Company	Four(04) P-8I LRMRASW Aircraft
54	The Boeing Company	HARPOON MISSILES
55	The Boeing Company	AH-64E Apache Attack Helicopters
56	Ultra Electronics Maritime Systems	New Torpedo Defence System

Quantum and Scope of Offsets

- These provisions are to be applied to all Capital Acquisitions such as 'Buy (Global)', 'Buy and Make with Technology Transfer'. The estimated cost of the acquisitions proposal is poised to be over INR 300 Cr. As a part of the "Buy (Global)" procurements, the provisions are to apply to joint ventures and Indian enterprises.
- The said value of the offset obligations is expected to account for 30% of the acquisition cost in 'Buy (Global)' capital acquisition category. Roughly 30% of the foreign exchange component under the 'Buy and Make using ToT' capital acquisitions category. Offset requirements are to be fulfilled by referring to services and eligible items.
- In special circumstances, the DAC (Defence Acquisition Council) may mandate variable offset obligations that exceed up to 30% or pave way by waiving the requirement for offset responsibilities. Factors like acquisition type, the ability of the Indian defence industry to absorb the offset, strategic importance or priority of the acquisition, are some of the relevant attributes.

Positioning of DCX in Indian Defence Offsets

DCX has been a preferred Indian Offset Partner for foreign OEM's for executing many prestigious Aerospace and Defence projects including

- MRSAM/LRSAM – (Secured orders of about 67% of the offset value of US\$ 635Million)
- ASR (Surveillance Radar)
- ADFCR (Air Defence Fire Control Radar)
- HPR (High Power Radars)
- Iron Dome – Part of Multi-Tiered Missile Defence System
- Barak-1 and Barak-8 Missile Systems
- TISK (Thermal Imager Stand alone Kit)
- TIFCS (Thermal Imager Fire Control System)

- LORROS (Long Range Reconnaissance & Observation System)
- COAPS (Commander Open Architecture Panoramic Sight)

DCX is also the largest Indian Offset Player for M/s. IAI Group, Israel, for the Indian defence market in the manufacture of electronic sub-systems. DCX undertakes - build-to-print products for both domestic and international OEMs as part of larger defence manufacturing contracts. DCX has submitted its letter of agreement/ acceptance to act as the IOP for upcoming projects for several automatic missile detection radars, HERON unmanned aerial vehicle systems, Barak systems, medium range maritime reconnaissance system and short-range surface to air missile.

Make in India Defence Projects

Foreign partnership provided by Indian Defence Offset is already having an impact, delivering technological improvements, fostering new innovations, and raising awareness of the importance of strengthening people's technical skillsets. As a result, increased participation of local subcontractors (SMEs) may be secured with more foreign investment and a strong push for Make in India. This would help strengthen the technical skillsets of local R&D and production facilities that cater to Make in India Defence Projects, as well as increase employment prospects.

Small and Medium Enterprises (SMEs) are benefiting greatly from India's Defence Offset policy. The offset policy has made possible for SMEs to develop, design, produce, and provide diverse electronics components and subsystems to TIER-1 and TIER-2 defence players, both private and government. Small and medium-sized enterprises (SMEs) in India have a significant skill pool, which plays a huge role in defence offset. These SMEs have formed an important part of the Indian defence supply chain in recent years.

Small and medium-sized enterprises (SMEs) are the most prominent actors in the Indian manufacturing industry. An ample number of opportunities are provided to SMEs owing to the establishment of the Indian Defence Offset and Make in India Programs in recent years. The key challenges for SMEs are large capital requirements, limited facilities, and unequal competition. The government can solve the difficulties to some extent by decreasing the burden of generating large amounts of capital and regulating unexpected technological obsolescence.

DCX's Role in Domestic Indian Technology Integration

DCX is involved in manufacturing a comprehensive array of cables and wire harnesses assemblies for a variety of uses including Communication systems, Sensors, Surveillance systems, Missile systems, Military Armoured Vehicles, Air Defence Systems, Reconnaissance & Observation System, Multifunction Displays and other Electronic Warfare Systems. DCX has made long term Aerospace & Defence investments in the Israel market which processes high-end advanced and modern

technology in the last several years. Further, the company has forged a deeply penetrating OEM customer relationship based on which their track record of growth in financial parameters have marched leaps and bounds. DCX has invested strategically in processes- and physical infrastructure - to develop its manufacturing facility and has become a leading player in the cable and wiring -harness domain in aerospace and defence sectors -. Around 56% of the revenues for the year FY 2022 were from Israeli based customers and about 44% are from the domestic market. Private players like DCX plays an important role in meeting the offset obligations and helping the goals set by the Government of India with reference to be a US\$ 5 Billion export country by 2025.In 2022 DCX exported USD\$ 76 million worth of equipment accounting for 4.7% of the overall Defence Exports from India.

Defence Production and Export Promotion Policy 2020

The Defence Production and Export Policy is a policy to position India among the world's leading countries in the defence sector, which includes the aerospace and naval shipbuilding domain, from design stage to execution and production, with active public and private sector participation, therefore achieving the dual goals of exports as well as self-reliance.

The Department of Defence Production, GOI has facilitated the establishment of a wide range of production facilities for various equipment through Ordnance Factories and Defence Public Sector Undertakings (DPSUs) since 2001 via private players. This in turn has resulted in a diverse product range for the government. Moreover, the contribution for private sector within the defence industry has been increasing. Roughly 460 licenses have been issued to private companies. An increase in the number of licenses issued is poised to prove beneficial for companies like DCX in terms of increased Aerospace & Defence product orders.

The goals and objectives of the policy are as follows:

- The key objective is to generate a turnover of USD 25 billion, with an export value of USD 5 billion in aerospace & defence goods as well as services.
- To build a competitive as well as defence sector, including the aerospace and naval shipbuilding industries, to meet the needs of the armed forces services with high-quality products.
- Reduce import dependency and advance "Make in India" objectives through domestic design and development.
- To encourage the export of defence products and to join global defence value chains.
- To create an environment that supports rewards innovation, R&D, protects Indian intellectual property, and develops a strong as well as self-reliant defence industry.

FIGURE 18: FEATURES OF THE DRAFT DEFENCE PRODUCTION AND EXPORT POLICY 2020

Focus Area	Brief	Benefit to Indigenous Industry
Procurement Reforms	<ul style="list-style-type: none"> • Includes reforms such as the already initiated Negative Import Lists • Taking a project based approach to defence procurement and modernisation. Several developed nations, such as Australia and Canada, that take a project based approach towards defence 	<ul style="list-style-type: none"> • Greater procurement contracts go to indigenous industry. • Less planning slippages and thus less risk for the industry • Faster acceptance rates, procurement cycle rationalisation

Focus Area	Brief	Benefit to Indigenous Industry
	<p>acquisition, have been successful in time bound modernisation without delays</p> <ul style="list-style-type: none"> • Overhaul of testing and evaluation procedure and processes to save time • Adopt a “family of weapons” approach and move away from discrete procurement 	
Indigenous Support to MSME and Start Ups	<ul style="list-style-type: none"> • Intergovernmental mechanisms to promote indigenization • A Defence Investor cell to handhold start-ups and MSME • DPSUs/ OFBs to issue long term contracts for critical items to incentivize indigenous private industry by lowering risk and guaranteeing revenues 	Higher value/ long duration contracts from DPSUs/ OFBs can be anticipated to go to the private defence industry
Optimising Resource Allocation	<ul style="list-style-type: none"> • Setting out a separate budget for domestic procurements. Enhance domestic procurement capital allocations by at least 15% per annum for the next five years • Enhance efficiency and productivity of DPSUs and OFBs 	<ul style="list-style-type: none"> • Greater domestic procurements • DPSUs and OFBs likely to offload ancillary R&D/ subcomponent production to the private sector
Investment Promotion, FDI & Ease of Doing Business	<ul style="list-style-type: none"> • Focus on the development of an Aero Engines Complex, MRO facilities and investment in critical technologies such as main battle tanks, rocket systems, under water systems, naval systems, communication systems, electro optic systems, EW systems, etc. • Provide additional support for Defence Corridors • Continued easing of licensing for defence industries 	<ul style="list-style-type: none"> • Additional incentives to facilitate expansion of Indian defence companies in Defence Corridors • Indigenous companies can get into new segments rapidly
Innovation and R&D	<ul style="list-style-type: none"> • DRDO to set up specific “missions” in select areas of hypersonic weapons, armoured 	<ul style="list-style-type: none"> • Indian private companies likely to become major partners of DPSU as opposed to “suppliers”

Focus Area	Brief	Benefit to Indigenous Industry
	<p>vehicles, submarines, airborne sensors etc.</p> <ul style="list-style-type: none"> • Include production partners at early Technology Readiness Levels (TRL) itself • Competitively funded prototyping • Systems Engineering approach • iDEX for startups 	<ul style="list-style-type: none"> • Involvement at early project stage itself • Funding for prototypes
DPSUs and OFB	<ul style="list-style-type: none"> • Position DPSUs as system integrators and create a multi-tier domestic supply chain • Corporatization of DPSUs/OFBs • Maximise outsourcing from indigenous sources • Disinvestment and technological upgradation 	<ul style="list-style-type: none"> • More opportunities to the Indian defence industry as DPSUs offload subsystem/subcomponent production to private players
Quality Assurance & Testing Infrastructure	<ul style="list-style-type: none"> • Streamlining of processes and made time-bound • Accredited third party inspection bodies to augment DGQA in quality control • Government testing and quality control infrastructure to be expanded and made easily available to private players • Assistance provided to industry to set up testing facilities • Expanding self-certification in certain cases 	<ul style="list-style-type: none"> • Greater opportunities and revenues in the testing and QA sector for the private defence industry • Products can be made market-ready more rapidly • Lesser wait times for private defence companies that want to use government testing facilities
Export Promotion	<ul style="list-style-type: none"> • India aims to add \$5 Billion in defence exports by 2025 • Open General Export License regime • Defence Attachés to promote Indian defence industry • Export clearance processes to be made time-bound and hassle free 	<ul style="list-style-type: none"> • Faster export license approvals • Attaché support for export promotion

GLOBAL DEFENCE ELECTRONICS MARKET

Market Brief

The Defence Electronics market comprises of electrical components which are integrated onto defence technologies. Some of the key focus areas for the global defence electronics market include avionics, military communication systems, UAVs, airborne systems, electronic warfare systems, land system electronics, naval system electronics, C4ISR and weapon as well as missile system electronics.

A demand for high performance electronics within the defence sector is poised to be one of the key factors to serve as a market driver. Defence Electronics accounts for roughly 32% of the total defence procurement. With the change in warfare tactics and battlefield management, the need to modernize conventional military equipment has increased. Modernization is the key in keeping pace with technological progress on the battlefield. This demand for upgrading is expected to drive the growth of the market. The traditional defense industrial base is heavily skewed toward expensive, exquisite systems where high performance is the priority. However, the Ukraine Russia war is proving just how much can be accomplished with innovative uses of commercial technology that costs thousands of dollars, not billions. Using more inexpensive drones that are far cheaper allows them to treat them more like munitions than aircraft, which radically expands opportunities for tactical innovation.

Early into the Russia-Ukraine conflict, Germany announced it was committing €100 billion (\$113bn) in military spending. Other countries are following suit. After the end of the Cold War, Sweden slashed military spending. It was only after Russia's annexation of the Crimean peninsula in 2014 that the parliament agreed on a turnaround. Following the Ukraine Russia war Sweden has committed to increase defence expenditure. Romania and Poland have committed to increasing defence spending beyond 2% of their GDP. In the medium-term, priorities include the modernisation of Europe's air defences and expanding drone, cyber and space capabilities. Another target is the development of a new battle tank, the MGCS tanks project, to replace Germany's Leopard and France's Leclerc.

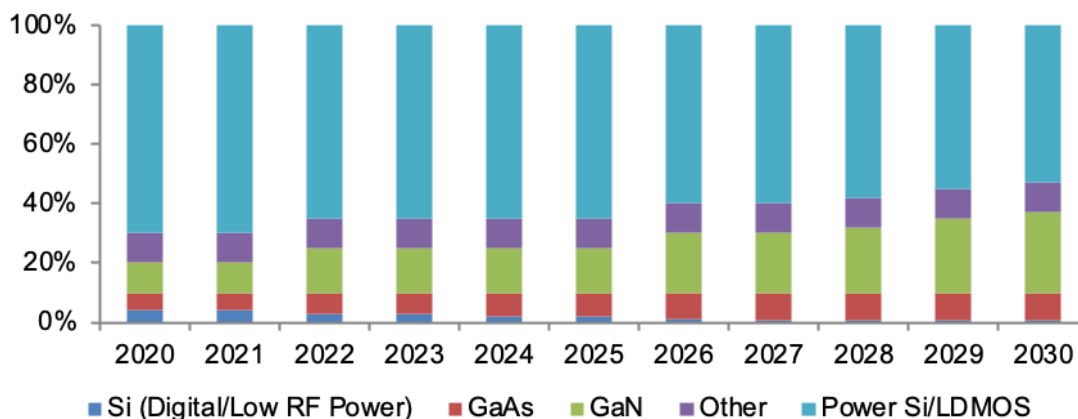
Growth in investment associated with the semiconductors industry is expected to be one of the key drivers for this market. Major chip suppliers to the defence industry such as Taiwan Semiconductor Manufacturing Company (TSMC) experienced shocks during the pandemic and had to roll back supplies. As a result, several nations are shoring up their indigenous semiconductor manufacturing capabilities. By the year 2030, expenditure associated with R&D, materials, equipment and training is anticipated to attain a value of US\$ 900 Billion.

Semi-conductor Industry as a key contributing market

The segmentation for the semiconductors sector based on its application across verticals including communication systems, radar and electronic warfare have been shown in the Figure below. The semiconductor's content within the electronic

components market is poised to attain a value of roughly US\$ 6.5 Billion by the year 2030. A rapid growth in the usage of GaN is another notable observation for the semiconductor's market. GaN's dominant power RF performance is one of the key factors that contribute to this growth. GaN is noted to be binary III/IV direct bandgap semiconductor which was used in the production of LEDs. It is a very hard mechanically stable semiconductor. GaAs is another semiconductor variant (widely used in radars) with a III-V direct band gap with a zinc blend crystal structure.

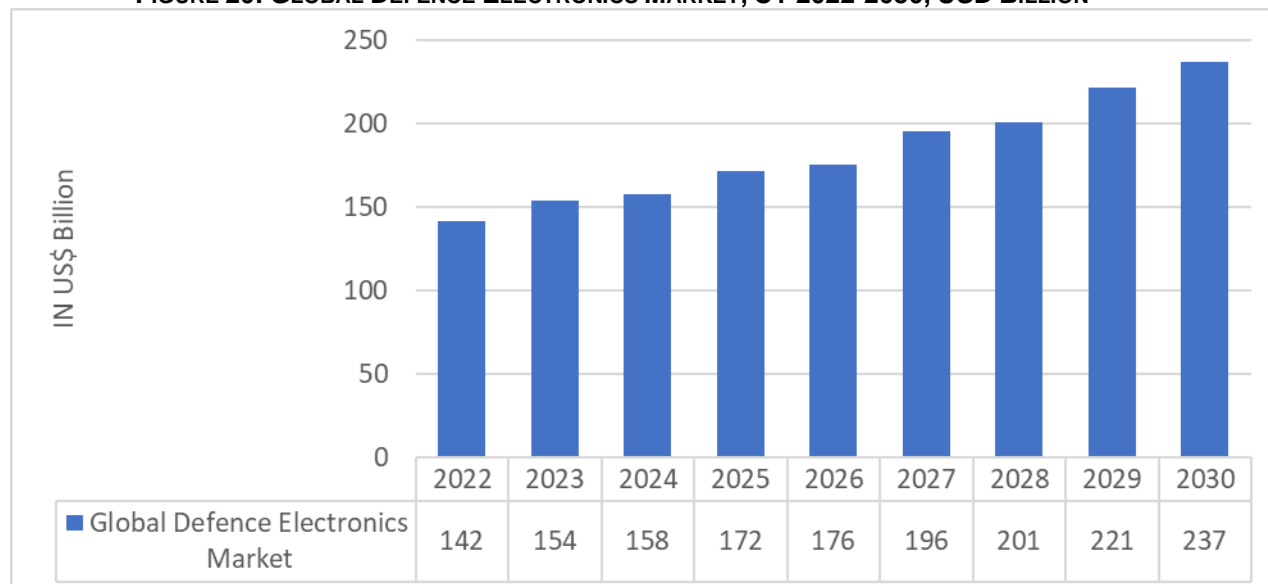
FIGURE 19: TRENDS ACROSS THE GLOBAL SEMICONDUCTORS MARKET, CY 2020-2030, USD BILLION



Note: Defence Component revenue segmentation for Semiconductor Technology.

Estimated Market Size and Market Projection

FIGURE 20: GLOBAL DEFENCE ELECTRONICS MARKET, CY 2022-2030, USD BILLION



Note: The Estimated Market Size and the Projected Values for the Global Defence Electronics Sector have been showcased in this figure. A top down and a bottom up approach was used to calculate the estimated market size. The values are mentioned in USD Billion and are in calendar year.

The estimated market size for the Global Defence Electronics Market is expected to be US\$ 142 Billion for the year 2022. Driven by the proliferation of multi-domain operations, proliferation of network-centric command and control, and improved forms of surveillance (for example, shift from passive to active radars) further driven as a consequence of the Russia Ukraine war, the market is poised to reach a forecasted value of US\$ 237 Billion by the year 2030, with a CAGR of roughly 6.6%. The increasing number of policies related to the nation's security and mounting demand for digitalized solutions is forecast to fuel the market growth.

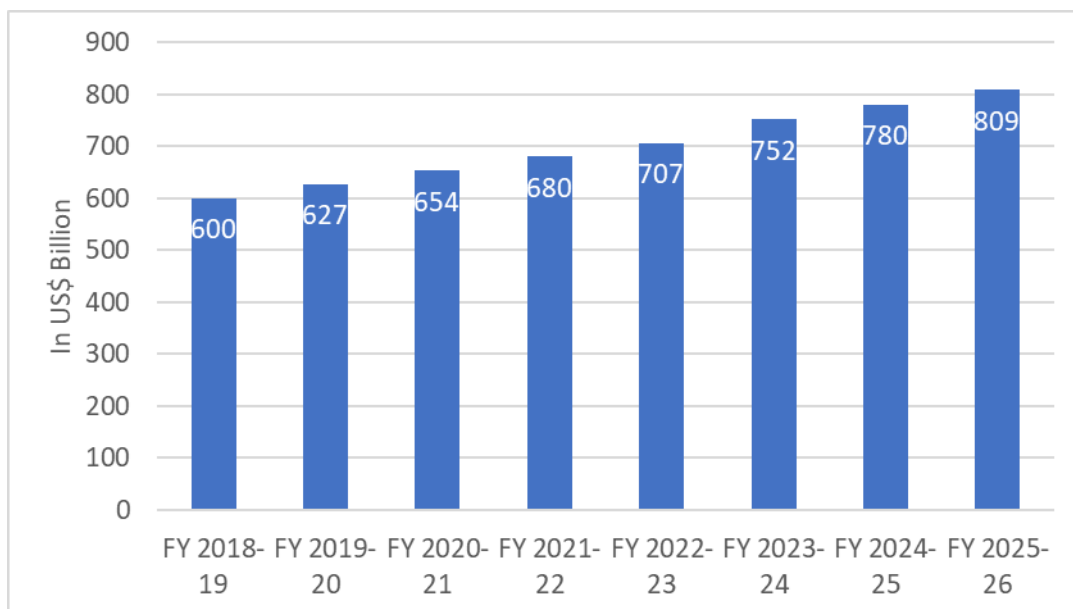
Market Size of Printed Circuit Board Assembly

The Global Electronics Market is estimated at around US\$ 2 Trillion in FY 2019, out of which PCBA is expected to account to around 40%-50% of the total market value of Global Electronics Market. The Global PCBA market is expected to account to around US\$ 600 Billion. The key consumer electronics which are key drivers for the PCBA are

- Mobile phones
- Tablets, notebooks and desktop PCs
- Smart TVs, audio devices, video and music streaming devices
- Consumer appliances (washing machine, refrigerator, AC and heaters)

These four categories account to around 46% of the overall Global Electronics market.

FIGURE 21: GLOBAL PCBA MARKET, 2019-2026, USD BILLION



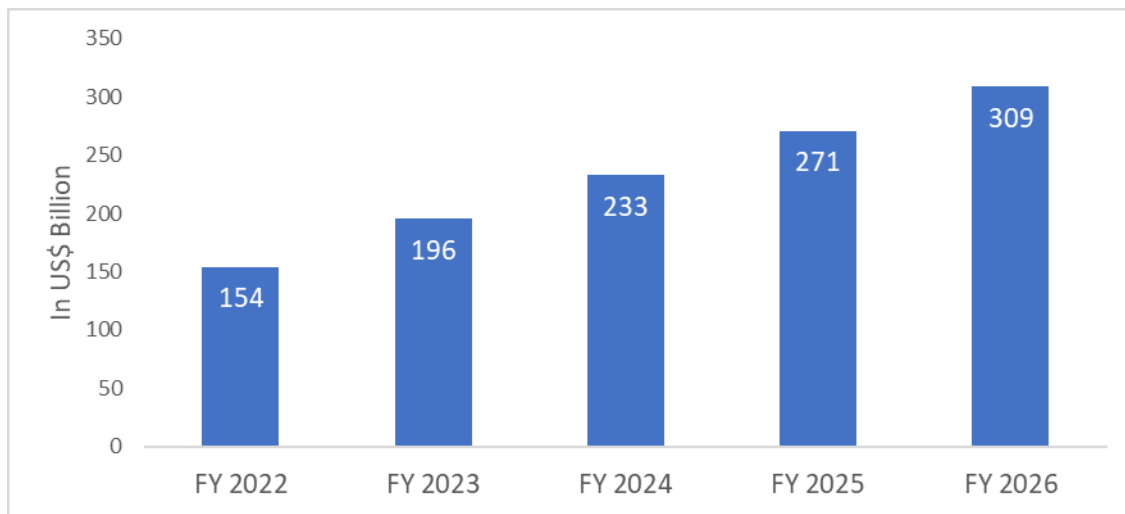
Note: FY 2018-19 to FY 2020-21 are actuals| FY 2021-22 onwards are forecast.

INDIA ELECTRONICS MARKET

Indian Electronics Market

The Indian electronics market accounts for around 3.6% of the Global Electronics Market in 2019. The market in 2021 was around US\$ 118 Billion and this is expected to grow to US\$ 309 Billion by 2025-26. The National Policy on Electronics (NPE) 2019 had set a target of reaching \$300 bn by 2026. The expected growth in Indian Electronics Market is shown in the figure.

FIGURE 22: INDIAN ELECTRONICS MARKET, FY 2022-FY 2026

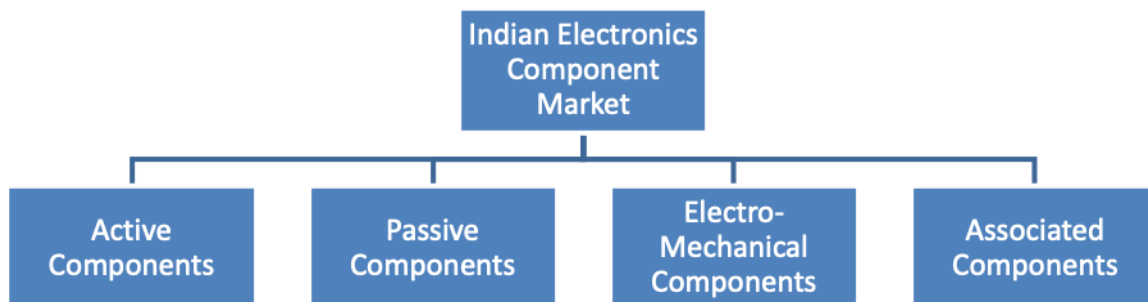


Source: Frost & Sullivan Analysis

Indian Electronics Component Market

The Indian Electronics Component Market can be segmented as shown in the figure below:

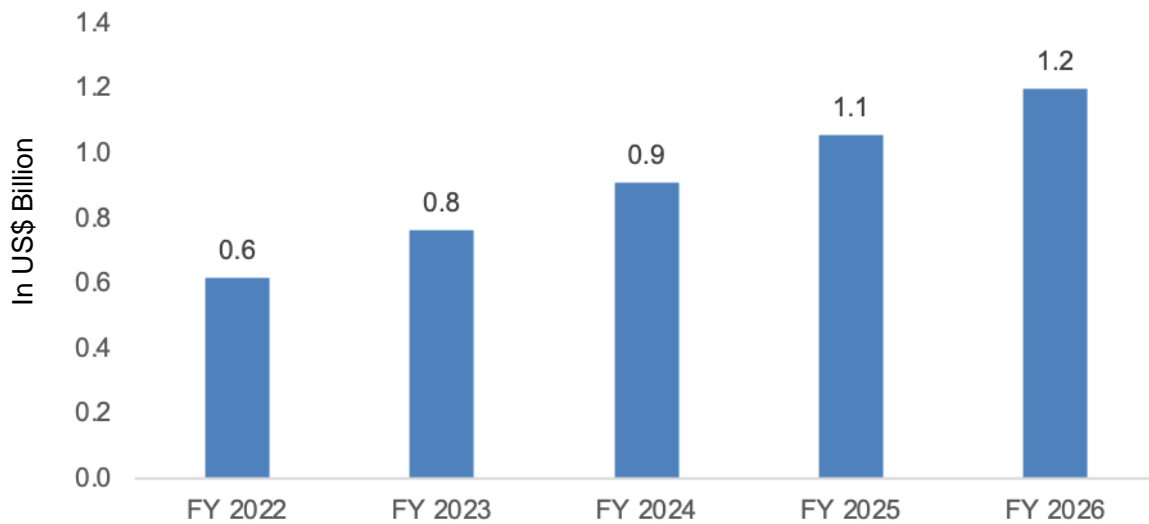
FIGURE 23: INDIAN ELECTRONICS COMPONENT MARKET SEGMENTATION, 2022



The products like PCB boards are in the Electro-Mechanical Components segment. The key subcategories of this segment are PCB, Connector and Cables which accounts to 70% of this segment.

Indian PCBA Market

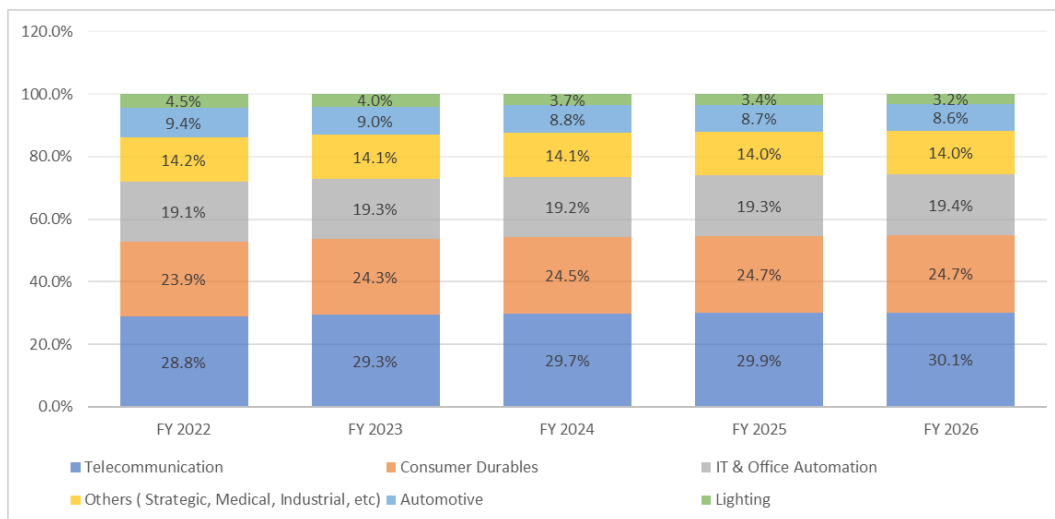
FIGURE 24: INDIAN PCBA MARKET, FY 2022-FY 2026



Source: Frost & Sullivan Analysis

The Indian PCBA market is estimated to reach US\$ 0.618 Billion in FY 2022 and is estimated to reach around US\$ 1.2 Billion in FY 2026 at a CAGR of 19%. The growth will be driven by increased adoption of active surveillance solutions, unmanned systems, digital communication systems, and network-based command and control systems in defence. The end use applications of PCBA in India are given below.

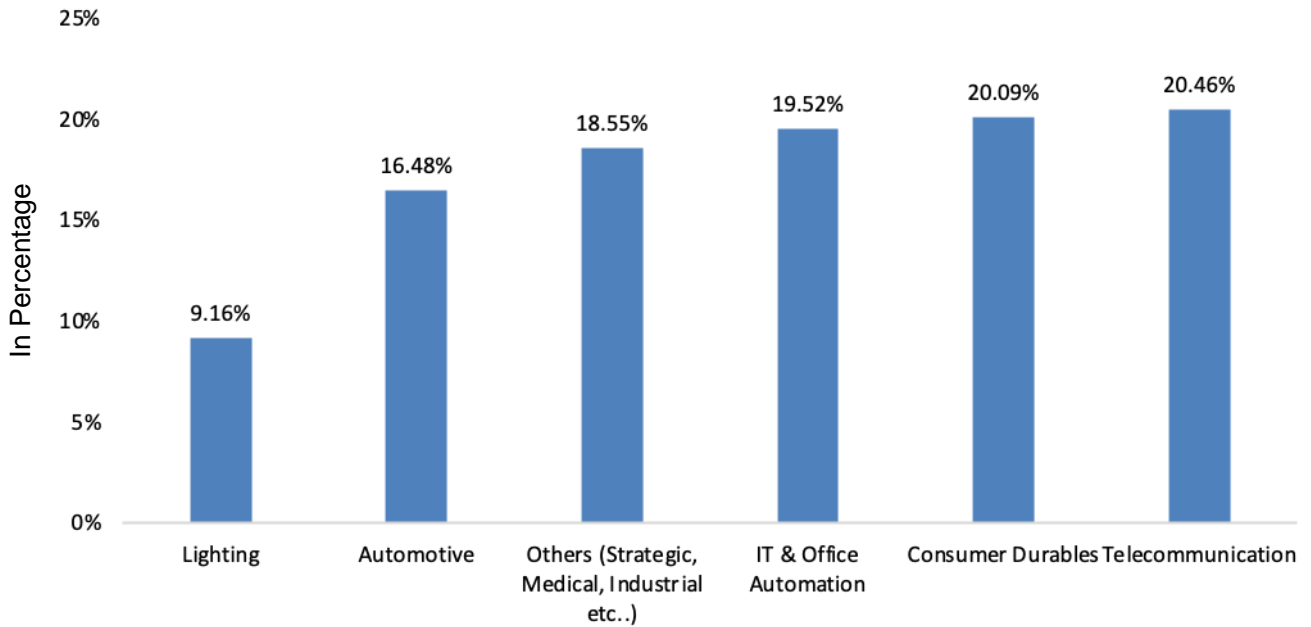
FIGURE 25: INDIAN PCBA MARKET, BY END INDUSTRY, FY 2022-FY 2026



Source: Frost & Sullivan Analysis

The other segment of PCB which includes defence application is expected to grow at a CAGR of around 19% between the period FY 2022 to FY 2026. The leading segments are Consumer Durables and Telecommunication which are expected to grow at a CAGR of more than 20% during the forecast period.

FIGURE 26: INDIAN PCBA MARKET, CAGR BY END INDUSTRY, FY 2022-FY 2026



The PCBA market for (Non- Consumer Durable) Lighting, Automotive, Strategic, Medical, Industrial, IT & Office Automation and Telecommunication is expected to grow from US\$ 470 Million in FY 2022 to US\$ 935 Million in FY 2026 a CAGR of around 19%

INDIAN DEFENCE ELECTRONICS MARKET

Market Brief

The Indian Market is presently focused on the indigenous development of Defence electronics amongst other segments. The country plans on increasing the value add for each step in the integration and manufacturing process for defence equipment. India has a strong IT and software industry. As of 2021, the number of people who are directly employed in the IT-BPM sector was about 4.5 Million. The indirect job creation for this market is estimated to be about 12 Million. The use of this manpower to increase local development of defence electronics is poised to create additional job opportunities as per the multiplier effect.

In 2019, the Indian government undertook financial initiatives that are likely to benefit offset disability. The government also took initiatives to promote the Electronics Manufacturing clusters in order to support the design and manufacturing of electronics manufacturing units.

On studying the overall defence ecosystem, it is noted that India accounts for 15% of Global arms trade imports. The three positive indigenization lists consists of roughly 1238 items which includes defence electronics, and sensors of various types.

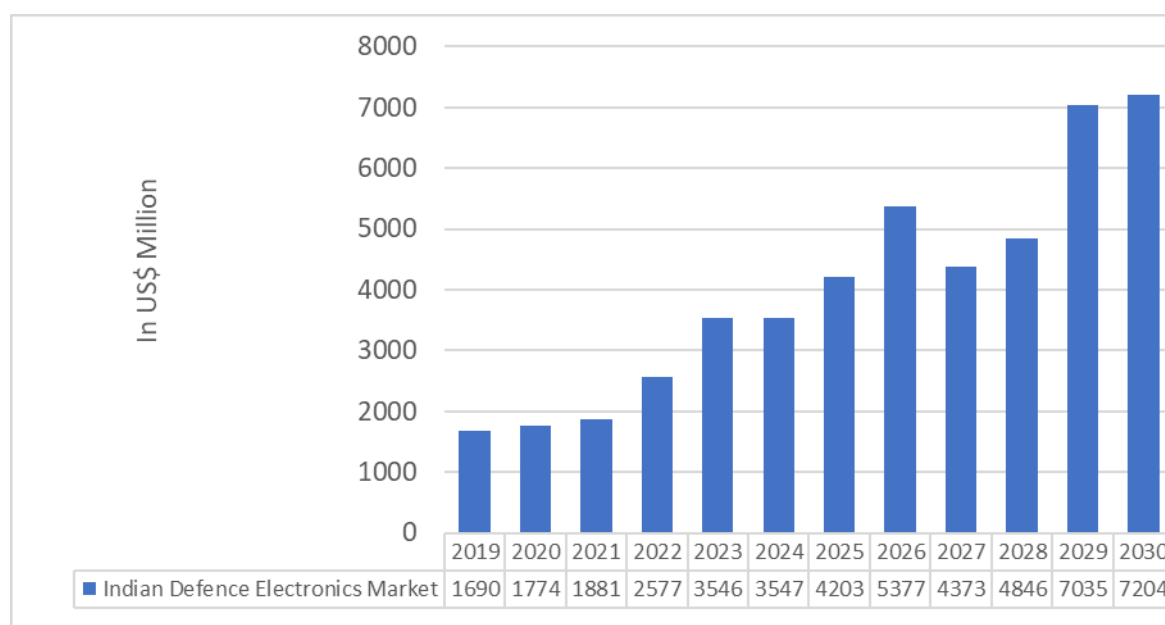
Change in Market Trends

According to the Economic Diplomacy Division, Ministry of External Affairs it is noted that 65% of India's electronics requirement was imported in the year 2018. Less than 10% of the electronic systems were entirely developed in India, and roughly 25-30% of the systems were assembled. As of 2021, France is noted to be one of the key component and equipment suppliers for the Indian space program. The companies ISRO and CNES are presently working on an agreement for the implementation of the Trishna infrared satellite project between 2024-2030.

However, the number of market opportunities within the defence manufacturing domain has been increasing within India owing to the instating of the "Atmanirbhar Bharat" programme. The Indian electronics equipment market was heavily reliant on the Chinese manufacturing sector. However, geo-political tensions between the two nations have accelerated the growth in local manufacturing within India. Moreover, the brewing geo-political tensions between India and its neighbouring countries, i.e. strained relationship with Pakistan and the growing instability in Afghanistan after the Taliban takeover, is also expected to boost the defence procurement rate. Increased market penetration of electronics and electronic warfare are some of the other factors which are poised to boost the market growth. India has also entered several strategic bi-lateral relationships to strengthen its stance in the global markets.

Estimated Market Size and Market Projections

FIGURE 27: ESTIMATED MARKET SIZE AND MARKET PROJECTIONS FOR INDIAN DEFENCE ELECTRONICS MARKET, US\$ MILLION



Note: Frost & Sullivan Analysis, all forecast period is in calendar year. 2019-2021 are actuals and 2022-2030 are forecast. The CAGR is 13.71% between 2022-2030. All years are in CY.

The estimated market size for the Indian Defence Electronics Segment is noted to be US\$ 2577 Million for the year 2022. The market is expected to reach US\$ 7204 Million by the year 2030. The overall growth in market size is due to the increased investment in indigenous programs such as the Future Ready Combat Vehicle (FRCV) and the Future Infantry Combat Vehicle (FICV). India's reliance on external markets is poised to reduce during the forecast period owing to the country's burgeoning defence capability. The market is poised to grow with a CAGR of 13.71% between 2022-2030.

It was noted that the Indian Defence Electronics Market was growing at a CAGR of 4.5% between 2017 and 2021. The Market was evaluated at USD 1.88 Billion for the year 2021. The use of Indian components across Global supply chains, for instance, in the Israeli UAS and European Combat Aircraft Market is noted to be a key driver for the Indian Defence Electronics Segment. At present, roughly 60% of electronic components are supplied by Foreign OEMs. Additionally, Electronics account for 25%-35% of cost of platforms used by the Indian Armed Forces. The future market valuation is to be bolstered by new combat aircraft acquisition, submarine building and T-72 replacement.

There is a strong focus and initiatives by the Government of India in the aerospace and defence sectors especially for Private players including Micro, Small and Medium Enterprises. With defence public sector undertakings focussing on specialisation and

integration and sub-component manufacture being outsourced to the private sector, there are significant opportunities for the private sector.

Aatma Nirbhar Bharat programme

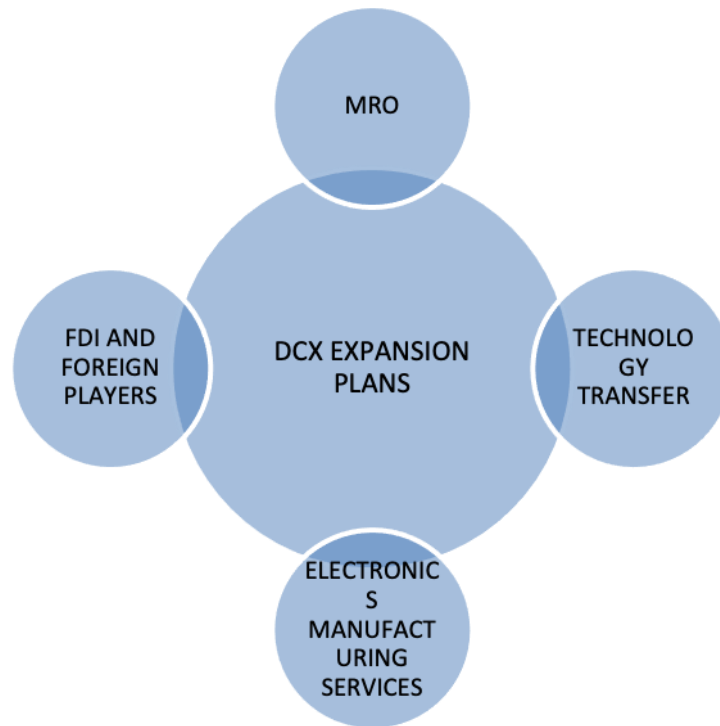
Measure	Description
Positive Indigenisation list'	To incentivise domestic production and limit imports, the Defence Ministry has banned the import of 209 defence related equipment and components. Services can only source the listed equipment from Indian vendors Equipment covered includes segments such as electronic warfare, sensors, radars, Unmanned Aerial Systems, amongst others. The Government has also introduced the 3rd positive indigenisation list that bans the import of 780 LRU items that will going forward have to be procured from the domestic industrial base. This will drive further development of the domestic Indian defence industry.
Budget Allocations	68% of capital procurement budget has been earmarked for domestic defence procurement for FY 2022-2030.
Corporatisation of Ordnance Factory Board ("OFBs")	The government aims to corporatize OFBs in a bid to improve production efficiency and transparency. There are 41 ordnance factories in India, which source components from Tier 2 and Tier 3 suppliers.
Foreign Development Investment ("FDI")	The FDI limit under the automatic route has been increased from the current 49% to 74%. The increase will encourage foreign manufacturers to invest in India with confidence as they will have a controlling stake in a joint venture.
Indian Offset – Self Reliant	This measure encompasses design, development, and manufacture as part of its mandate, and encourage OEMs and design firms to form long term partnerships with India's defence sector.

DCX has established a leadership position in the Indian aerospace and defence industry amongst other companies, in the segment of - System Integration Business - as a result of long operating history and the experience of its management team.

The company's in-depth knowledge base and understanding of the aerospace and defence industry, particularly in India positions DCX to take advantage of the growth in these sections.

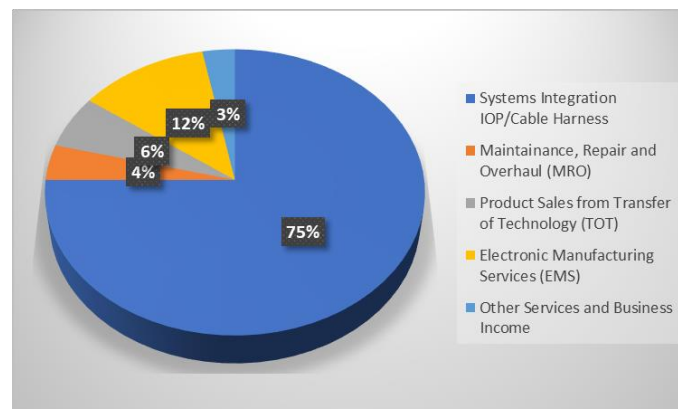
Market Size for Planned Expansion by DCX

FIGURE 28: PLANNED EXPANSION BY DCX



DCX Business Strategy Growth Focus FY 2022-2026

FIGURE 29: BUSINESS STRATEGY GROWTH FOCUS FY 2022-2026

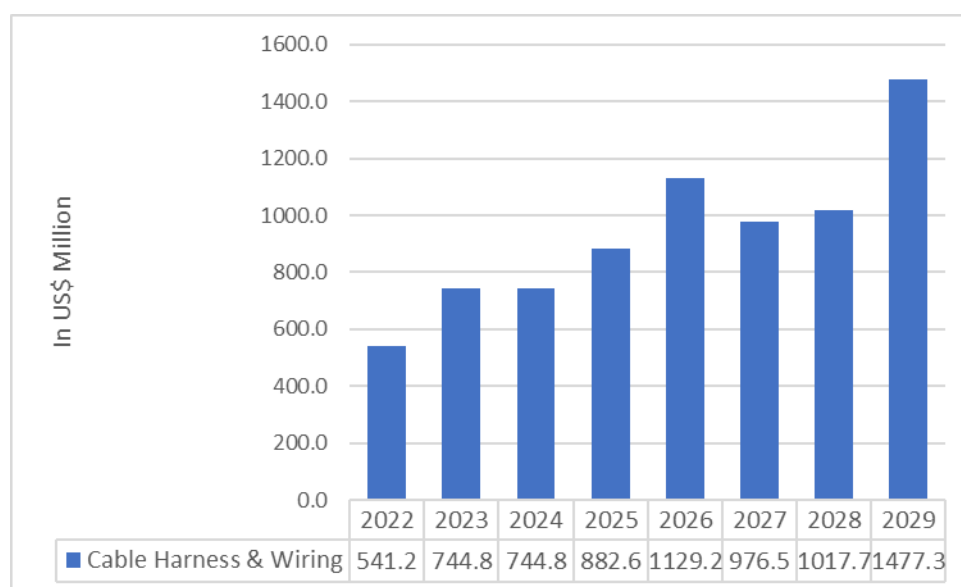


DCX has planned its cumulative revenue stream for the years FY 2022 to FY 2026 based on the above segments. System Integration & Cable Harness is expected to account to 75% of their total cumulative revenue in the next 4-5 years. This is expected to be followed by Defence Electronics Manufacturing Services (EMS), which is expected to account to 12% of their future revenue. MRO is expected to account for around 4%. The market forecast for all these segments have been discussed in detailed. However, business segments like ToT cannot be quantified on a yearly basis.

Cable Harness and Wiring

The cable harness and wiring segment is expected to increase due to increased indigenisation of defence production. Cable Harness and Wiring are basic requirement across land, naval and air platforms.

FIGURE 30: POTENTIAL MARKET SIZE FOR DCX IN INDIAN CABLE HARNESS AND WIRING, US\$ MILLION



Source: Frost & Sullivan

Most growth opportunities and programmes in defence translates to an increased market potential for cable and wire harnessing. This area is part of DCX’s key expertise, as the company manufactures a diverse portfolio of cables and related components including RF, Coaxial, Mixed Signal, Power, Data, Submergible, Shielded and Conduit Assemblies which includes connectors of types Coaxial, Triaxial, Quadriaxial, RF, Circular MIL, MIL D-Sub & micro-D-sub, Filter and Arinc connectors. These are used in submarines, tanks, fighting vehicles, helicopters, UAVS, targeting pods, etc., as these components deliver performance in extreme conditions. Conclusively, an increased investment in the electronics segment will drive the demand for electronic subsegments like cables and connectors within the Indian market – an opportunity that DCX is well positioned to seize. Globally military spending will be on the rise due to geo political tension with Russia and China. Already following initial approval of its 2021 budget, the Japanese Government added \$7.0 billion to military spending. Eight European North Atlantic Treaty Organization (NATO) members have already reached the Alliance’s target of spending 2 per cent or more of GDP on their armed forces in 2021. Germany—the third largest spender in Central and Western Europe—spent \$56.0 billion on its military in 2021 and has committed to spend more over the next few years as a consequence of the Russia Ukraine war. With countries procuring next generation air crafts, submarines and an increase in UAV procurement as a force multiplier the next few years will see an uptick in procurement activities.

Electronic Manufacturing Services

Globally, the revenues of the top 50 EMS companies were about US\$ 344 Billion in 2019, which accounts for 16% of the Global Electronics market by value. Most of the major manufacturers are considering the policy of “China+1”, where India is the most favoured destination. It is also important to note that most of the manufacturers have their manufacturing presence in South East Asia or China. The Indian Government is trying to attract these companies towards India to strengthen the export capabilities in Electronic Manufacturing. In India, TATA is considering setting up a semiconductor manufacturing facility with an investment of around US\$ 300 Million.

Defence Electronics is noted to be one of the substantially upscaling markets within India. Increased domestic production has been encouraged by governing bodies in this sector to reduce the market’s reliance on imports. Brewing geo-political tensions between India and China serves as a key driver for this cause.

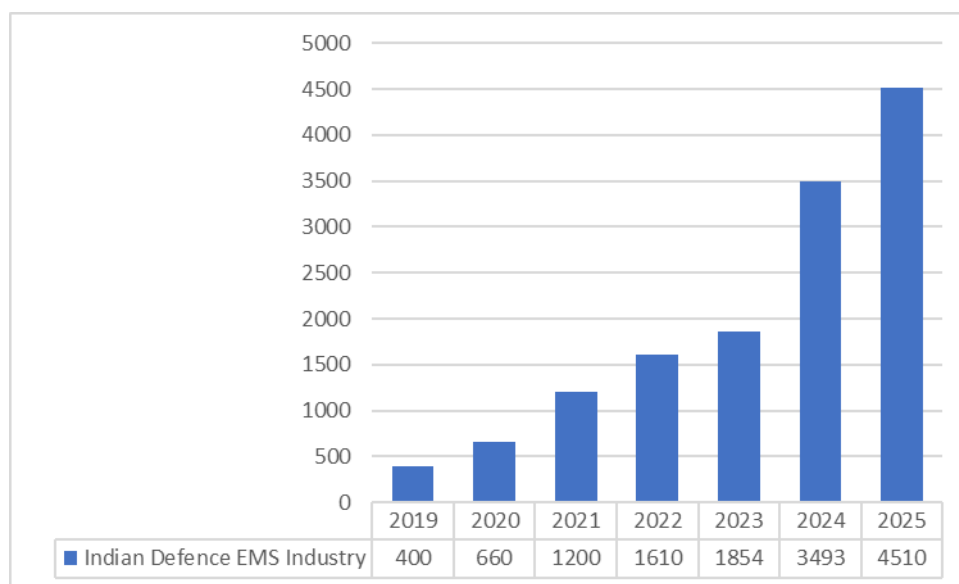
The defence electronics segment is poised to grow owing to the rapidly evolving trends in the semiconductors market. The imbalance of supply and demand in the semiconductors sector is anticipated to be one of the key factors that propel this growth. The onset of the pandemic led to an increased dependence on IT infrastructure. Moreover, the spread of the pandemic caused a ripple effect in the entire defence sector owing to the changing alliances globally. Thus, a substantial increase in demand was witnessed amongst both the industries. India has also been attempting to cultivate and pull electronic chip manufacturers into the economy. Advanced semi-conductors are noted to be an integral part of the defence sector. On a global basis, Taiwan is one of the key suppliers of this product.

Another driver of defence electronics and associated integration opportunities in India is the future proliferation of more advanced ISR solutions – particularly, radar systems. Several Indian combat aircraft continue to use passive radar solutions. Moving forward, passive radars will be replaced with indigenous AESA radar systems. The Electronics and Radar Development Establishment (LRDE) recently developed an AESA radar for combat aircraft with 95% indigenous content. Passive radar systems on the Tejas Mark 1A, Sukhoi Su-30 Mki, and MiG 29-K will be replaced with AESA solutions, whilst new Tejas aircraft procured are likely to be outfitted with AESA as standard. A similar procurement trend is anticipated from the Indian Navy. Further, the proliferation of new threats – faster missile systems, for example, would mandate a technological update of surveillance and missile defence radar systems – both on platforms, and on military bases. Precision approach radars in several defence bases are in excess of twenty years old and would require recapitalisation. The shift from passive to active radar solutions will thus provide opportunities for the manufacture, assembly, and integration of electronic radar modules, as well as related cabling. This is another opportunity that DCX can easily capitalize on based on the incumbent’s existing capabilities and future plans.

India has also been investing the development of low-cost semi-conductors which is poised to boost the supply of this product across verticals like aerospace and defence. The government has also given impetus to indigenous production through a INR

76,000 Cr. production linked incentive scheme for the Indian semiconductor industry. The technology can be integrated to ICs (integrated circuits) with a voltage of up to 20V. Low-cost semiconductor technology is noted to be in the fourth stage of the Readiness Level. The government in 2022 has committed \$10bn of incentives to tempt manufacturers to set up new semiconductor fabrication plants and encourage investment in related sectors. This might be an appropriate time to make such a push as countries attempt to decouple their supply chains from China, which has invested heavily to become a leader in the semiconductor industry. Additionally, with multiple covid strains causing chaos on supply chains combined with multiple lockdowns in China has sent companies and governments on a hunt for alternative sources of production. Singaporean group IGSS Ventures has already signed a memorandum of understanding with the Tamil Nadu state government to set up a factory within three years for wafers. The Israeli group ISMC has signed a letter of intent with the state of Karnataka, home of India's tech capital, Bangalore, to build a \$3bn semiconductor chipmaking plant. Additionally Foxconn has teamed up with Indian group Vedanta to build a semiconductor plant, surveying sites in the western Indian states of Gujarat and Maharashtra.

FIGURE 31: MARKET SIZE FOR INDIAN EMS INDUSTRY, US\$ MILLION



Source: Frost & Sullivan Analysis | FY2019 to FY 2021 are actuals, rest of the years are estimated.

The Indian EMS Industry is expected to grow from US\$ 400 Million in FY 2019 to US\$ 4510 Million in FY 2025 at a CAGR of around 49.8% .

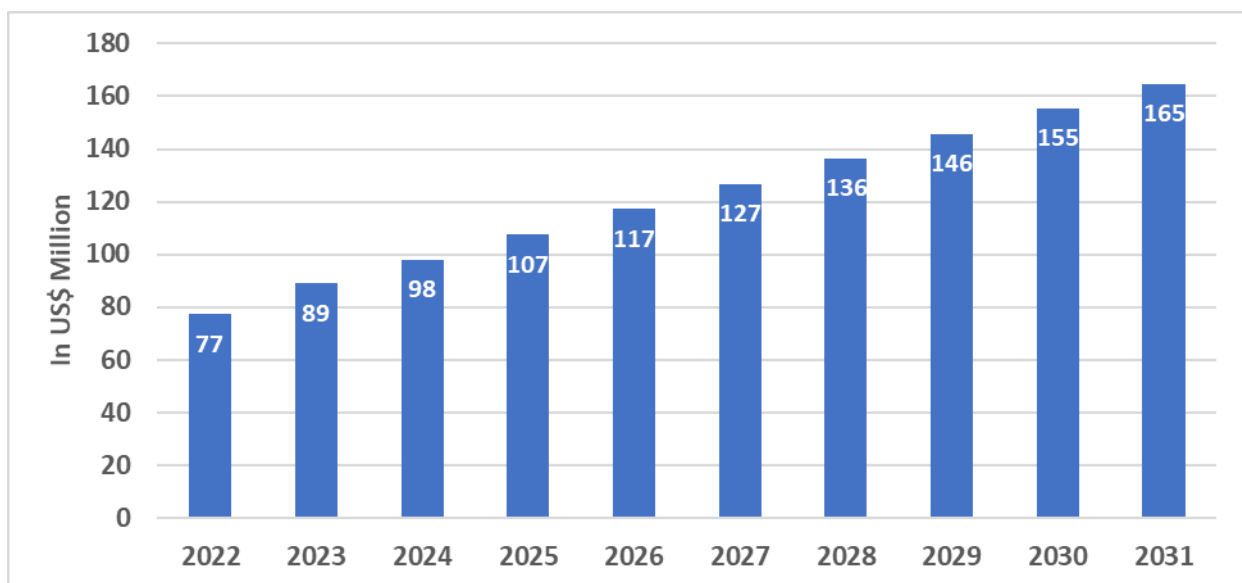
India made an investment worth US\$ 9.67 Billion to attract roughly 100 semiconductor chip manufacturing companies in the coming 4 years. The current semiconductor demand in India is noted to be US\$ 49 Billion, by the year 2025 the semiconductors market is expected to attain a value of US\$ 100 Billion. A study on the Indian Semiconductor market suggests that the country consumes roughly 5% of global semiconductor production. India presently produces semiconductors via in-house

foundries of the Indian Space Research Organisation (ISRO) and the Defence Research and Development Organisation (DRDO). However, India accounts for roughly 45% of research and design carried out within the semiconductor industry via a pool of 20,000 engineers. The domestic value addition for the Indian semiconductors sector is noted to be roughly 15-20%.

MRO

The Maintenance, Repair and Overhaul is a term referred to the overall maintenance of the aircraft, both commercial and defence aircraft. This is a common term used for both the rotary platforms and fixed wing platforms. In the Indian context, the defence MRO is typically done in-house. The commercial MRO is further classified into A, B, C and D check, this is based on the age of the aircraft and the flying hours. This is also referred to as line, component, engine and airframe. The airlines in India have a strong capability in line and component checks, however airlines are usually flown outside the country for C and D checks.

FIGURE 32: POTENTIAL MARKET SIZE FOR DCX IN MRO (CABLE HARNESS), US\$ MILLION



Source: Frost & Sullivan Analysis

India is noted to be the third largest buyer of commercial aircraft with over 1000 aircraft currently on order similarly Indian defence is also heavily investing in the defence air platforms. The purchase value translates to 200-300 major maintenance checks. The increased replacement of ageing aircraft fleet is one of the key factors which is poised to drive the growth margins. In case of defence aircraft, the MROs are done in-house, however there are components or spares which are procured from private organizations.

The Indian MRO market attained a value of US\$ 1.7 Billion in 2021. The Indian Commercial MRO Market is poised to grow with a CAGR of roughly 9% between 2022 to 2031. The global MRO market is estimated to expand with a CAGR of 7.7% between

2022-2030, as the market expands from \$ 64.7 Billion in 2022, to \$ 117 Billion in 2030. Currently most of the major MRO is happening outside India, mainly due to the lack of manpower and facilities to undergo maintenance in India. The Electronic cables and connectors segment are expected to account for 4% of the total Indian MRO market. It is estimated that the potential market for DCX is around US\$ 165 Million in 2031.

Transfer of Technology

Transfer of technology is poised to be one of the key factors which is anticipated to drive the market size for the hardware components vertical. Connectors and cables are used across various turnkey and subsystems assembly; hence an increased number of technology transfer contracts on both national as well as global basis are poised to boost the demand for cables and connectors. Technology transfer agreements have a major advantage in terms of defence offsets. Locally manufacturing companies in India would gain a potential opportunity to explore international markets via the same.

On studying the recent technology transfer contracts signed by India it is noted that DRDO signed 30 agreements with 16 Indian companies in the year 2019 at the Vibrant Goa Global Expo. An increased number of nationally collaborative agreements are expected to boost the domestic manufacturing capability in India. According to the multiplier effect, an increased number of indigenous programs are anticipated to boost the direct indirect and induced employment in India. Earlier in 2020, the government also announced 10 PLI (Production Linked Incentives) Program which is expected to bring new investments in the consumption and export heavy sectors. In the commercial market, a similar program was launched to promote the local manufacturing of mobile phones and electronic components.

In 2019, India also signed a defence technology transfer agreement with the US and around 900 ToT licensing agreements had been signed as of 2019 according to a statement from Defence Minister. The Industrial Security Annex (ISA) provided an avenue for Indian and US private companies to work collaboratively towards developing defence technologies. The instating of internationally collaborative agreements provides future scope for DCX to explore external markets. Under the Defence Technology and Trade Initiative, India and the US have also signed three agreements in order to boost their mutual capacity for the production of critical technologies.

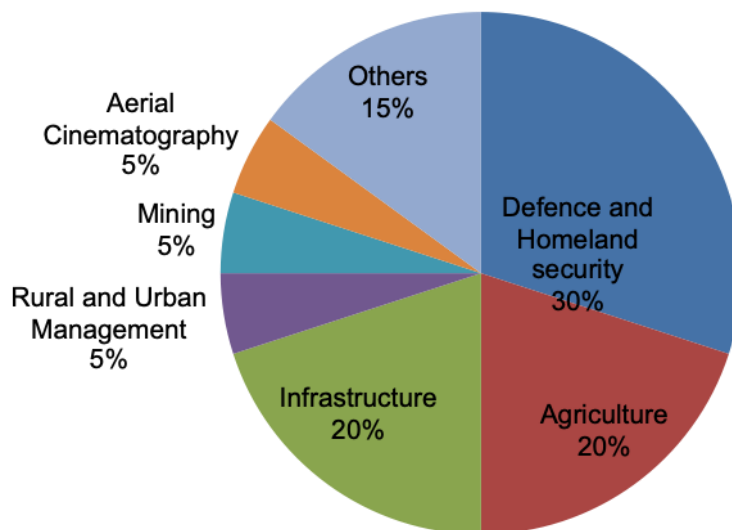
Since 2017, UK is also noted to be one of the key technology transfer partners for India. The two governments had come to an agreement in order to co-produce military platforms and weapon systems. The countries planned on positioning themselves in a strategically stronger position in the arms exports trade via this agreement.

Opportunities for UAVs and drones in India

Commercial UAV Market in the Indian Context

India serves as a lucrative market for drones owing to the increased market opportunities created by commercial and defence domain. The use of drones across commercial verticals like aerial cinematography, land survey, mining and other applications like disaster management and overseeing construction applications has led to the growth of the market. A procurement framework for usage of unmanned aerial vehicles or drones is in the works. The focus of the framework is on the commercial purposes of drone usages. The purpose of the framework is to enable public sector enterprises to decide whether they want to buy drones as equipment or use them as a service. At the beginning of 2022, the government notified the drone certification scheme in order to spur the drone manufacturing industry in the country and make certification simpler, faster and transparent.

FIGURE 33: SECTOR WISE REVENUE ESTIMATES IN INDIA (2021-26)



Source: <https://www.businesstoday.in/magazine/technology/story/the-rise-of-the-drones-308606-2021-10-06>

Defence UAV Market in India

Some of the essential features to be included in the design of a UAS system include:

1. The modern stealth technology in addition to the size of the drone should make them difficult to detect. The drones should also have the ability to make

their own assessment of the surroundings in order to take autonomous decisions, i.e. choice of route via the use of sensors is one such example.

2. Technologies that enable unmanned autonomous strike capabilities against a spectrum of potential targets are to be enabled. The integration of these systems is poised to improve the flexibility of the UAVs to operate from multiple platforms which is expected to rationalise manning as well as financial effects. Additionally, flexibility in terms of basing and operational requirements is to be facilitated through the control of multiple UAV platforms from remote locations.
3. The sensors as well as payload are to be upgraded with the changing market technology. The military aviation sector is steadily moving towards an unmanned sector which is capable of performing multiple tasks. The UAVs are expected to have extended loiter time, in addition to providing real time, continuous information to the pilot picked via its system of sensors. The onboard computation of data is poised to increase within the UAVs market.

Impact of Drone Rules 2021 on the total market

The commercial market has been made more liberal and conducive to drones through the imposition of the Drone Rules 2021 by the Indian Government. The instating of this new policy improved UAS (Unmanned Aerial Systems) Rules in March 2021 which required excessive licensing as well as permissions. Roughly 10-12 licenses were required for research, development, manufacturing, importing, as well as operating drones. Other mandates affiliated to fines and technical requirements were also not favourable to the market. Some of the key market advantages induced due to the imposition of the Drone Rules include:

1. Reduction of licensing fees irrespective of the size of the drone, i.e. the remote pilot licensing fee was noted to be INR 300 which has now been reduced to INR 100 for all drone categories.
2. Pilot license requirement for non-commercial micro drones as well as Nano drones.
3. Relaxations were levied on various certifications as well as approvals concerning airworthiness, maintenance, manufacturing, import clearance, operator permit, acceptance of existing drones, and authorization of R&D associations. Student remote license was another criterion that reaped advantages through the imposition of the drone rules 2021.
4. Unique authorisation and prototype number have been removed from the requirements for approval. The type certification and unique identification numbers are required only for drone operations within India. Exceptions have been granted for drones that are manufactured for export purposes or imported.
5. Cargo deliveries are to be facilitated via the setting up of drone corridors.

6. The drone promotion council has been set up to facilitate healthy business communication.
7. Flight permission requirements for up to 400 ft have been removed from green zones, and areas ranging from 8-12 kms from airport perimeter have permissions ranging to 200 ft.
8. The ease of business operations within the drone market is to be facilitated via the digital sky platform, as a single window online system. This platform is to function as an interactive airspace map portraying red, green, as well as yellow zones for drone operations.
9. The process of transfer and deregistration of drones have been made easier.
10. Penalty for violations have been reduced to INR 1 Lakh.
11. The ease of doing business for foreign companies have been increased within India owing to the instating of these norms.

FDI Collaboration with Foreign Players

The Indian government has strategic ties with countries including Canada, Australia, China, France, Israel, Germany, Italy, Japan, Taiwan, Russia, South Korea, Saudi Arabia, United Arab Emirates, United Kingdom and United States. Some of the key FDI collaborations have been mentioned below.

US

The alliance between India and the US is based on a comprehensive strategic partnership over shared democratic values. US is noted to be one of the top FDI contributors within the Indian economy. A 44% increase in FDI equity flow was noted between the FY 2020-21 as compared to FY 2019-20. In the recent past, the two countries signed the agreement BECA, which was designed for the Electronic Exchange of Customs Data between postal operations. Other MoUs that entailed the strategic partnership of the two nations across domains like energy and healthcare were also signed.

UK

UK and India invested roughly US\$ 30.59 Billion (2000-2021) in foreign direct investment inflows. Presently, there are approximately 572 UK based companies operating within India, and they employ in excess of 4 Lakh people directly. UK represents roughly 5.59% of total FDI inflows. The imports from the UK were noted to attain a value of US\$ 3 Billion, while the exports were noted to attain a value of US\$ 5.4 Billion. The two nations have also been working on collaborative agreements that are poised to increase the number of start-ups across both, the UK and India. The FDI to GDP ratio for UK is noted to be 72%

France

India and France have been in a longstanding strategic partnership to strengthen their respective market stance in the global economy. The two nations are focused on promoting Indo-Pacific relations, intelligence and information sharing. The French

government has also been supporting India in its efforts associated with Atmanirbhar Bharat. France is noted to be India's 11th largest investor, and the cumulative FDI flows account for a value of US\$ 9978.33 Million. The bilateral trade between the two nations is valued at US\$ 7.86 Billion between April 2020 and Feb 2021. The FDI to GDP ratio for France is 32%.

Israel

Diplomatic ties between India and Israel were established in the year 1992 formally. In Feb 1992, Israel opened its New Delhi embassy and in the same year, India opened its Embassy in Tel Aviv. Since 1992, the bilateral relationship between the two nations has flourished. Since the establishment of these embassies, the bilateral relationship between the two nations has grown stronger in military, economic, agricultural as well as political levels. India is noted to be one of the largest trading partners for Israel.

The two countries are focused on increasing innovation and cooperation through a series of strategic agreements. Israel's Start Up National Central and India's International Centre for Entrepreneurship and Technology (iCreate) signed an MoU in order to promote innovation within their markets. The evolving strategic relationship between the two nations has led Israel to becoming one of the key trading partners of for India. Several companies across both the nations have entered a Joint Venture.

Between the year 2019-2020, the trade value between India and Israel was noted to register US\$ 4.95 Billion. The exports from India was valued at 67%, while the imports from Israel was noted to attain a value of 33%. Additionally, the FDI inflows from Israel were seen to attain a total value of US\$ 254.66 Million between April 2000 and September 2021. Israel's strong foothold in the aerospace and defence manufacturing domain is another factor which serves beneficial to the fast-evolving Indian defence sector. Roughly 80% of Israel's aerospace and defence produce is exported to over 60 overseas customers, and the turnover generated by this segment is anticipated to be roughly US\$ 5 Billion. In September 2021, Israel's FDI registered a growth of 4.5% of the country's nominal GDP.

The FDI agreement between the two countries has been shown in the following Table

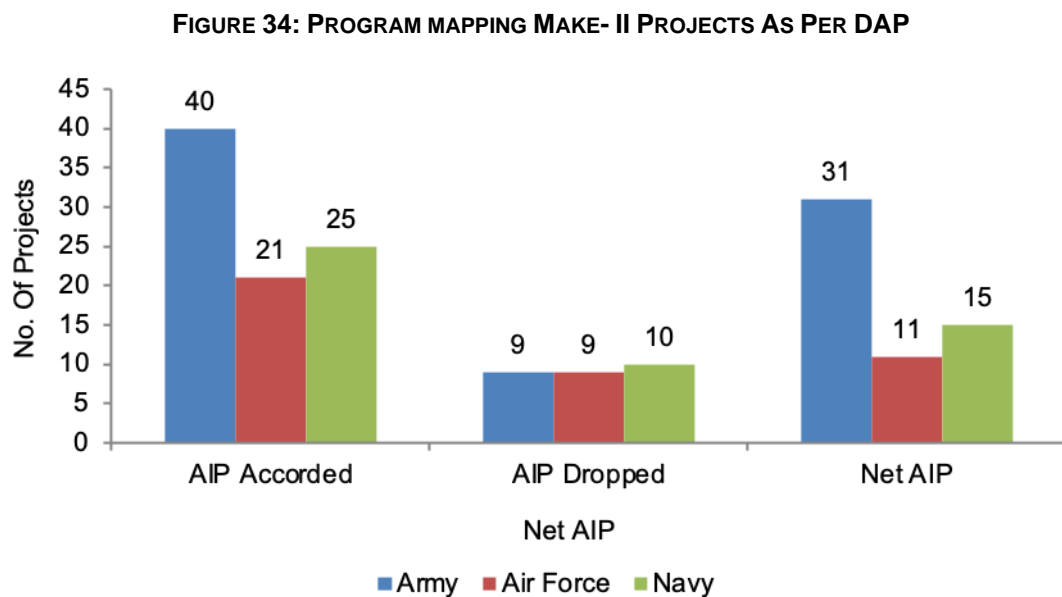
TABLE 8: DEFENCE FDIS, ISRAEL AND INDIA

Sector/Activity	% of Equity/ FDI Cap	Entry Route
Defence Industry subject to Industrial license under the Industries (Development & Regulation) Act, 1951 and Manufacturing of small arms and ammunition under the Arms Act, 1959	100%	Automatic up to 74% Government route beyond 74% wherever it is likely to result in access to modern technology or for other reasons to be recorded

In November 2020, India and Israel signed an MoU which entailed mutual co-operation of the two countries in the Healthcare and Medicine domain. The agreement is aimed at promoting research in relevant areas, in addition to exchange of medical resources and setting up of healthcare facilities.

Growth Drivers

Current and Expected Order Pipeline



Source: Indian Ministry of Defence

Few Key Projects Summary

- In February 2021, Bharat Electronics Ltd. received an order worth Rs 2,400 crore from Hindustan Aeronautics Limited for manufacturing and supplying 20 types of airborne electronic systems to be integrated on the LCA Tejas fighter aircraft. The supply of crucial avionic Line Replaceable Units (LRUs) is a part of the agreement for Digital Flight Control Computers, Weapon Computers, Air Data Computers, and LRUs for Radar Warning Receiver (RWR) and Head Up Display over a five-year period from 2023 to 2028. The LRUs have been indigenously designed and developed by DRDO Labs, Aeronautical Development Agency (ADA), Combat Aircraft Systems Development and Integration Centre (CASDIC) Aeronautical Development Establishment (ADE), and Central Scientific Instruments Organisation (CSIO). Bharat Electronics (BEL) has secured its largest ever order for Avionic Systems. Two BEL's Strategic Business Units, BEL - Panchkula, and Electronic Warfare &

Avionics (Bengaluru, Karnataka) will execute the order for the supply of Avionic Systems pertaining to 83 Tejas MK1A fighter aircraft (Haryana).

- The Cabinet Committee on Security (CCS) sanctioned the purchase of 73 LCA Tejas Mk-1A fighter aircraft and 10 LCA Tejas Mk-1 trainer aircraft under a contractual agreement worth INR 45,696 Cr, as well as Rs 1,202 crore for the development as well as design of infrastructure. The Light Combat Aircraft Mk-1A version is a state-of-the-art current 4+ generation fighter aircraft developed and manufactured entirely in India. This aircraft, which is fitted with critical operational abilities like Electronic Warfare (EW) Suite, Beyond Visual Range (BVR) missile, Air to Air Refuelling (AAR), and Active Electronically Scanned Array (AESA) Radar, will be a powerful platform to meet the operational needs of the Indian Air Force. The Aircraft Development Agency (ADA) of the Defence Research and Development Organisation (DRDO) designed the Light Combat Aircraft Tejas, which is manufactured by HAL.
- In February 2021, Bharat Electronics received a contract worth Rs 1000 crore order from the Ministry of Defence to develop software-defined radio tactics (SDR-Tac). The Defence Electronics Laboratory (DEAL) of the Defence Research and Development Organization (DRDO), in collaboration with a consortium of local agencies and industry (including weapons and electronic engineering systems (WESEE), Bharat Electronic, The Centre for Artificial Intelligence and Robotics (CAIR), and the Indian Navy), will provide strategic depth to the Indian Navy. Within three years, the delivery will take place. The latest SDRs would be provided to the Indian Navy by DRDO and BEL with the highest level of security.
- The Indian Navy signed a contract with DPSU, and BEL, for manufacturing fully comprehensive Naval Anti Drone System (NADS). The NADS is the first locally built anti-drone system to be deployed into the Indian armed forces. It is developed by the Defence Research and Development Organisation (DRDO) and produced by BEL. To identify and jam hostile micro drones, the NADS employs a variety of sensors, including electro-optical/infrared (EO/IR) sensors, radar, and radio frequency (RF) detectors.

COMPETITIVE PROFILE

The Indian Defence sector is entering a self-sustaining and highly indigenous market with DPSUs and companies shifting towards becoming component suppliers, integrators, as well as defence prime. The key competitors for DCX in the Indian market are discussed in this section.

The steps taken by the Government to indigenous Defence production capability within India has helped the SMEs in this sector to generate more business. The Indian companies that have gained significant experience in the Indian market are also offset fulfilment partners to foreign players. The next objective of the Indian players is to move towards full system manufacturers, for example a company specializing in the development of RF components would further build complete radar systems. This section covers in detailed the key competitors of DCX.

FIGURE 35: CAPABILITY COMPARISON OF DCX AND COMPETITION

SL.No	Peer Entity/Capability Matrix	System Integration	Cable & Wire Harness Assembly	MRO	EMS	Electro-Mechanical Assembly
1	DCX SYSTEMS LIMITED	✓	✓	✓	✓	✓
2	ASTRA MICROWAVE PRODUCTS LIMITED	✓	✗	✓	✓	✓
3	ALPHA DESIGN TECHNOLOGIES PVT LTD	✓	✗	✓	✗	✓
4	BHARAT ELECTRONICS LIMITED -BANGALORE	✓	✗	✓	✗	✓
5	CENTUM ELECTRONICS	✗	✗	✗	✓	✓
6	CYIENT DLM PVT LTD	✓	✓	✗	✓	✓
7	SASMOS HET TECHNOLOGIES	✗	✓	✗	✗	✗
8	ALMPHENOL INTERCONNECT INDIA PVT LTD	✗	✓	✗	✗	✗
9	DATA PATTERNS PVT LTD	✓	✗	✗	✓	✓
10	HELA SYSTEMS PVT LTD	✓	✗	✓	✗	✓
11	KAYNES TECHNOLOGY INDIA PVT LTD	✗	✗	✗	✓	✗
12	ROSSEL TECHSYS	✓	✓	✗	✓	✓
13	APOLLO MICRO SYSTEMS	✗	✗	✗	✓	✓
14	PARAS DEFENCE	✓	✗	✗	✓	✓

DCX is uniquely positioned to partner with major government and Private Indian/global defence entities, and to independently seize future defence manufacturing and integration related opportunities because of its strong capabilities across the five inter-

related segments – System Integration, Cable & Wire Harness Assembly and Electro Mechanical Assembly. The company also plans to expand into MRO and EMS segments in the short term. This broad-based capability mix is highly sought after, especially by foreign OEMs looking for strong offset partners in India for major defence contracts, and is one of the reasons why global defence primes continue to seek out DCX as a key partner to tap the Indian defence market.

Earnings before interest, depreciation, taxes and amortization (EBIDTA) indicates the company’s performance and is calculated by subtracting interest on debt financing, depreciation on assets and equipment, taxes and amortization.

Return on Capital Employed (RoCE) is a measure of how effectively a company has used its capital. The formula used to calculate RoCE is Operating Income/ Capital Employed.

Return on Equity (RoE) measures the return stockholders of a company get on their shareholding. The formula used for calculation is Net Income/ Shareholder’s Equity.

TABLE 10: FINANCIAL DATA FOR COMPANIES, FY20

FY20							
Company	Revenues (INR Cr)	Net Profit (INR Cr)	Net Profit/Revenue (%)	EBITDA	EBITDA Margin (%)	RoCE (%)	RoE (%)
Amphenol Interconnect	988.4	186.1	0.2	23	2.3	NA	
TE Connectivity India	1031.5	14.2	0.01	62.5	6	NA	
Rossell Techsys	NA						
Sasmos HET Technologies	8.8	0.8	9.2	0.2	NA		
Data Patterns	156.1	21.1	13.5	47	29.5	23.4	13.7
Astra Microwave Products	462	47	10.2	90	19	13	8.5
Apollo Micro Systems	203.1	10	5.1	39	19.3	-0.5	3.4
Alpha Design Technologies	399	10.4	2.6	10.4	1.3	0.1	42.8
Centum Electronics	486	25.0	5.2	75.6	15.6	23.6	10.6
Paras Defence & Space Technologies Ltd	149	19.7	13.2	27.01	14.9	16	45.7
BEL	12921	1794	13.9	2734	21	26	18
DCX	449.3	9.7	2.1	30.5	6.8	19.2	56.8

TABLE 11: FINANCIAL DATA FOR COMPANIES, FY21

FY21							
Company	Revenues (INR Cr)	Net Profit (INR Cr)	Net Profit/Reven ue (%)	EBIT DA	EBITDA Margin (%)	Ro CE (%)	RoE (%)
Amphenol Interconnect	NA						
TE Connectivity India	NA						
Rossell Techsys	NA						
Sasmos HET Technologies	NA						
Data Patterns	224	55.6	24.8	92	41.8	31	38
Astra Microwave Products	589	24	4.1	75.9	11	9.4	2.6
Apollo Micro Systems	203.7	10.3	5.0	39.2	19.2	9.5	3.2
Alpha Design Technologies	NA						
Centum Electronics	428	23	5.4	66.3	15.5	18. 3	9.4
Paras Defence & Space Technologies Ltd	143.33	15.79	11.01	43.4	30.3	13. 4	4.2
BEL	14064	2065	14.68	318 1.12	23	23. 9	7.1
DCX	641.2	29.6	4.3	10.1	1.6	4.2	63.2

TABLE 11: FINANCIAL DATA FOR COMPANIES, FY22

FY2022							
Company	Revenues (INR Cr)	Net Profit (INR Cr)	Net Profit/Revenue (%)	EBITDA	EBITDA Margin (%)	RoCE (%)	RoE (%)
Amphenol Interconnect	NA						
TE Connectivity India	NA						
Rossell Techsys	NA						
Sasmos HET Technologies	NA						
Data Patterns	311	94	30.2	141	45.4	24	33
Astra Microwave Products	735	40	5.4	94.9	12.9	15.9	8.8
Apollo Micro Systems	243.9	14.6	6.1	38.5	15.8	11.6	4.5
Alpha Design Technologies	Unavailable						
Centum Electronics	353	11.8	3.3	48.3	13.7	11.7	4.4
Paras Defence & Space Technologies Ltd	182.5	26.9	14.8	51.85	28.4	10.4	9.3
BEL	15314	2349	15.3	3309	21.6	26.2	19.6
DCX	1102	65.61	5.95	83.87	7.61	13.15	55.80

- In Fiscals 2020, 2021 and 2022, a DCX's revenue from operations were ₹ 4492.62 million, ₹ 6411.63 million and ₹ 11022.73 million, respectively.
- DCX has witnessed consistent and extraordinary improvement in their balance sheet position in the last three Fiscals.

- The value of DCX's total owned assets have grown from ₹ 6988.47 million, as of March 31, 2020 to ₹ 7931.78 million, as of March 31, 2021 and was ₹ 9426.15 million as of March 31, 2022.
- Among the companies assessed DCX has a revenue CAGR of 56.64% between FY 2020 and FY 2022, indicating that the firm is a rapidly growing company in the Indian defence space. Also, DCX has also shown the highest RoE metric for the same time frame, indicating consistent return on shareholder's equity, surpassing the other firms compared.

Competitor Profiles

TABLE 12: COMPANY PROFILES

Company	Year of incorporation	Product	Industry Segments	Key Customers	Major areas of business
Amphenol Interconnect	1972	Amphenol has a product portfolio that consists of connectors, accessories, cable assemblies and system integration for almost all the applications across various industries. The key verticals include Military, Aerospace, Industrial and Telecom market segments.	Manufacturing of electrical, electronic and fiber optic connectors, coaxial and flat-ribbon cable, and interconnect systems.	Military and commercial ventures across US, Europe and Asia.	Major focus areas include cables and connectors, as well as system integration
TE Connectivity	2007	TE connectivity provides a varied range of services depending upon the market of choice. In India, the company serves as the supplier of connectors, cables and other electromechanical components. The key verticals include the Aerospace and Defence as well as the commercial market. In India, the medical sector is noted to be one of the key consumers.	Manufactures and designs sensors as well as connectors	NA	Major focus areas include cables and connectors in the Indian market.

Rossell Techsys	2011	Rossell Techsys provides hardware and software systems airborne applications The company is majorly focused in the Aerospace and Defence domain.	Build to Specifications and Build to print solutions.	Indian Air force, HAL, BEL, Lockheed Martin, Boeing, etc.	The company specializes in the provision of hardware and software services to the aviation domain.
Sasmos HET Technologies	2007	Sasmos HET Technologies provides electrical harness, electromechanical assemblies and electronic panels to OEMs. The company provides solutions across Land, Naval and Airborne platforms.	supply of cables and connectors to aerospace and defence manufacturers	Saab, Boeing, Elbit systems, Airbus, Pilatus, MBDA, IAI, Rafael, Tata, L&T, QinetiQ, and ISRO	The company specializes in the provision of electrical harness, electromechanical assemblies.
Data Patterns	1985	Radar solutions – surveillance, weather and tracking radars Platform electronics for land, air and sea EW, COMINT and ELINT solutions Communication equipment, Radar warning systems Seekers for missiles Cockpit displays UAS Fire control systems for missiles and torpedoes Visual display units Small satellites Automatic testing equipment (ATE)	Defence Electronics, End- to End Military Solutions, COTS	DRDO, ISRO and several DPSUs.	C4ISR end to end solutions Electronic Warfare Weapons systems (seekers) Satellites Ground equipment Automatic Testing Equipment

		Ground station Antenna Launch vehicle tracking radars Weather radars			
Astra Microwave Products	1991	Subcomponents for radars, EW and telemetry Perimeter intrusion detection solutions Meteorology solutions Air traffic management radar solutions Space Electronics	RF/Microwave/Digital electronics	Israel Aerospace Industries, and Italy's SIAE Microelectronica	Major focus is on advanced microwave and C4ISR solutions
Apollo Microsystems	1985	Apollo Microsystems provides End-to-End Design, assembly and testing services. The key verticals include Aerospace, Defence, Space, Transportation and Home Land Security markets.	development, design, assembly as well as testing of Ruggedized Custom Built Electronic Hardware & Software solutions for Mission Critical applications.	BHEL, DRDO ONGC, HAL, CCMB, ISRO	Major focus areas include End-to-End assembling, functional testing

Alpha Design Technologies	2003	Optronics & LRF Based Products Laser Aiming Systems Thermal Imagers & Fire Control Systems Navigation Systems Tactical Communication Radar and C3I Systems EW Systems Simulators Microwave Components & RF Units Aerospace Ground equipment: Rail Mass Terminal (SATCOM transceiver module), Power Module Unit, Indian Rail Navigator Very Small Aperture Terminal (VSAT) Antenna Control System (ACS)	Military Equipment and solutions provider	Supplies products to ISRO and HAL.	Major focus is twofold – 1. Development of RF based solutions for EW, communications and ISR solutions for the military. Development of subsystems and eventually full satellites and ground systems as per ISRO’s requirements Advanced aerostructures
Centum Electronics	1993	Within defence, the group focuses on electronic subsystems for missiles, EW, communications and fire control systems For the commercial aviation sector, the company develops UPS, embedded computers, inverter modules etc. Several tier 1 aircraft manufacturers are	Engineering R&D services, Electronic Manufacturing Services, and Build to Specification services.	DRDO, ISRO	Major focus is on advanced defence electronics and testing. Limited focus on developing end to end solutions

		among the company's clients Satellite bus systems, test tools, power management systems, LRU and Data Recorders.			
Paras Defence & Space Technologies Ltd	2009	Heavy engineering solutions including flow formed tubes, titanium based manufacturing and radar cooling assemblies Optics solutions including diffractive gratings, mirrors and optical domes Military grade control systems EW subsystems EMP hardening solutions Opto-electro-mechanical assemblies for satellites, nano satellites.	C4ISR and in niche technologies such as EMP protection.	ISRO, DRDO, BEL, HAL, Cochin Shipyard, GRSE, BDL, Brahmos, OFB, IAI, Elbit Systems, Rafael Advanced Defence Systems, Safran, and L&T	C4ISR subsystems, EMP protection, EW and heavy engineering
Bharat Electronics Ltd.	1954	Communications solutions – SDR, SatCom, datalinks, nodes, encryption modules Land based radars – surveillance, weapon-locating, fire-control, secondary surveillance 3D Naval radars, missile defence radar, surface surveillance radar C4ISR solutions EW, ELINT, COMINT, SIGINT, MULTIINT	Communication Systems, Radars, C4ISR, Avionics, Optronics, Missile Systems., Electronic Warfare	ISRO, DRDO	End to end C4ISR solutions; however, the company is focusing more on product development and integration with the intention of outsourcing a large proportion

		<p>solutions</p> <p>Avionics</p> <p>Optronics</p> <p>Akash missile systems</p> <p>Combat management systems</p> <p>Simulators</p> <p>Batteries</p> <p>Sonar systems</p>			<p>n of component/subsystems manufacture.</p>
DCX	2011	<p>Sub-system integration, electro-mechanical assembly, testing, repair and engineering support, cable and wire harness assemblies</p>	<p>a full service and manufacture of Electronic Sub-Systems and Cable harnesses</p>	<p>Elta Systems Ltd, Sasmos HET Technologies Ltd, Bharat Electronics Ltd, Astra Microwave Products Ltd, SFO Technologies Private Ltd, Israel Aerospace Industries, Missiles & Systems Division, Rafael Advanced Defence Systems Ltd, Cyient DLM Pvt Ltd, ACE Antenna, Alpha Elsec Defence & Aerospace Systems Pvt Ltd, Alpha Design Technologies Pvt Ltd, Defsys Solution Pvt Ltd, Kalyani</p>	<p>Major focus is cable and wire harness</p>

				Rafael Advanced Systems Pvt Ltd, Astra Rafael Comsys Pvt Ltd.	
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Opportunities and Risks for DCX

Expanding Opportunities in the Indian Defence Environment

The growing Indian landscape for defence and aerospace serves as a key opportunity for DCX. The Indian aerospace and defence sector is poised to attain a value of USD 70 Billion by the year 2030. The accessible cumulative revenue generated by the India defence sector is expected to be USD 306.95 Billion over 2021-30.

On studying the overall market trends, it is noted that the Indian defence sector is on the cusp of change. The introduction of policy changes are anticipated to reduce program delays and accelerate the defence procurement. Provisions including equipment leasing and the waiver of offset requirements across government-to-government deals are expected to be promising. By the year 2025, the Indian MOD plans on increasing defence exports by roughly 5 folds through the increased involvement of private players within the defence component manufacturer's market. The privatisation of Ordnance Factory Board is expected to be another key strategic move which is poised to boost the market growth.

Government Opportunities that are expected to Boost Opportunities for DCX

Recent initiatives like the permission granted for 100% FDI in the Indian defence sector is anticipated to be a key driver and growth opportunity for this market. The Union Budget FY 2021-2022 for DRDO (Defence Research and Development Organization), increased to Rs 11,375 Crore by a value of 8%. DRDO has also announced the indigenous development of roughly 107 systems and sub-systems which is expected to generate demand for cables and connectors across the Indian defence environment.

The Indian government has pushed for the indigenisation of 458 components in through the first and second indigenisation list. The government has also introduced the 3rd positive indigenisation list that bans the import of 780 LRU/components. This initiative is poised to boost the indigenous manufacturing within India. The instating of Defence industry corridors across Uttar Pradesh and Tamil Nadu is also poised to boost the market growth dynamics by broadening the opportunities offered to the private sector.

On further analysis of the defence budget, it is noted that the government is focused on the advancement of sectors like ammunition, surveillance, as well as tracking systems. The defence sector's growth can be catalysed by DRDO's focus on ballistic missiles, quick reaction SAM, rocket systems, as well as anti-tank missiles. India's expanding aerospace division also offers a substantial growth opportunity to the players within the Indian defence electronics market. 70% mandate is to be provided to private players by the ISRO for all upcoming space missions across a period of 5 years. On studying the growth rate of the Indian space sector, it is noted that the industry is poised to generate a revenue worth USD 1 Trillion by the year 2040. The Introduction of the draft SPACE COM policy is another factor which is expected to

increase the involvement of private players within the Indian space manufacturing segment. The ISRO plans to launch roughly 500 PSLVs in the coming 5 years. An investment of Rs 10,000 Cr is to be made by ISRO's commercial arm during this period. The Indian MOD has also removed the limitations on procurement norms within the defence market.

Risks for DCX in the Indian Defence environment

One of the key threats faced by DCX within the Indian defence sector is the growing entry of small players within this market. Start-ups within the defence environment are making use of low cost as their entry strategy thus increasing the overall market competitiveness. Another key market limitation is the tedious process involved in the approval of defence equipment across the Indian market. The generally seen delays in the commercialisation and the development of products are also expected to be a key drawback for this sector.

India is noted to be a hotspot for international market players. However, the increased market penetration of external players is poised to boost competition within the Indian defence scenario. The potential deferment of major government programs is also expected to be a market risk for DCX. Potential budget constraints that could possibly limit the overall defence spending for India are expected to create an obstruction in the demand margins for connectors and cables.

Strengths of DCX

Salient Points which highlight the market leadership position of DCX in respective product segments and the key factors that have enabled the same

DCX is among the leading Indian Defence manufacturing players for the manufacture of electronic sub-systems and cable harnesses in terms of manufacturing capability and revenue in Fiscal 2022 in the Defence & Aerospace sector.

The company manufactures High Quality, Complex Microwave Modules and Sub-Systems, such as Transmit Receiver Modules, Receiver Modules, Antennas and Data Processing Units used in both Passive and Active phased array Radars, Search Radars in Air Defence Fire Control Radar, Perimeter Intrusion Detection System, Search and Track Radar in MRSAM/LRSAM, Surveillance Systems, Missile Systems and Air Defence Systems.

The company's extended presence in an industry with high entry barriers has helped in the developing the experience required to navigate the intricacies of the Indian defence market.

DCX is involved in manufacturing a comprehensive array of cables and wire harnesses assemblies for a variety of uses including Communication systems, Sensors, Surveillance systems, Missile systems, Military Armoured Vehicles, Air Defence Systems, Reconnaissance & Observation System, Multifunction Displays and other Electronic Warfare Systems. Advanced manufacturing processes are employed that have been certified by international A&D primes.

The company also uses advanced ERP systems for managing operations and ensuring order commitments are met without fail.

The company has the capability for manufacturing High End, Digital and RF Printed Circuit Assemblies having its applications in Complex Microwave Modules and Sub-Systems.

Direct Exports

Currently, DCX supplies Electronic Sub-Systems, Cable and Wire Harness and Electronic Kits to countries, primarily Israel, United States of America and Korea.

In the Fiscal year 2022, the company's revenue from contracts with customers located outside India was ₹6117 million, accounting for 55.73% of the revenue from operations.

DCX intends to expand their international operations to enhance their global presence in the sectors they cater to, particularly in the aerospace and defence sectors.

DCX - intends to enter new markets such as Europe where they believe they can provide cost and operational advantages to our clients, and where they possess the ability to distinguish ourselves from other companies in the same sector.

The company is focussed on expanding its business verticals and also converge a business model which includes forward and backward integrations. This initiative will provide enough and adequate scope to not only expand the customer base but also will provide opportunity to penetrate new geographical markets.

GOI defence licence for high end defence equipment manufacture

DCX has been granted Defence Industrial License bearing number DIL 83(2015) for the manufacture of Microwave modules for Radar and Electronic Warfare sub-systems, Microwave modules for Command and guidance units for Missile Sub-systems, by the Ministry of Commerce, Government of India.

Recognition by Government of India for their commitment towards Make-In-India Program. A Glimpse of the company and its motives was highlighted in India's National Media Channel "Doordarshan".

Moving up the value chain by being a system integrator

The company intends to focus on their strategy on the business model by expanding the existing vertical of business like Cable and Wire Harness, Strengthening the High volume business in - System Integration and Kitting, simultaneously focusing on adding new verticals to business in the form of backward and forward integration.

DCX intends to expand the Cable and Wire Harness Business for their global customers and also make new geographical penetrations.

DCX intends to add Maintenance Repair and Overhauling (MRO) as a new business vertical in view of the opportunity and the positioning of their company processes.

The domain experience of the senior management team and the promotor, -H. S. Raghavendra Rao, lies in Electronic Manufacturing Services (EMS), not only in Aerospace and Defence, but across various sectors like, Telecom, Medical, Power, Industrial, Automotive etc., The Major focus of the proposed expansion would be devoted to these verticals because it brings high volume business along with high EBIDTA and PAT margins.

DCX intends to strongly focus on the positive Indigenisation lists (containing 351, 107, and 780 items to be indigenised in the first, second and third lists respectively) of the Ministry of Defence, Govt. of India. These lists provide immense opportunities for companies like DCX to gain access to Transfer of Technology (ToT) in complex defence equipment, and in MRO. These lists, prevent defence equipment imports in favour of indigenisation in order to achieve self-reliance in defence manufacturing and minimize imports by the Defence Public Sector Undertakings (DPSUs).

DCX intends to enter into a subsidiary based joint venture mode with OEM's possessing high-end technologies in areas such as Radars, Electronic Warfare, Missile Systems, Surveillance Systems, Sensors, Communication Systems etc., with companies in countries like, Israel and United States of America.

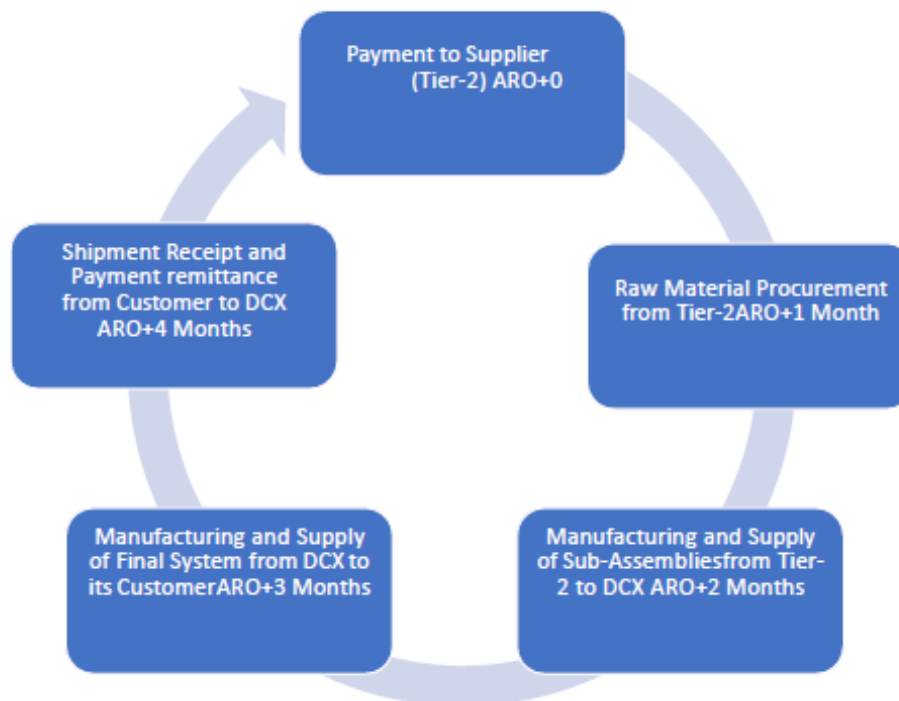
DCX also intends to acquire few strategic assets identified in this country for which a dedicated committee of experts within the company is evaluating the same.

Technology enabled and scalable end-to-end capabilities

DCX provides life cycle support of one year of warranty on back-to-back basis for the effectiveness of their customers for the Master System Integration Sub-Systems, Electronic Sub-Systems and on the End user products in Cable and Wire Harness Business.

FIGURE 36: TYPICAL PROJECT EXECUTION CYCLE FOR SYSTEM INTEGRATION BUSINESS AS INDIAN OFFSET PARTNER(DCX)

Projection Execution Cycle



The company is devoid of product obsolescence as the technology coupled with intellectual property rights vests with their OEM customer. As an Indian Offset Partner, the company role is effective Master System Integration along with maintaining high security protocol systems and quality standards.

Over time, customers tend to want to upgrade and/or modify their assets or equipment to meet particular enhanced combat capabilities and operational performances, or to extend their usable life mitigating to make them a contemporary and effective platform.

DCX's business model is resilient on the back of highly skilled, trained, technical resources and Technology-Driven Manufacturing.

DCX's expansion in the State-Of-Art infrastructure, High Quality Standards, enabling timely and adequate working capital limits and continuously upgrading skills and technical resources has enabled the company to scale their operations in the last three Fiscals, a growth of which in their sector the industry has not witnessed.

The company possess the flexibility to scale vertically in terms of capacity expansion and horizontally in terms of product expansion, as per requirements driven by both customers and market needs on a global scale.

The company's scalability is derived from the changes and adaptations seen in both international and domestic markets, innovation and diversification in the product range and by maintaining the consistent quality of their products.

Skilled workforce with 96 + employees having 7+ years of average experience

DCX possesses a highly qualified senior management team with considerable industry experience. DCX's Key Managerial Personnel includes a combination of management executives and independent members who bring in significant business expertise including in the areas of accountancy, supply chain, logistics, IT systems, Human Resources and Technology backed electronics sectors, which positions them well to capitalize on the current and future growth opportunities.

The heads of functional groups, such as operations, finance, logistics, production and testing and quality, enhance the quality of their management with their specific and extensive industry experience.

As on March 31, 2022, DCX had over 96 full time employees. In addition to full time employees, DCX frequently hire workers on a contractual basis largely for manufacturing. As of March 31, 2022 the average tenure of employees with our Company is 7.00 years. Its attrition rate was 2.23%, 2.50% and 2.24% in the last three Fiscals and 2.61% and 0.83% in the three months ended June 30, 2021 and June 30, 2022, which is below the industry average and standards.

Order Books and Backlogs

- DCX has an order book position as on March 31, 2022 of US\$ 315 Million to be executed in the year 2022-23 to 2024-25.
- DCX orders in Pipe-line to the tune of about US\$ 300 Mn which are expected to materialize in 2022-23 and 2023-24.

DCX competitive advantages include its efficiency in operations resulting in timely delivery to its customers, maintaining quality control and product security. This has enabled DCX to develop long-term and entrenched relationships with OEM customers that has resulted in growth in its operations and sizeable order book. DCX believes that its system driven efficiency will continue to attract higher revenues going forward. Additionally, given the nature of its operations and industry that DCX operates in, projects have long lead times.

DCX is focused on turnkey – built-to-print projects for OEM customers and using advanced manufacturing facility, technological skills and experienced manpower to leverage this model. DCX leverages the intellectual property of its customers and manufacture products to suit their requirements. Build-to-print is when a supplier produces work instructions, assembly drawings, and calls out specific and detailed manufacturing practices used in building the parts along with the customer’s specification of the component’s functional requirements. This method requires a little more effort and development costs from the customer, but it is advantageous to them because they maintain control of the intellectual property right while having the flexibility to select appropriate suppliers to produce the parts for them. This approach allows an easier vertical integration for the customer’s business because they only need to focus on their core, and this often alleviates the bottlenecks they encounter while trying to do all those processes themselves.

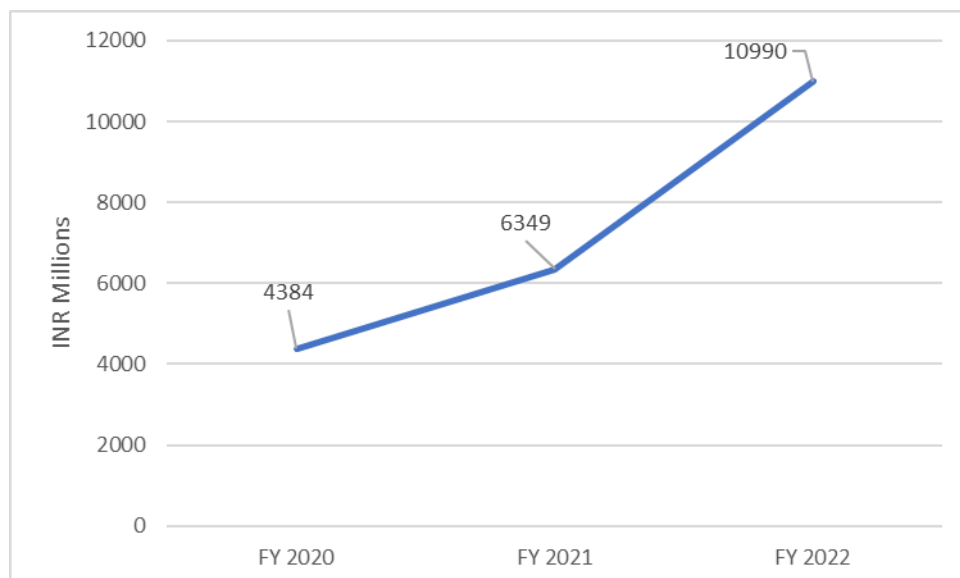
Upcoming Projects

DCX expects to be the IOP for the upcoming projects worth US\$2 Bn. Off-set value related to the business will be around US\$300Mn to US\$400Mn.

- AMDR (Automatic Missile Detection Radars)
- HERON Unmanned Aerial Vehicle (UAV) Systems
- BARAK Systems
- MRMR (MEDIUM RANGE MARITIME RECONNAISSANCE SYSTEM)
- SRSAM (Short Range Surface to Air Missile)

Customer base

FIGURE 37: DCX REVENUE FROM TOP 10 CUSTOMERS (FY 2020- FY 2022)



Note: FY 2022 value up to 31st March, 2022

In the Fiscal 2020, 2021 and 2022 DCX's top 10 customers generated ₹ 4384 INR million, ₹ 6349 million and ₹ 10990 millions of their revenue from operations, respectively, and accounted for entire 97.60%, 99.03% and 99.71% respectively of revenue of the company in such periods.

Customers List in the last 3 years

TABLE 13: DCX CUSTOMER BASE

Customer Name	Country of Customer
IAI-Elta Systems Ltd	Israel
IAI-Missiles & Space Systems	Israel
Bharath Electronics Ltd	India
Rafael Advanced Defence Systems Ltd	Israel
Alpha-Elsec Defence & Aerospace Systems Pvt.Ltd	India
Alpha Design Technologies Pvt.Ltd	India
Astra Microwave Products Ltd	India
Astra Rafael Comsys Pvt.Ltd	India
Sfo Technologies Private Ltd	India
Defsys Solution Pvt.Ltd	India
Cyient DLM Pvt.Ltd	India
Sasmos HET Technologies Pvt Ltd	India
Ace Antenna Corp	US
Lotus Aviation Technology Pvt. Ltd.	India
Bharat Forge Ltd (BFL)	India
Nucon Aerospace Pvt. Ltd.	India
Kalyani Rafael Advanced Systems Pvt. Ltd	India
DCX-CHOL Enterprises Inc	US
Centum Electronics Ltd	India

End users

DCX's Products are used by Indian end users as below

- Space Organisations - ISRO
- Research Organisation: DRDO
- Defence forces - Army, Navy and Air Force
PSUs – Bharat Electronics Limited, Bharat Dynamics Ltd, Hindustan Aeronautics Limited and Mazagaon Dock yard Limited, Ordnance Factory Board

The international end users includes American, European and Asian companies such as

- Lockheed Martin,
- Raytheon
- Dassault Aviation,
- Pilatus
- Boeing
- Thales.
- Airbus

Suppliers

- DCX has developed a robust supply chain for sourcing their specialized raw materials used to manufacture their products.
- Essential raw materials required to manufacture DCX’s cable and wire harnesses and Master System Integration are majorly in the form of Electronic Assemblies and Sub-Systems such as Printed Circuit Board Assemblies, Power Supplies, RF Cables and Wires, RF Connectors, Circular connectors and Mechanical Enclosures.
- DCX typically sources its raw materials from OEM nominated suppliers, Authorized distributor of the Original Manufacturer.
- The company has also increased their supplier base substantially to meet the growing needs of business. e table below sets forth details of our supplier concentration in the periods indicated and the average relationship period with such suppliers:

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TABLE 14: DCX SUPPLIER BASE, FY 2020- FY 2022

Supplier Concentration (%)	Fiscal 2020	Fiscal 2021	Fiscal 2022	Average Relationship Period
Top 1	25.92%	46.77%	33.70%	4
Top 5	85.00%	93.11%	85.78%	5-6
Top 10	98.38%	98.12%	95.54%	3-6
Top 15	99.20%	99.05%	98.52%	3-6

APPENDIX

The factors used for modelling Capital and Stores

- Historical Trends

The historical trend of capital and stores allocation shows a compounded growth of 7%, with the current year allocation exhibiting an increase of 14.9%. The growth rates are expected to moderate in future budgets.

- Geopolitical Tensions

The Geopolitical tensions with China and Pakistan are expected to continue for 2 years and this is expected to have positive impacts on the Defence budget.

- GDP Growth

The Indian GDP growth is exhibiting a strong rebound and this is expected to increase the GDP which in turn will allow higher allocation of the Defence Budget.

- Programs and Delays

There have been program delays in the past and these have been delayed further due to COVID related disruption of supply chain. Frost expects a greater cohesion, effective policy implementation, and larger participation of the private industry on account of the government push to create a level playing field, to accelerate the modernization program.

- Creation of Non-Lapsable Defence Modernisation Fund

The gap in FY 22 capital budget projection by defence forces and actual allocation was \$ 7.8 billion^{iv}. To bridge this gap, the 15th finance commission recommended setting up of a non- lapsable modernization fund⁴⁵. The total size of this fund for the period 2021- 2026 is indicated as \$ 32 billion with maximum accretion of \$ 7 billion per year.

- Technology Incorporation

Technology incorporation and the need for advance offensive and defensive technologies to counter the hybrid threats are also expected to drive the forecast.

List of Make II Projects by OFBs/DPSUs

TABLE 15: LIST OF MAKE II PROJECTS BY OFBs AND DPSU

Company Name	Number of Projects As of January 2022	Name of the Projects
Mishra Dhatu Nigam Limited (MIDHANI)	10	<ol style="list-style-type: none"> 1. Machining of SNI 115 Blades 2. Machining of EP 742 3. Hipping of Ti Castings 4. LC Fe Cr 5. Al-V Master Alloy 6. Rare Earth Material like Re, La and Mish Metal 7. Thermocouples 8. Phase Array System for Ultrasonic testing 9. Deep Hole drilling machine 10. Machining of 617CC
Advanced Weapons And Equipment India Limited (AWEIL)	3	<ol style="list-style-type: none"> 1. Aperture sight with illuminating point, F-1303-032270 D in F/C 2. Front sight with illuminating point, F1303-032260 C in F/C 3. Barrel Assembly of 84mm LWL liner -Withdrawn
Hindustan Aeronautics Limited (HAL)	1013	<ol style="list-style-type: none"> 1. Anti -Collision Light (1) 2. Taxi Light (1) 3. TACHO GENERATOR (1) 4. Gear Blow Down Unit (1) 5. Single Seat LH (1) 6. Single Seat RH (1) 7. Double Seat 8. Weather Radar 9. Traveling Wave Tube (TWT) (1) 10. Frquency Synthesizer(1) 11. Receiver Amplfier(1) 12. Angular velocity Sensor(1) 13. Voltage Control Oscillator(1) 14. RF Frequency Modulator(1) 15. Microwave reception module(1) 16. RF Frequency Multiplier(1) 17. Microprocessor based Interface Module(1) 18. Microprocessor based Communication Module(1)

		19. Linear Acceleration Sensor(1) 20. Microprocessor based Processor module(1) 21. Shock Absorber(3) 22. Voltage Stabilisation Valve(1)RF Local Oscillator(1) 23. DC to DC Converter(1) 24. Non-Controllable Protective Discharger(1) 25. RIVET-ROUND HEAD BLIND(52) 26. BLIND RIVET PROT HEAD(1) 27. RIVET-100 DEG C'SK BLIND(53) 28. RIVET BLIND (12) 29. Fluoroplastic Hose (8) 30. Hose(1) 31. Seal(2) 32. Seal -Lh Ecs Panel(1) 33. Seal -Rh Ecs Panel(1) 34. Sealed Canopy(1) 35. Seal Channel Assy(1) 36. Seal- Anti Collision Light(1) 37. Seal-LH(1) 38. Seal-RH(1) 39. Nut Anchor 40. PVC Pipe(10) 41. Enamel(5) 42. AZT Lining material with antipyrine(2) 43. Cotton cord(2) 44. Fabric Agniguard Antm-1(1) 45. Xylene(1) 46. BENZENE NEPRASS(1) 47. Hardner(2) 48. Rubber compound(4) 49. Induction Pressure Switch(5) 50. Sealing Compound Vgo(1) 51. Stainless Steel Tube(1) 52. Sealing Ring(2) 53. Lock Washer(3) 54. Tab Washer(1) 55. Supporting Taper (1) 56. Thermocouple (1) 57. Cap Assy-Pressure Seal Flared Tube(3) 58. Tee Equal(5) 59. Lock Nut.(4) 60. Cross, One Swivel(1) 61. Union-Flared Tube(5)
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		62. Nut-Coupling(1) 63. Rivet-100 Deg Flush Head(25) 64. Washer-Spring(7) 65. Lead Electrical Bonding(3) 66. Castle Nut(3) 67. Nut-Castle(3) 68. Screw-C'sk Head(4) 69. Bolt-Hex. Head(6) 70. Screw Hexagonal(4) 71. Screw-Slotted Cheese Head(2) 72. Anchor Nut (1) 73. Collar Assy Self Aligning (3) 74. Pin-Hi-Lite Protruding Head(40) 75. Pin-Hi-Lite 100 Deg Flush Head(11) 76. Double Row Angular Contact Ball Bearing(3) 77. Cyl. Roller Bearing(19) 78. Deep Groove Ball Bearing(7) 79. 4pt Contact Ball Bearing(4) 80. Roller(4) 81. Backshell(8) 82. Toggle Switch(3) 83. Cladded- Al-Zn alloy Sheet(1) 84. Safety Washer(1) 85. Spring Washer(2) 86. Bent Pin(1) 87. Wire Clamp(2) 88. Lock Ring(2) 89. Sealing Ring(2) 90. Others
Garden Reach Shipbuilders And Engineers Limited (GRSE)	1	1. Data Acquisition & Processing System(DAPS)
Armoured Vehicles Nigam Limited (AVNL)	13	1. Electric Motor (Drg No. ED76.000GCH) 2. Synchro Revolver, 2.5W with coupling assy to Drg No. 188.94.026CBCB 3. Installation of Tachogenerator Assy to Drg No.188.94.005CBCB 4. 12 type of Rubber items being used in IGB T-90/T-72 Tank (OE & OH) 5. Alarm Signalling Unit BAC6A

		6. AVNL Hydro Pneumatic Cleaning system 7. Gyro Compass GPK-59, 175.70.071CB - Withdrawn 8. Starter Generator (Drg. No. 175.70.071CB)- Withdrawn 9. 54p Steel- Withdrawn 10. Blast Attenuating Seat- Withdrawn 11. Unit PKUZ-1A, AED1.570.001TY1- Withdrawn 12. Convert PAG-1F, TY.002.016- Withdrawn 13. Optical Sending Unit OD1-1C, OD1.1C.000TY- Withdrawn
BEML Limited (BEML)	846	1. Synchromesh 4th & 5th Gear(1) 2. Synchromesh Constant Mesh(1) 3. Seal Ring (6) 4. Floating Seal Kit(2) 5. Ring Seal(1) 6. Ripper Hyd Cylinder (1) 7. Spacer(4) 8. Transmission Control Valve Assy (1) 9. Shift Control(1) 10. Side Plate(3) 11. Ring(5) 12. Piston Ring Assembly(4) 13. Bushing, Tacho Drive(1) 14. Cross Grider(1) 15. Steering Booster With Joint(1) 16. Front Bracket, Lh(1) 17. Telescopic Damper (8 X 8) 18. Cushion(4) 19. Nyloc Nut(11) 20. Propeller Shaft(6) 21. Gasket Cylinder Head(3) 22. Pump Gear Wheel(5) 23. Pv380 (R2) 24. Ring, Back-Up(3) 25. Display Kit(2) 26. O-Ring(11) 27. Check Valve(2) 28. Flex Plate Assy(4) 29. Bearing (9) 30. Wear Ring(13) 31. Rod Seal(16) 32. Wiper Seal(16)

		33. Buffer Seal(3) 34. Buffer Ring (6) 35. Others
Bharat Dynamics Limited (BDL)	11	1. MDN 250 Raw Material as per specification 2. Pellets (BKN03) under ToT 3. APC Coat-219 as per specification 4. APC coated Cambric cloth and Al Foil as per specification 5. Carbon Silicon Carbide (C-Sic) Blocks under ToT 6. P2 Igniter Assembly as per drawings 7. Paints (Air Craft Grade) as per specification 8. Grit Blasting and Primer Coating as per specification 9. Throat Insert Machining (C-Sic) as per drawings 10. Tungsten Plates(12mm) Non-China material as per specification 11. CM Missile Containers (BTS)
	16	1. Block-PL (Drg No. AL 5008009) 2. Motor (Drg No. DPR-2-F1-13) 3. Transformer (Drg No. AL 5.720.031) 4. Transformer (Drg No. IUMK671121007) 5. Gyro Stabilizer, BL2.564.018 6. Aiming Device, BL3.812.065 7. Position Sensor, BL2.320.040 8. Head Unit, BL3.906.063 9. Gun Position Sending Unit(GPSU), BL5.132.045 10. Control Mechanism (Drg No. AL 6.063.271) 11. Laser Unit (Drg No. AL 5.008.008) 12. Gyro Chassis (Drg No. AL 5.153.009) 13. 05 types of PCB 14. Electric Unit, BL2.300.041 - Withdrawn 15. Flange, BL6.220.177- Withdrawn

		16. Prism Assembly, BL5.935.783- Withdrawn
Mazagon Dock Shipbuilders Limited (MDL)	1	1. Static Frequency Converter for project 75
Goa Shipyard Limited (GSL)	1	1. Ship's doors & Hatches in Composite Material
Hindustan Shipyard Limited (HSL)	2	1. Flight Deck Hydraulic System 2. Pneumatic controlled Quick Closing valves
Bharat Electronics Limited (BEL)	46	1. Miniature Connector 2. Connectors 6 Pin (3 Types) 3. AC-DC Converter 28V 150W 4. Rugged 24" LED Display 5. 5kVA UPS cum Battery Charger 6. Inertial Measurement Unit (2) 7. OFC CABLE ASSY 8. 5kVA UPS cum Battery Charger 9. Voltage Controlled SAW Oscillator 10. DIFM Receiver 2-18 GHz 11. Inertial Measurement Unit 12. Synchro 13. Torque Motor 14. T72 Gyro Unit 15. Cosine Potentiometer 16. Line Interface and Detector Unit 17. WG RX Azimuth Assy 18. WG TX Assy 19. Comparator 20. Multi Output AC/DC Power Supply 21. WG RX Sum Assy 22. WG RX EL Assy 23. Integrated Light Plate 24. Pressure Transducer 25. ARINC 429 Module 26. DIFM 27. Others

Projects as per DAP

Category	Net AIP Projects	Name of Ongoing Projects
Indian Air Force	12	<ol style="list-style-type: none"> 1. Chaff & flares 2. Air to Ground Rockets 3. Aerial Fuse for Bomb 4. 125 kg bomb (akin to MK-81 bomb) 5. Design and development of Foldable Fiberglass Mat (FFM) for Rapid Runway Repair 6. Infrared Imaging Search & Track System(IRST) 7. Inflatable Decoys 8. 80 MM Rocket 9. Lightning Detection system 10. Wind Profiler 11. Indigenous Precision Range Extension Kit 12. Airborne Ruggedised Flight Instrumentation System 13. Aerial Bomb 1000 Kg
Indian Army	33	<ol style="list-style-type: none"> 1. 125mm APFSDS Ammunition with Depth of Penetration (DoP) of 550mm for T-72 Tank 2. Assault Track Way- CI 24 3. MEAT (Manoeuvrable Expendable Aerial Target) 4. Pre-fragmented programmable proximity fuzed ammunition 5. Night Fight Control System- AGS – 30 6. Augmented Reality (AR) based head Mounted display system to make fair weather such as IGLA-1m and Zu-23n weapon systems 7. Munition 8. Asibal System (ATGM) 9. GPS/GIS based Minefield Recording System 10. Precision Kill System 11. Auxiliary Power Unit for Tank T-72 and T-90 S/SK 12. Upgrade of BMP-2/2K 13. Unit Level Target System - Air Defence 14. Mobile Integrated Network Terminal (MINT) 15. Integrated Air Defence Combat Simulator 16. AFV Protection and Counter Measure Sys 17. Robotic Surveillance System 18. Truck Mounted Crane for ULH Regts (Suo Moto) 19. Mountain Fire Control Radar (Suo Moto) 20. HF Software Define Radio (Suo Moto) 21. V/UHF Software Define Radio (Suo Moto) 22. Portable Helipad 23. Drone Kill System 24. Infantry Weapon Training System(IWTS) 25. 2.5-4 Ton All Terrain Fork Lift Truck

		<ul style="list-style-type: none"> 26. Electronic Fuze for Pinaka Rocket Ammunition 27. Laser Beam Riding MANPADS 28. Integrated Drone Detection and Interdictions System 29. Low Level Light Weight Radar 30. Runway Independent Remotely Piloted Aircraft System 31. Autonomous - Surveillance and Armed Drone Swarm (Desert) 32. Autonomous - Surveillance and Armed Drone Swarm (HAA) 33. Ballistic Helmet
Indian Navy	16	<ul style="list-style-type: none"> 1. Deep Sea Side Scan Sonar Towing Winch (DS4TW) 2. Upper Air sounding system (UASS) 3. Expendable Underwater Target 4. Digital Beamforming based Satellite TV 5. Three phase inverters 6. Proximity, DA and Graze fuse for 76/62 SRGM with universal capability for 76-127mm calibre ammunition 7. Effectors for Anti-Torpedo Countermeasure System 8. Autonomous Surface Vessel in Mine Counter Measures 9. Limpet Mine Mk 414 (7 Kg) and Mk 430 (15 Kg) 10. HIGH ENDURANCE AUTONOMOUS UNDERWATER VEHICLES (HEAUV) 11. Sewage Treatment Plant 12. Marine Grade Aluminium Alloy Plates 13. Supersonic Weapon Imitating Flying Target 14. Integrated Standby Instrument System 15. Buoyancy Glide for enhancing underwater Domain Awareness 16. Glide SSM

As per the Ministry of Defence, DAP targets to achieve 125 projects by 2024, and 4000 projects by OFBs and DPSUs.