Geopolitics of the Intellectual Property Rights
Implications for India's National Security

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This article highlights the pivotal role of Intellectual Property Rights (IPRs) in science and technology and the complex dynamics of power projection in the global IPR regime, particularly in defence research and development. As innovation becomes a key driver of economic and military power, it has occupied centre-stage. While IPR laws encourage and protect innovation, they also raise challenges, especially for developing countries, which face barriers to accessing cutting-edge technologies. The discussion also delves into how developed nations, particularly those with strong IPR regimes, dominate technological innovation and global arms markets. By analysing India's IPR laws in the context of defence technology and comparing them with the practices of developed countries, the article sheds light on how IPR affects not only technological innovation but also military modernisation and global power dynamics.

Keywords: *Intellectual Property Rights (IPR), R&D in Defence, Power Projection, Defence Indigenisation, Military Modernisation*

Introduction

Intellectual Property Rights (IPRs) play a pivotal role not only for an individual, or a corporation, but also for a nation in this highly digitised

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world. The risks of intellectual innovations and ideas being stolen are higher today than ever. Strong IPR laws guarantee the security of these ideas and inventions and contribute to the economy of the state. There have also been disagreements over the technicalities of assigning such rights, as well as about the legitimacy and virtues of certain core IPR principles. Some claim, for example, that the existence of strong IPR laws catalyses innovation and has a significant impact on the economic future of corporations and states. Others believe that such laws are unnecessary and oppressive and obstruct the growth of developing countries. Science and Technology (S&T) is an arena where innovation and inventions are encouraged by governments and get great backing, be it in the civil or the military domain. While patenting can encourage innovative minds and give them the rightful credit, it might also be a barrier to otherwise a rapid technological freeway.

This article aims to put light on the significance of IPR in S&T, further analysing the importance of power projection and how the IPR regime is dominated by developed nations. It also evaluates India's IPR in defence research and development (R&D) as a case in point. The article follows an empirical and deductive methodological approach.

Assessing the Significance of IPR in S&T

To begin with, Act VI of 1856 was the first piece of patent legislation in India. The goal was to stimulate inventions and persuade innovators to reveal their inventions' secrets. Later on, a new law, Act XV of 1859, was introduced to grant absolute exclusivity, which was renamed 'The Patterns and Designs Protection Act' in 1872. The statute was in effect for 30 years, with only one amendment in 1883. The Indian Patents and Design Act of 1911 nullified all previous laws in India, covering various aspects like secret patents and additional patents, and extending the patent period from 14 to 16 years. After independence, committees were formed to review these changes and a bill was introduced in the Lok Sabha in 1965, though it ultimately expired.[1]

On a global level, the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement protects R&D innovations by covering seven types of intellectual property (IP): patents; copyrights; trademarks; industrial designs; geographical indications; integrated circuit layout design; and protection of secret technology or trade secrets. Article 27 of the TRIPS Agreement states that all inventions, regardless of the technology sector, are eligible for protection. Strong IP protection deters imitations, while also

attempting to strengthen ownership of the innovation.[2] Thus, the IPRs are meant to safeguard investments in innovation by guaranteeing the innovator temporal control over its use. On the other hand, the IPRs may also drive up the cost of innovative technology and limit its access by restricting imitation.[3]

Today, the context in which IP operates is drastically different from the one where IP was created. The IP's status in the economy and society has shifted as a result of changing settings. This also asks for a shift in how we conceive of IP and its purpose. More investments are being made in knowledge-based capital than in physical capital in several industrialised economies. Furthermore, the rate of growth in knowledge-based capital is consistently outpacing the rate of development in physical capital. Naturally, this adjustment results in a shift in the competition's focus. The competitive edge generated from knowledge-based capital is increasingly being attacked by competitors. Francis Gurry, for instance, mentions that *The Wall Street Journal* conducted a review of quarterly and annual reports filed with the Securities and Exchange Commission and discovered that the word 'innovation' appeared 33,528 times in those reports in the year 2011. This emphasises that IP captures and protects the competitive advantage that innovation provides.[4]

The geopolitical shift from the West to the East is another key movement informing the framework in which IP operates. The centre of economic gravity is shifting, and the centre of technological gravity is following suit. These are happening at various rates. There are three indications for this: one for inputs to knowledge generation and the other two for outputs. One of the most important inputs to knowledge generation is R&D. In absolute terms, China is now the world's second-largest investor in R&D. Japan is the world's third-largest economy in absolute terms. In 1999, Asian countries accounted for 24 per cent of worldwide R&D, and by 2009, they accounted for 32 per cent.[5]

In terms of outputs, Asia's ascent may be seen in the production of scientific papers, where the scientific output of a number of Asian countries increased at a pace significantly faster than that of mature economies in the first decade of the 21st century. According to a Royal Society report from 2011: 'The scientific league tables are not only about status—they are a measure of a country's ability to compete on the global stage.'[6]

Inherently, IPRs represent a policy tension between the aims of encouraging technological innovation and facilitating the faster growth of new technology and the development of technical prowess. These conflicting aims also entail significant as well as competing strategic interests, ranging

from R&D-intensive to non-R&D-intensive verticals at one level, and at another level, there are the industrialised, recently industrialised and emerging countries. States have typically understood the risks involved in IPR legislation, at least to an extent, and each nation has constructed its national IPR systems that seek to find the right balance within conflicting goals that are still considered appropriate for its country's economic, political and social environment.[7]

Scholars argue that IPRs never guarantee absolute protection, and that is why many experts have rejected the notion of guaranteeing even a temporal monopoly. Additionally, some countries have a record of trying to exploit IPR rules to favour domestic enterprises over foreign firms (The major international IPR conventions are designed to govern these practices in order to facilitate global trade). The modern rise in international science, technology, commerce and economic progress, on the other hand, has stressed IPRs' ability to safeguard S&T discoveries even more. The increased price of R&D and other innovation-related tasks is one of the primary S&T developments that is driving up the need for robust IP protection.[8]

Almost all of the growing concerns have been directed towards the developing world, especially the so-called newly industrialised countries (NICs), where patent and copyright rules have been lax or non-existent in some contexts. Unlawful IP theft has occurred in developing countries as a result of piracy and national economic practices (that is, protectionism). Furthermore, limited IPR protection increases the odds that pioneering businesses may suffer financial damage, resulting in a decline in the speed of industrialisation in the United States (US) and other technology-driven countries capable of creating innovative ideas. A slower pace of technological development could cause delayed global economic growth, which would be detrimental to all countries. Notwithstanding this logic, NICs and less developed countries that stand to gain the most from robust global economic growth have been hesitant to embrace the concept that increased IPR protection is in their long-term national interests.

Today, development in S&T is unanimously linked to national security, which, in turn, is impacted by developments in defence research and technology innovation. Defence R&D includes conventional and modern weapon systems that possess nuclear and space capabilities, as well as critical industrial technologies covering the whole gamut of technological arena about aeronautics, armaments, biological and chemical technologies, electronics, energy and information systems, security, sensors, ground combat and so on. If IP is developed within national defence R&D institutions, there are

challenges with IPR protection and administration. If such technologies are acquired from outside the country, it is also necessary to consider concerns of IPR while trying to negotiate technology purchases. The S&T's security perspective is thus inextricably related to IPR, which affects the country's technological superiority and consequently, its military supremacy.[9]

In India's case, security-related provisions in the national laws on IPR point out that there are aforementioned provisions in the laws adhering to patents, designs, integrated circuits, etc., where the government might restrain the publication of information evidently if they found it relevant for defence purposes as they were of primordial concern for 'security of India'. The term 'security of India' is an umbrella term for:

1. Fissionable materials or materials from which they are derived.
2. Related to arms and ammunition and implements of war and trafficking of such materials to the military establishment.
3. Made during times of war or other emergencies.

Licence to file a patent application outside India cannot be granted without previous authorisation of the central government if indeed the invention is pertaining to defence or atomic energy. By filing a notification in the official gazette, the government may take appropriate decisions, including revoking any patent, that it deems appropriate in the interest of India's security. The laws on copyright, trademarks and geographical indications contain no particular provisions connected to national security.[10]

Analysing the Importance of Power Projection and How the IPR Regime is Dominated by Developed Nations

According to classical international relations theory, the foreign policy of great powers is inherently linked to their material power capacity. The concept that enhanced capabilities prompt greater ambition offers a clear and plausible rationale for the conduct of major powers: they behave as they do simply because they possess the capability to do so. This principle lies at the core of realist international relations theories. Morgenthau's second principle of political realism, that 'leaders conceive and act in terms of interest defined as power', indicates that states would grab ways to maximise their power. Any state with the necessary material capabilities will naturally adopt a great power foreign strategy.[11]

What does the 'capabilities drive intentions' reasoning imply about the link between economic potential and apparent elements of major power

foreign policy, such as military capability development and power projection capacity? This question can be answered in two ways.

1. The first requirement is that the link be result-oriented and focused. All states should mobilise whatever resources they have available for military objectives. Economies with more capability should merely be able to mobilise more resources. This perspective argues that there is no fundamental contradiction between strong and weak governments' foreign policies but a gradual growth in foreign policy ambition as economies grow. If most of the great powers want to be the strongest, they must leverage their economic potential into military force at a faster rate than their weaker competitors.[12]
2. Empirical research indicates that international threats serve as a plausible justification for expanding foreign policy objectives. The arms race stands out as the most notable illustration of this phenomenon. Consequently, the concept of 'power projection' often evokes thoughts of military modernisation. While this association holds true to a significant extent, India has recently recognised the potential of leveraging indigenous technological capabilities for power projection. Put simply, India should prioritise internal balancing, emphasising the development of domestically sourced military modernisation. This strategic shift may address long-standing weaknesses in India's defence policy. If successful, these adjustments could significantly impact India's dynamics with China and its relationship with the US, surpassing mere superficial displays of cooperation.

It all started when, among Indian decision-makers, there was an increasing recognition that excessive reliance on imports posed heightened long-term risks. Initially, India inadvertently strengthened the military–industrial complexes (MICs) of other nations by prioritising military imports over domestic production. Additionally, the fear of potential external weapons embargoes, capable of severing the supply chain, emerged as a second concern among the Indian decision-makers. While endorsed by Rajnath Singh, this apprehension was not commonly articulated explicitly. Third, for a nation of India's magnitude, dependence on external military provisions represents a precarious gamble.[13]

However, it is easier said than done. As stated by R.S. Bhatia: 'World trade for defence equipment is not run on economic considerations alone. Technology denials have been and will always be used as an instrument of

foreign policy.'[14] Surprisingly, Indian analysts are typically positive about defence offsets. India, as one of the largest importers of defence equipment, stands to gain a lot from a well-thought-out offset strategy. Offsets will play an important role in the industry if the transaction is understood on a commercial level. These ideas can be under the following issues:[15]

1. technology transfer;
2. direct and indirect offsets;
3. enhancement of foreign direct investment (FDI);
4. capability building;
5. the role of defence public sector undertakings (DPSUs); and
6. accountability of offsets.

Now, it is not just about building a defence ecosystem that allows indigenous technology weapons to grow; it is also about convincing the end-users—the Indian Armed Forces—to change their stance about Indian R&D by investing more trust in the Indian defence industry. The Indian Air Force (IAF) is much more forthcoming about indigenising its inventory and continues to closely work with the academia and the industry. It is a challenging path to tread since a lot of time, resources and risk are involved. The Indian Navy (IN) has also been at the forefront of indigenisation of defence equipment among the three services.[16]

The IPs, such as patents, copyrights and trade secrets, have now become crucially influential in developed economies' exports. On the other hand, IP is particularly vulnerable to appropriation by nations, businesses or people. The IP's concept of comparative advantage applies to the military too. Patents and trade secrets have traditionally been a significant component of the value of specific weapons systems. On the patent front, states have often been unwilling to replicate their allies' weapons without permission; in the 1950s, even China and the Soviet Union (states not known for respecting IP rules) signed licence agreements with one another. As the technical sophistication of military equipment has evolved, IP has become an essential component of their significance.

India needs to have a thorough look at developed countries that have been doing admirably well in the field of indigenous military modernisation, which, in turn, has resulted in strengthened arms exports and consequently, a strong IPR regime on the global front. The US, Russia, France, Germany and China have been the top five arms exporters in 2016–20. In the period 2016–20, they accounted for 76 per cent of all significant arms exports.[17]

France

The French have taken the indigenisation of their military stockpile quite seriously. Not only did they go indigenous but they also benefitted highly from arms exports. In the years 2015–19, they witnessed their best performance in terms of any five years since 1990, accounting for 7.9 per cent of total worldwide arms exports. Egypt (which accounted for 26 per cent of France's defence exports), Qatar (14 per cent) and India (14 per cent) have helped the French arms market. Dassault Aviation and Naval Group are principally responsible for France's stunning 72 per cent increase in weapons exports from five years ago in the aforementioned time-frame.[18]

France's politicians and defence industry executives have acknowledged that without exports, they will be unable to afford the most cutting-edge and high-performance weaponry to their armed forces. Furthermore, buying weapons from the US comes with layers of bureaucracy, such as the need for legislative approval for all foreign military transactions, which can hinder the process and, some claim, constrain France's sovereignty.[19]

The US

According to the Stockholm International Peace Research Institute's (SIPRI) factsheet, the US tops the arms export rankings. The country's global share of arms exports in 2011–15 was 32 per cent and went on to further increase up to 37 per cent in 2016–20. Top importers from the US in 2016–20 were Saudi Arabia (24 per cent), Australia (9.4 per cent) and South Korea (6.7 per cent), respectively. Between 2011 and 2020, there were particularly high increase in the US weapons exports to three nations in the West Asian region: Israel (335 per cent); Qatar (208 per cent); and Saudi Arabia (175 per cent).[20]

<Para>In fact, according to the US's Arms Control Export Act, arms export is an extremely crucial aspect of the state's foreign policy tool, so much so that the decision to export must include the US interests, the buyer's greater demands, as well as the threat of inciting an arms race or regional conflict. Of course, there are some advantages for the market: while the US Department of Defense is the core target for most US-produced munitions, exports provide the defence sector with a bigger market but are less susceptible to declines in any US expenditure.[21]

Germany

Several non-European Union and non-North Atlantic Treaty Organization (NATO) member states, including Algeria (€2 billion), Egypt (€1.88 billion) and Qatar (€720 million), are among Germany's top 10 arms buyers. In

2016–20, German armament exports accounted for 5.5 per cent of global totals, up 21 per cent from 2011–15. In the period 2016–20, Germany delivered substantial weaponry to 55 countries. A total of 38 per cent of German significant arms exports went to countries in Asia and Oceania, while 21 per cent went to countries in Europe. Despite stricter prohibitions on arms sales to Saudi Arabia (the Middle East's largest arms importer) from 2016 to 2020, the Middle East received 23 per cent of German arms exports during that time, making the region the second-largest receiver of German arms transfers.[22]

Israel

In 2016–20, Israel was the ninth-largest arms exporter. Its armament exports accounted for 3 per cent of global aggregates and were up 59 per cent from 2011 to 2015. In the period 2016–20, Israel delivered large armaments to 40 countries, with India accounting for 43 per cent of the total. Air defence systems were among Israel's 2016–20 supplies to India.[23] According to government estimates, radar and early warning systems, as well as weaponry and weapons, accounted for 16 per cent of sales, while manned aircraft and avionics, as well as surveillance and optronics, accounted for 13 per cent. Sales of missiles, rockets and air defence systems accounted for 10 per cent of the total. Communication, drones and intelligence systems were among the others.[24]

Other countries, like Brazil and South Africa, have also been active in developing MICs for a couple of decades. The two countries are also part of the BRICS, which makes their position as a 'developing country in defence indigenisation' further crucial. Both face unique challenges when it comes to domestic defence indigenisation and IP rights.

Brazil

Brazil has been making strides in the defence indigenisation space, although at a cost. More so, it seems like Brazil has been using defence space to deepen diplomatic ties. In the year 2020, Bolsonaro and Trump signed a deal that enabled the US, as the main foreign player, to contribute to the growth of Brazil's domestic defence sector. Brazil was designated as the main non-NATO ally of the US after the two countries signed an agreement in March 2020 that allowed Brazil access to the US's defence funding. In turn, Brazil would exchange its defence technology and IP. Before this deal, during Brazil's Temer administration, a Research, Development, Test and Evaluation Agreement was introduced in 2017. Following the inception of

this defence agreement, the US and Brazil have been working together on defence initiatives and IP laws. Brazil has incorporated defence contracts and money for Amazon protection by utilising the resources of the US through the NATO.[25]

Furthermore, the top five defence IP patent holders in Brazil from 2002 to 2022 are foreign entities, namely, Qualcomm (1,142 patents), Toyota Motor Corp and Huawei Investment & Holding Co. Ltd (341 patents each), Nissan Motor Co. Ltd (266 patents) and Nokia Corp. (186 patents).[26] Consequentially, Brazil will be more dependent on these foreign companies-held patents for critical technologies. This also leads to lessening interest from domestic companies, due to potential lower returns on investment, to invest in R&D.

South Africa

South Africa has released an official white paper on defence-related industries. In this paper, the government has recognised the importance of having domestic defence industry capabilities from a strategic and defence perspective. However, because of financial limitations and in the context of a larger national industrial policy, it is stated that the government will be extremely picky about the essential or strategic skills and technology to be protected.[27] Furthermore, post-Apartheid era, more public criticism has been directed towards the domestic arms business than in the past. Former Deputy Minister of Defence, Ronnie Kasrils, acknowledged that keeping a defence force and a domestic defence sector comes at a hefty cost—more than Rand 10 billion annually in the case of South Africa. However, according to him: 'Not every one of these factors can be valued in monetary terms. Due to the cancellation or suspension of defence contracts, domestic defence-related companies have been severely impacted by the sharp reductions in defence spending.' As a result, many companies have been forced to retrench and undergo downsizing.[28]

Although South Africa's industries devote significant financial resources to R&D, the white paper on S&T, which addresses defence research, observes that the trade balance in medium and advanced technology products stays negative. The top five defence IP patent holders in South Africa from 2002 to 2022 are: Compagnie de Developpement de l'Eau (CDE) SA (64 patents); Safran SA (32 patents); Orica Ltd (28 patents); Detnet South Africa (Pty) Ltd (24 patents) and Thales SA (21 patents).[29]

From the aforementioned statistics and indigenisation efforts taken by these countries, India can rise to the challenge of defence military capability

development and power projection capacity so that it delivers to the demands of the security environment in upcoming years. Additionally, as previously mentioned, a strong IPR will subsequently lead the country to a developed defence industrial base.

Evaluating India's IPR in Defence R&D as a Case-in-Point

The budget allocation for the Defence Research and Development Organisation (DRDO) was significantly boosted by the Modi-led administration in 2014, with the 2015 budget mostly maintaining that amount of expenditure. In the year 2014–15, Rs 15,282.92 crore was allocated to the Department of Defence Research and Development (DDR&D);[30] and in the year 2018–19, it was allocated Rs 17,861.19 crore,[31] which is significantly higher than the inflation-adjusted (inflation factor being 1.1449) amount of Rs 13,344.12 crore (latest annual report released was in 2019). This increase hinted that the Modi government felt that India's defence R&D had been hampered by decades of lack of investment, resulting in a labour deficit and a paucity of critical testing facilities. The government was also keen to invite 'FDI in defence' for that reason, in addition to advocating for substantially greater domestic private sector investment. With indigenisation of military weapons being viewed as a strategic imperative, the government appeared to be pursuing a dual strategy of promoting local R&D while also expanding India's defence manufacturing base. This was a sensible decision because both decisions complement one another. However, to ensure the political viability of this approach, indigenisation needed to be prioritised as a national ideological goal.[32]

The Ministry of Defence (MoD), in 2018, launched Mission Raksha Gyan Shakti, intending to encourage inventions and developments in the IPR regime. Diverse inventions from the defence industry, including those from the DRDO, DPSUs and Ordnance Factories, that were successfully filed as IPR applications, were also on display. The then Defence Minister aided several scientists as well. In addition, panel meetings took place to develop a strategy for how IPR and defence might work together and what the future strategies will be in this regard. 'Intellectual Property for Self-Reliance in Defence' was the event's tagline.[33]

The Mission Raksha Gyan Shakti framework was established to promote IPR ethos in the Indian defence sector. The programme's coordination and implementation were to be handled by the Directorate General of Quality Assurance (DGQA). The initiative's main goal was to promote and enhance

the IP in the defence industry in line with the national policy on IPR and to empower and facilitate the DPSUs in implementing the same. In April 2018, the MoD/Department of Defence Production (DDP) laid a solid foundation for this mission by establishing an enabling ecosystem composed of Tier-I 'Intellectual Property Rights Facilitation Cell (IPFC)' under the auspices of DGQA; Tier-II level IPFCs at the corporate headquarters-level in DPSUs/Ordnance Factory Board (OFB); and Tier-III IPFCs at respective production divisions/units. Former Defence Minister Nirmala Sitharaman formally began the mission on 27 November 2018, with an ambitious goal of educating around 10,000 individuals and filing at least 1,000 IPR applications during the fiscal year 2018–19.[34]

The Mission Raksha Gyan Shakti aspires to improve the indigenous defence industry's IPR culture. To attain self-reliance in the defence sector, it stresses the importance of shifting from a mentality of seeking transfer of technology (ToT) from foreign sources to developing IP in India. It has led to the DPSUs/OFB submitting a total of 2,078 IPR petitions as of 31 March 2021.[35]

Additionally, incorporating a 'Make' category in the Defence Procurement Procedure (DPP) has been pivotal for achieving the government's vision of fostering indigenous capabilities. This entails the design and development of essential defence equipment, products, systems or upgrades by both public and private sector entities within a compressed time-frame.[36] According to DPP 2016, the 'Make' procedure has two sub-categories:

1. 'Make-I' (government funded): Projects in this sub-category will get 90 per cent government financing, which will be released in stages and depend on the scheme's development, as negotiated between the MoD and the vendor.
2. 'Make-II' (industry funded): These projects involve the prototype development of equipment, systems, platforms, upgrades, or their respective subsystems, assemblies or components. These initiatives primarily aim at import substitution or introducing innovative solutions. Notably, no government funding will be allocated for these endeavours.

Furthermore, in March 2019, the government announced a 'Policy for Indigenization of Components and Spares Used in Defence Platforms', with the aim: 'To create an innovation ecosystem capable of indigenizing imported components (including alloys and special materials) and sub-assemblies for defence equipment and platforms manufactured in India, and to capitalize the said capability to create components export market.'

Under this policy, the DPSUs were expected to decrease their import cost by more than 15,000 crore by 2022 by indigenising items and systems.[37] The policy also envisaged different strategies, such as priority for indigenous parts, culminating in significant cost savings; the establishment of an indigenisation portal; an IP policy for indigenised components; promotion for the advent of technical capabilities; no-cost, no-commitment testing of indigenised items; long-term orders; the establishment of dedicated defence testing infrastructure; the indigenisation fund; and the encouragement of export, among others.[38]

In the past few years, the theatre of geopolitics has shifted to cyberspace, with information warfare reaching a new peak. This is why when it comes to emerging technologies, like artificial intelligence (AI), the DDP and the MoD have developed indigenous AI products initiative, AiDef (AI in Defence). Collaboration between the public and private sectors of business, academic institutions, research organisations, start-ups and innovators has resulted in the development of numerous innovative AI-based technical products in the fields of data, logistics, surveillance and ammunition, among others.

Defence Minister Rajnath Singh, on 11 July 2022, during the inaugural AiDef symposium and exhibition in New Delhi, presented 75 recently developed AI products and technology. The symposium reflected Prime Minister Narendra Modi's goal of making India a 'Global Hub for AI' and ensuring social welfare and national security through the development of AI-led and enabled technologies. To stay ahead of technological advancements and optimise technology's benefits for our services, it is imperative that the military industry promptly integrates advanced technologies, such as AI and big data.[39] The AiDef has developed products in the domain of command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR), autonomous robotic systems, blockchain-based automation, human behavioural analysis, Internet of Battle Things (IoBT), and so on.[40]

So far, 1,499 articles have been indigenised, compared to a target of 1,244 for 2020–21. During the time-frame 2020–25, the DDP has set a goal of indigenising 5,000 products.[41] As per DDP's annual report 2022–23, 5,852 items worth Rs 3,931 crore have been indigenised.[42]

Focusing on IPR and defence indigenisation has worked wonders for India. Various defence projects are underway, and defence corridors in Uttar Pradesh and Tamil Nadu are attracting enormous investments (Rs 20,000+ crore each), creating job opportunities and boosting other

related industries. As per the DDP dashboard, the defence exports target for 2024–25 is around Rs 30,000 crore. Furthermore, defence production by DPSUs, private companies and joint ventures (combined) is expected to touch Rs 160,000 crore by the end of 2024–25. Under Mission Raksha Gyan Shakti, till September 2024, 6,018 IPRs had been filed, out of which 2,765 have been granted. The target is to grant 6,900 IPRs by the end of 2025.[43]

Despite the progress, one should not shy away from looking at the obstacles that India may need to overcome in its quest for achieving defence indigenisation. Apart from the previous government's lax attitude towards indigenous defence modernisation, budgetary issues and time and delivery delays, there are other concerns that one tends to miss out upon.

1. One prominent issue is the absence of strategic planning to address the future requirements of the armed forces. Given the evolving geopolitical landscape and border threats, it is imperative for the Indian Armed Forces to maintain tactical readiness. This entails continual enhancement of combat proficiency and the regular updating of weapon and gear technology. To fulfil these evolving demands domestically, strategic and realistic preparation is essential, including long-term investments in the development of advanced weaponry. Some critics argue that India's current military strategy falls short in this regard.
2. Decision-making is hierarchical and distorted. Imbalanced decision-making processes, bureaucratic red tape and several decision-making authorities have been listed as the factors for excessive delays in defence procurement in a 2018 internal assessment done by the MoD. Due to institutional constraints, decision-making on national security and defence procurement has been inefficient and cumbersome, resulting in the stagnant growth of defence modernisation. Furthermore, the armed forces are not included in the decision-making process when it comes to defence and national security strategy.[44]

To counter these issues, the ministry initiated a separate title in the Department of Military Affairs designated as Chief of Defence Staff (CDS), two decades after the Kargil Committee proposed it in 2000. The CDS will serve as a single point of military advice to the MoD and will coordinate the activities of the three forces, but he will not be the operational chief. According to industry analysts, this might produce tension within the military leadership and jeopardise the three service chiefs' power.[45]

Exploring Potential Future Scenarios and Policy Recommendations

Under Prime Minister Modi's leadership, India is being recognised as one of the major powers in the Indo-Pacific. Recently, ex-United Nations Security Council Chief, Kishore Mahbubani, former Permanent Representative of Singapore, stated in an interview:

> There is absolutely no question that India is the third most powerful country today after the United States and China. Great Britain (UK) is no longer great…fearing 'backlash,' the UK has not used its veto power 'for decades'…So, the logical thing is to give up its seat to India.[46]

One of the several future scenarios based on India's growth in the domestic defence industry is credibility and stakeholding in international issues. India is exporting arms to around 85 countries, including Myanmar, Mauritius, the Maldives, Azerbaijan, Nepal, Suriname and Namibia. Unlike the US and China, India does not usually prefer coercive diplomacy and stands for non-reciprocity. This policy in near future might make the developing countries consider India as the voice of Global South and the preferred security provider. For this very reason, India's MICs should develop themselves into a strong alternative to major arms-exporting nations. On the other hand, India's DPSUs as well as private arms exporters should conduct certain risk assessments before exporting. Certain factors, such as likelihood of a military coup, state's economic, social and political vulnerability, behaviour towards their citizens and kinds of conflict—internal and external—should be taken into consideration before providing arms to any country. Although there are existing indexes available, they can be biased and agenda-driven, which may lead to skewed rankings. Hence, India should also come up with its own rankings for such assessments.

Conclusion

Advancements in S&T and data are powerful but volatile sources of power in geopolitics. The combination of three essential components, that is, the MICs, political capability and secure borders, makes up military power. The IPR landscape and innovation ecosystem has shown significant growth with India's transition to a knowledge-based economy and society over the past decade. Numerous DPSU stocks have reached all-time highs due to

the explosive increase in defence manufacture and exports. Also, the sector's prospects are further boosted by the Indian government's coordinated efforts to strengthen export-oriented country-to-country relations. Additionally, having a strong domestic defence manufacturing and export industry will strengthen national security by shielding New Delhi from supply line disruptions during wartime. Collaboration between the public and private sectors of business, academic institutions, research organisations, start-ups and innovators has resulted in the development of numerous innovative AI-based technical products in the field of data, logistics, surveillance and ammunition, among many others.

While IP is developed within national defence R&D agencies as well as when it is procured from abroad, concerns of IPR protection and administration are important. Characterisation of technology for IP protection, submission of inventions in patent applications, protection of confidential data, utilising patent information, fundamentals of shareholdings of sharing IPR during collaboration, the premise of the naming of inventors/co-inventors, commercial manipulation of patents and sustaining resale value are all key aspects of IPR management that are likely to play an important role in strengthening defence R&D and technology development.

The requirements of the Indian Armed Forces are limitless and always shifting, and the process of developing innovative arms is also time-consuming and expensive. That is why relevant technologies, systems, platforms, etc., should be exported to other nations as soon as national criteria are satisfied. For India to export defence equipment, our forces must induct and operationalise the products—that is where the majority of defence-related marketing and sales comes from. Finally, financial considerations heavily influence the process of indigenisation. Nations are unlikely to prioritise indigenisation efforts if they perceive a risk of sacrificing strategic advantages to other countries due to the increased costs associated with domestic production. Additionally, rigid delivery schedules that leave little room for time-consuming indigenisation endeavours may deter nations from pursuing this path. Moreover, doubts about the MoD's capacity to support follow-on orders for indigenised products, stemming from long-standing budgetary constraints, can further hinder indigenisation efforts. Adopting a more modest and targeted mission-mode approach to indigenisation can potentially yield more significant results under such circumstances.

Notes

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