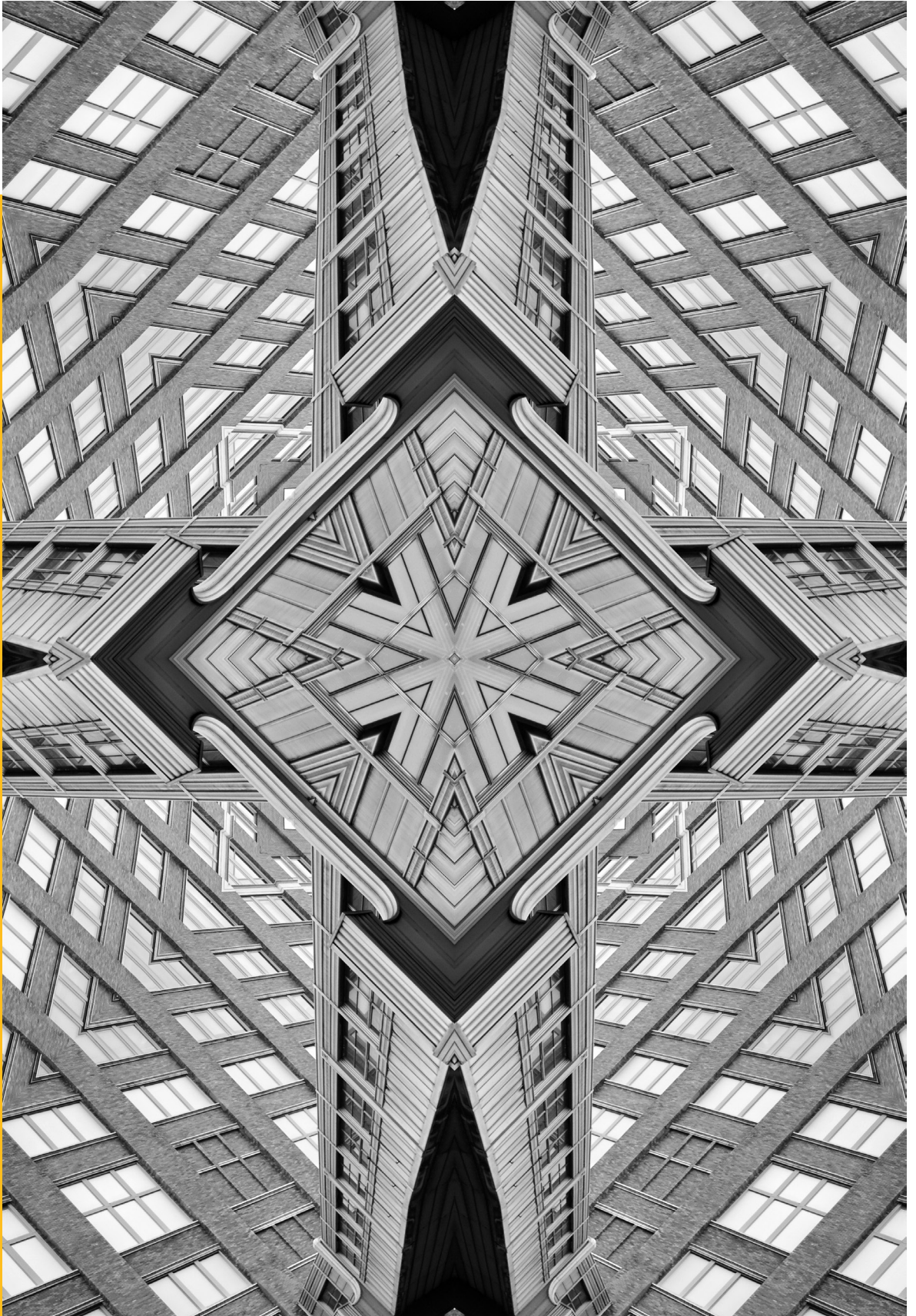


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Light Tanks: A Missing Priority for the Indian Army

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Abstract

The Indian Army's (IA) difficulties with regard to the acquisition of light tanks are as much self-inflicted as they are a product of fiscal constraints. The Army has exerted only half-hearted efforts in developing its light-armoured capabilities—inconsistent with current Army doctrine and in disregard of history. Indeed, the IA has used light armour in high-altitude operations in the past. This paper argues that the IA is hobbled by an infantry-oriented mindset that does not allow for other areas of force development such as a light-tank capability.

Introduction

India remains locked in boundary tensions with the People's Republic of China (PRC), and although these crises have momentarily abated, India would need to seriously address the gaps in its ground armour against the PRC. The Indian Army (IA) has been historically biased in favour of medium- and heavyweight tanks, and there is an absence of a significant or at least a consequential light-tank component in its armoured corps. The IA's predilection for medium and heavy tanks is largely due to the service's preoccupation with India's foe on its western border—i.e., Pakistan. Medium and heavyweight tanks constitute a large component of the three strike corps of the IA geared for offensive operations against Pakistan.

To be sure, experience with light tanks is not new for the IA. For example, the IA used Sherman and Stuart light tanks against the Pakistan army in the 1947-1948 war at the Zojila Pass, which enabled the capture of Kargil.¹ As General Kodendera Subbayya Thimmaya observed about tanks: "I had only a few weeks before...the onset of winter and heavy snow. The plan of opening Zoji La had, therefore, favoured a *blitzkrieg*. The Germans did it in Europe, in better terrain, I needed to attempt it here."² Zoji La was, and continues to be an inhospitable environment for the use of tanks, more than the terrain in Ladakh through which the Line of Actual Control (LAC) runs especially the Depsang Plains. There is not a single recorded case specifically during the Second World War of armour being used at the altitudes found in Zoji La. It is here that tanks were deployed and proved operationally effective on the snowy mountainous heights. Although extremely daunting and verging on the impossible given the steep gradients and the narrow paths on which tanks had to move at Zoji La, it was an inspired move reflecting great tactical and operational acumen. The rarefied air with temperatures dipping below -45 degree Celsius in Zoji La is also comparable to what exists in Ladakh. As a senior officer of the IA noted in 2016 in Ladakh: "The vast flat valleys along the mountain ranges allow for armoured movement; besides, there has been an increase in the force levels across the border as well."³

Introduction

The 1962 Sino-Indian boundary war was another instance when French-built AMX light tanks were employed with great effectiveness against Chinese forces in Ladakh, especially in Chusul, that prevented the Chinese advance to Leh.⁴ It is precisely this terrain's role in enabling armoured operations that should serve as the rationale for acquiring light tanks.

The ongoing boundary crisis with China has generated a debate about the importance of India developing and fielding light tanks against an adversary that has deployed purpose-built light tanks for high-altitude warfare. The crux of the problem lies in whether the IA needs light tanks as opposed to making do with inventory-heavy armoured combatants such as the Russian-built T-72s and the more modern T-90s. Today, like in many past acquisitions, the imperative to get a light tank is precipitated more by the ongoing Sino-Indian boundary crisis than by long-term planning with regard to the IA's armoured forces. Although light tanks are not a panacea to deal with adversaries such as China, they are an essential element in the larger mix of capabilities, which will need to be fielded by the IA against its North Eastern foe. The realities of terrain and the constraints on guns of heavy tanks to engage targets at high altitudes mean that light tanks assume considerable importance.

“The ongoing boundary crisis with China has generated a debate about the importance of India developing and fielding light tanks against an adversary that has deployed them.”

This paper makes a case for acquiring light tanks as an integral component of the IA's armoured forces. It assesses the reasons why light tanks have not found traction with IA force planners; evaluates why the PRC developed the Type 15 light tank and the nature of the tank's capabilities; and analyses the relative strengths and weaknesses of battle tanks operated by the IA and how they stack up against light tanks. The paper concludes with recommendations on what should be done to address the light-tank deficit.

Whither Indian Light Tanks: Reasons for Omission

The induction of light tanks should not be controversial, because it is neither an expensive investment nor a dispensable requirement especially when confronted with a neighbour such as the PRC, which has made a successful investment in light tanks and deploys them against India. Yet evidence of the PRC's efforts to develop and deploy light tanks has not induced the IA to do likewise. Support for, or objection to the need for light tanks come primarily from within the ranks of the Army's officer corps, both active and retired. Opposition does not come from the civilian bureaucracy nor the political leadership of the country.

While there have been fitful and unconvincing efforts going back to at least the 1980s to develop light tanks indigenously, none have borne fruit. For instance, there were sporadic attempts by the Defence Research and Development Organisation (DRDO) to build light tanks by replacing the Soviet-designed BMP Infantry Combat Vehicle (ICV) turret with a 105 mm gun, but the IA scuttled it.⁵ The DRDO, despite the IA's disregard made an additional effort by using the chassis of the Soviet ICV and then integrating it with the French GIAT TS-90 and 105 mm gun, which was again eventually shelved due to the IA's resistance.⁶

Today it is the boundary stand-off along the Line of Actual Control (LAC) which has revived attention to the need, if not urgency, for light-tank capability. It was in 2009 when the Ministry of Defence (MoD) issued a Request for Information (RFI) for light tanks; that effort went nowhere. Defence analysts attribute the failure to procure a light tank squarely to the IA's "indifference",⁷ which in turn is the result of the IA's priorities. It is also compounded by competing claims for resources for other tanks, namely the T-72s, T-90s and the mostly indigenously built Arjun Mk-1A.⁸

In its latest effort in April 2021, the MoD issued an RFI from vendors of light tanks. The RFI stated that the IA is expecting to acquire a "new generation combat vehicle platform, approximately 350 Light Tanks in a phased manner, along with performance-based

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logistics, niche technologies, engineering support package, and other maintenance and training requirements....The last date of acceptance of receipt of response is June 18, 2021.”⁹ In India’s post-independence history, greater attention to military acquisitions and capabilities has characteristically followed a crisis. The same is true for the discussions on light-tank capability, which heightened once again after the deaths of 20 Indian soldiers at Galwan in Eastern Ladakh.

Beyond the problems induced by indifference, there are deeper issues that influence how the IA structures its capabilities. Ideally, planning for the acquisition of light tanks should be an element of the IA’s doctrine. The IA’s Land Warfare Doctrine (IALWD -2018), while calling for the force structure of the service, observes: “The Indian Army will be structured to be an agile, mobile and technology driven force, operating in synergy with the other Services...”.¹⁰ This is a non-exceptional statement and consistent with the force development goals of major armies around the world. However, when it comes to the development, investment and acquisition of light tanks, there is hardly anything to suggest that the IA has sought to structure its armoured forces that meet the doctrinal test of agility, mobility and technology. The IA’s doctrine has had little bearing, if at all, on determining the development and procurement priorities and technological capabilities relating to light armour. On the other hand, the IALWD calls on the Army to cope with the lack of technological capabilities or technological “asymmetry” with better training, skillful use of terrain, mission-oriented performance, and effective leadership.¹¹

Matching the PRC pound-for-pound in terms of capabilities and technology is beyond India’s resources. However, light tanks are neither exorbitant nor a technologically complex investment; they generate pay-offs in terms of ease of deployment, readiness, and operational performance in difficult mountain and high-altitude, plateaued terrain against a strong foe. Thus, there is no reason why the IA should simply adapt to an “asymmetry” in capability vis-à-vis the PLAA when it comes to light tanks.

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Further, the IALWD and the leadership of the IA seem to overlook the Clausewitzian dictum: “The best strategy is *always to be very strong*: first in general and then at the decisive point.”¹² To be sure, this prescription is deeper than it first appears in that Clausewitz was clear in stating that superior or quantitatively larger forces are the surest way to succeed in battle. Indubitably, as he conceded, it is always desirable to have a skillful commander, well-trained troops with high morale and initiative; but these qualities are intangible which can be tested and ascertained only in the crucible of battle and they are not exclusively in the control of any side in a military engagement and war. There is wisdom in assuming that these attributes are present and equitably distributed on both sides.¹³ Assuming they are not evenly matched in that India emerges superior against China, Clausewitz would still caution India’s political and military leadership: there is a limit to which tactical and operational skill or virtuosity and high force morale can decisively influence results on the battlefield when faced with a numerically and technologically superior foe.¹⁴ The IA as far as light tanks are concerned has created a capability deficit where none should exist and has done little to acquire them under the terms of its own doctrinal requirements.

One other factor that weighs heavily and remains recondite is the IA’s investment in heavy battle tanks as opposed to light tanks, which is due in good measure to the operational challenges posed by India’s Western adversary – Pakistan. Indeed, years of insurgent and terrorist violence in Kashmir with active Pakistani sponsorship has drained the capacity of the IA to think beyond infantry-based operations to tackle operational challenges and threats posed by sub-conventional warfare. Wars and crises with Pakistan have reinforced an infantry mindset such as Kargil, Operation Parakram in 2001-2, the 2008 Mumbai attacks, and a series of cross-Line of Control (LoC) strikes employing Special Forces and frontline personnel than in technology, firepower and manoeuvre-intensive capabilities. The Kargil war in 1999 too, which was the most intense conflict fought between India and Pakistan in almost three decades, triggered an expansion in force for infantry-based operations, rather than a reduction.¹⁵ The IA, in a nutshell, is an infantry-dominant fighting force and will need significant restructuring and reorganisation if it is to effectively take on the PLAA.¹⁶

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Even when the IA has considered the importance of armour, it has been more often, if not exclusively in the context of operational effectiveness against Pakistan. Pakistan has been the primary determinant in the way the IA has structured the composition of its armoured forces. Each of India's three strike corps have battle tanks in the medium weight to heavy category. The central thrust of military planning for the IA has been against Pakistan. Nowhere is this truer than in the case of armour. The types of tanks ordered by the IA are revealing in that it has gone for upgrades to older-generation T-72s, purchased large numbers of T-90s over the last two decades with upgrades, and developed the heavier Arjun MBTs Mk and Mk-1A series which are already in service. The upgrade and procurement priorities have strongly privileged heavy armour over light armour. In addition, despite the quest for Mountain Strike Corps (MSC) geared for offensive operations against China, the effort has met with only partial fruition.¹⁷ However, light tanks never featured in the offensive mix of capabilities as part of the Mountain Strike Corps. This was true under the United Progressive Alliance (UPA) government of Manmohan Singh, and thereafter under the current National Democratic Alliance government of Prime Minister Narendra Modi. Consequently, light tanks have not received the investment both in terms of development and acquisition to service the needs of armoured operations in select areas on India's northeastern boundary with China.

Beijing, for its part, confirmed the deployment of its Type 15 or Xinqintan ZTQ light tank built by the State-owned enterprise China North Industries Group Corporation (NORINCO) in 2017.¹⁸ Under the Modi government, in the last seven years, if there was any allusion to the lighter platforms and weapons systems, which most definitively included armour for operations in mountain terrain—it came in 2017 when then Army Chief and currently Chief of Defence Staff General Bipin Rawat drew attention to the importance of lighter platforms. Speaking in the context of modernising India's mechanised forces and the varied terrain in which armoured vehicles would operate, they had to be suited for operational deployment on India's Western and Northeastern borders. He observed: "We will have to look at

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technology to reduce the weight of our war fighting machines. We will have to overcome terrain with manoeuvring space reducing... Even down south in desert, in that sector hardening of desert has started.”¹⁹ Despite the recent RFI of April 2021, there are divisions between serving and retired officers about the necessity for light tanks. The divide is between two schools on the imperative of a light tank for the IA.

The first school remains committed to the necessity of inducting light armour, because light tanks in especially in the Western sector of the Sino-Indian border in Ladakh are likely to be in the forefront of ground operations. Citing past uses of light tanks in wars by the IA while drawing attention to their effectiveness in mountain terrain, this school sees light tanks as particularly useful in a military contest against China.²⁰ Ladakh, especially the Depsang Plains, are most suited to the employment of light tanks, but there are other areas inaccessible to medium and heavy tanks such as narrow mountain gaps, valleys and plateaus where light tanks can be effective.²¹ Indeed, as a former Director General of Mechanised forces of the IA observed: “Light tanks enjoy enhanced strategic, operational and tactical mobility for rapid deployment in inaccessible areas and where medium tanks’ movement is impeded.”²² Their “superior agility” and “power to weight” ratios mean that there is an imperative to acquire these combat platforms because they are likely to perform better in undulating terrain than their medium- and heavyweight counterparts.²³

The second school contends that the rationale for light tanks is not due to any need because India can tackle the threat from the People’s Liberation Army (PLA) armoured forces with existing tanks in the IA’s inventory. Their defence of heavier battle tanks stems from the protection and firepower they offer. They point to the deployments of T-72 and T-90 battle tanks in Ladakh, which they claim are militarily effective against the Light Battle Tanks (LBTs) of the PLA. One tank commander told the media: “I believe that in case there is a battle involving the tanks during the present situation and they deploy their light tanks, I can assure you that it won’t survive against our T-90s

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and the T-72s.”²⁴ Another IA officer averred, “We have not seen the deployment of Chinese light tanks opposite our area so far. Even if they deploy it and takes part in a duel with us, it will be of no match to our strong and sturdy T-90 and T-72 tanks.”²⁵ Such position, however, overlooks the fact that the ongoing border standoff, which was at its peak in between June 2020 and February 2021,²⁶ did not fully test the effectiveness of battle tanks in that there was no active military engagement between the armoured deployments of the IA and the PLA Ground Forces (PLAGF).

This paper is of the first school of thought: light tanks are necessary because they are generally well adapted and suited for effective performance in mountain terrain and warfare. It is their lightness, transportability and deployment in difficult mountain terrain that make them highly suitable for operations on India’s Northeastern border with China.

“There is a limit to which tactical and operational skill and high morale can decisively influence results on the battlefield when faced with a numerically and technologically superior foe.”

China's Rationale for the Development of the Type 15 Light Tank

China's development of light tanks has had a specific purpose: India. This is particularly true of the Type-15 light tank, which is also known as the ZTZ-15 or VT5.²⁷ This section outlines the rationale behind China's development of the light tank and describes the tank's most important features. Indeed, China developed it specifically for armoured operations on the Tibet-Qingdao Plateau and the Gobi Desert. The Western Theater Command (WTC) is the largest of the Theater Commands (TCs) and covers the largest land area with complex terrain of desert, mountain, and plateaued terrain.²⁸ This variable and vast terrain that encompasses the WTC has required the PLAA and China's leadership to prepare, invest and plan the development of ground warfare platforms that operate effectively in the harsh geographic environment.

Chinese experts see the Type-15 tanks as highly suitable for these environments.²⁹ All tanks are based on three elements: mobility, firepower, and protection. (Marsh Gelbart, *Tanks: Main Battle and Light Tanks*, (London: Brassey's UK Ltd, 1996), p. 5.) The Type-15 light tank not only has these three features, but was also developed specifically with an emphasis on what China calls "informationisation"³⁰ which involves the application of information and digital technologies to enhance its performance and combat effectiveness. The development of the Type 15 is consistent with the goal in China's 2019 White Paper, which emphatically states: "to generally achieve mechanization by the year 2020 with significantly enhanced informationization and greatly improved strategic capabilities."³¹ The Type 15 is a 35-tonne armoured platform with a 105 mm gun, which is derivative of the gun used by the Type-96 tank and its barrel can self-tighten and withstand considerable pressure in the chamber. Although the Type 15 is equipped with a rifled gun, its projectile is tail-stabilised which can pierce armour. The ordnance is a 105-mm hull armour-piercing projectile and represents a threat to all Indian tanks.³² It is equipped with an Advanced Piercing Fin-Stabilised Discarding Sabot (APFSDS) and a complete body bomb in that it uses a core that can be inserted into the cartridge enhancing the length of the core, thereby augmenting its armour-piercing capabilities.³³ It is also equipped

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with an automatic ammunition loader supplying ordnance from the tail to the gun, which contrasts with the turntable-type loader on other Chinese tanks.³⁴ Indeed, even the PLA Army's (PLAA) highly advanced Type 99A2 is equipped with the turntable type loader.³⁵

It has a muzzle velocity of 1700m/s and a range of 3000 meters or three km. It can penetrate homogenous steel armour at a distance of 2 km. The Type-96 B Main Battle Tank (MBT) which is an improved variant of the Type 96 A uses a 125 mm gun.³⁶ However, its 125 mm gun projectile can penetrate the frontal armour of 540 millimeter (mm) at a distance of 2000 meters or 2 km, whereas according to Chinese assessments when fighting on plateaued terrain, the Type-15 can penetrate frontal armour against every adversary tank including India's mighty T-90 battle tank.³⁷ The latest 105 mm APFSDS of the Type 15 uses tungsten alloy cores which significantly increase the penetrative strength against the armour of not just second-generation battle tanks, but a few third-generation battle tanks as well.³⁸ Despite their contact 5 explosion reactive armour which can produce a weakening effect on the armour penetrating shell, even the formidable T-90s are vulnerable to the armour piercing capabilities of the 105 mm APFSDS.³⁹ Consequently, the frontal armour of the T-90S faces a high probability of penetration.

More critically, the Type 15 has other strengths such as mobility and information advantages. In the case of the latter or what Chinese experts call informationised capabilities, it can locate, identify and strike the enemy's targets or battlefield assets with great precision.⁴⁰ It has a detection range of 3 to 4 km, which is enabled by thermal imaging that is useful especially in poor weather conditions. When mobile or moving, the Type-15 has a first hit strike rate of 85 percent against targets.⁴¹ Although it is unclear whether the 85 percent strike rate is against mobile or static enemy targets. Even as the Type 15 tank's detection capabilities enable it to identify and destroy enemy targets, its visibility to the enemy remains low, making it harder for the latter to strike.⁴² Its capacity to operate and strike targets in variable and difficult weather makes it a highly effective combat platform. However, Chinese analysts concede that India's T-72s⁴³ have also been

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equipped with thermal detection capabilities – a process that started in late 2014.⁴⁴ As a consequence, the IA's T-72s have not just Thermal Imaging (TI), but also Night Vision Devices (NVD), which enable the tanks to detect targets up to 3 km.⁴⁵

Notwithstanding these qualifications on the improved capabilities of the IA's T-72s, the Type 15 has information-related advantages. For instance, it is connected via datalink with other platforms in the battlespace. It has direct links with rotorised and fixed wing aircraft, Infantry Combat Vehicles (ICV) and artillery, enabling close cooperation and coordination with all battlefield assets thereby optimising effective operational battlefield performance and outcomes.⁴⁶ It can send and receive target information through its datalink system at high speeds. It can also indirectly engage targets that it cannot sight by supplying information to the Red Arrow Anti-tank missile to execute strikes against which are located beyond the line of sight.⁴⁷ If this is not possible, it can also secure or receive reconnaissance imagery from Unmanned Aerial Vehicles (UAVs) to locate, identify and strike enemy targets.⁴⁸ The Chinese contend that this is not merely “tactical cooperation”, but characterised by “real time collaboration” that has critical “strategic” importance.⁴⁹ Thus “informationisation” gives the Type 15 not just improved survivability, it helps assess and discern the battlespace in real-time, enabling attacks against an unprepared adversary, playing directly to the strengths of the PLA's armoured forces by obviating a debilitating battle of attrition.⁵⁰ Thus, it is the Type 15 which is regarded at least by the PLAA to possess highest informationisation capability among all its tanks.

The armour of the Type 15 uses a wedge-shaped reactive armour and at the front of the turret uses composite armour. It reportedly has adequate capacity to withstand or absorb 100 mm and 105 mm tank gun strikes by tanks presently operational in the PLA.⁵¹ In order to protect tank crew, the Type 15 also has a pressure relief plate that is integrated into the upper end of the tail magazine. In the event of a strike in battle against the tail chamber of the tank,

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the pressure relief plate releases pressure generated by the massive explosive shock wave, protecting the crew inside the tank.⁵² This is also a key vulnerability of the Type 15 tank. However, as a result of the highly informationised capabilities of the Type 15, which cover reconnaissance, surveillance, communications, imaging, detection capacities and a taut datalink system, the tank can avoid being struck at its weakest parts.⁵³ The Type 15's informationised capabilities offset some of its vulnerabilities. However, as is the case with most light tanks, in all probability the Type 15 is likely to be used for infantry support and reconnaissance.⁵⁴ For additional capabilities see Table 1.

**Table 1:
China's Tanks**

Tank Name	Type 15	Type 99A	Type 96B
Type	Built for high altitude armoured operations as well for sea to shore missions. 3 rd generation tank. Three-man crew.	Very advanced Main Battle Tank (MBT). Three-man crew. 3 rd generation Tank. Three-man crew.	Upgraded battle tank and most potent advanced of the Type 96 family of tanks and mainstay of PLAA armoured forces. With upgrades likely to meet 3 rd generation standards. Three-man crew.
Weight	35 tonnes (Light category)	58 tonnes (Heavy category)	41.5 tonnes

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Tank Name	Type 15	Type 99A	Type 96B
Key Features	Advanced Fire control system include: wind sensors, laser ranger finders, ballistic calculators enabling better sensor to shooter capability. Equipped with auto-loader. Commander has panoramic peripheral sighting capability. Capable of striking mobile targets. Modular design. 12.7 mm heavy machine gun can be converted in to a 35 mm grenade launcher. Hydropneumatic suspension system.	125 mm smoothbore main gun. Main gun is fed by an auto-loader. Capable of firing APFSDS rounds. Highly advanced thermal sensors, DV-5 cross wind sensors, panoramic sighting capability. Capable of firing Refleks missile to a distance a of 5.5 kms. Lacks the mobility of of the Type 15. Likely to complement the Type 15 in high altitude warfare. However, lacks mobility of Type 15 and too heavy to be used exclusively at high altitudes. Production capacity still limited.	Equipped with 125 mm smoothbore gun. 7.2mm anti-personnel co-axial gun and 12.7 mm anti-aircraft gun. Improved hill climbing capability and acceleration due to improved horsepower and engine. Upgraded communications capability. Unclear if commander has independent sight as the Type 15 and 99As do. Will most likely provide critical firepower support.
Deployment Status	Deployed on the Tibetan Plateau.	Official Chinese reports suggest a few units deployed close to Karakoram in Xinjiang. Exact numbers deployed are unclear.	Given hill climbing capabilities, likely deployed on Tibetan Plateau under Western Theater Command (WTC).

Sources: Franz-Stephan Gady, "China now has world's largest active tank force", *The Diplomat*, 15 February, 2018, Franz-Stephan Gady, "Meet the 'Backbone' of China's Deadly New Tank Force", *The Diplomat*, 11 August, 2016, "Type 99A Tank", *Fighting-Vehicles*, accessed 10 July, 2021, "Type 96B Tank", *Fighting-Vehicles*, accessed 10 July, 2021.

China's Rationale for the Development of the Type 15 Light Tank

The PLA sees the deployment of the Type 15 in high-altitude terrain as a crucial element of their land warfare strategy. The ease of its deployment and transportability as opposed to the main battle tanks in the PLAA inventory also give it an edge beyond the aforementioned reasons. Further, being a light tank means that the Type 15 is highly manoeuvrable, allowing it to operate in complex mountain terrain. The manoeuvrability of the Type 15 and its being informationised do give it some advantages when operating on the high-altitude terrain that divides India and China. The PLAA and the PLA Logistics Support Force (PLALSF) will be crucial in sustaining the operational performance in combat of the Type 15 light tank and all combat platforms deployed on the Tibetan Plateau given its cold environment and high altitude, which is likely to have a degrading effect on the PLAA's military equipment.⁵⁵

Recognising this challenge, the PRC has invested heavily in logistics in the form of centralised command structure and through a significantly improved airlift capability, extensive rail and road network, and well-placed supply and maintenance depots that keep forward-deployed Chinese forces optimally replenished and battle-ready.⁵⁶ Very importantly, the Type 15 will operate under the WTC of the PLAA that will oversee military operations and missions adjoining India and will operate as part of integrated or combined arms formations and missions.⁵⁷ When operating and executing missions as part of unified and combined arms operations strategy, the Type 15 light tanks, given their mobility and manoeuvrability, are likely to be formidable. In all likelihood, the PLA sees the Type 99A and Type 96B offering complementary support to the Type 15.⁵⁸

India's Main Battle Tanks: Limited Value Against China

India's Main Battle Tanks T-72s and the T-90s have been the mainstays of the IA. However, they were acquired with the intent of dealing with a very different adversary in mind. The acquisition priorities of the IA have veered towards tackling India's threat on its Western border against Pakistan. Also, the upgrades that these tanks have undergone in recent years reflects a higher priority attached to MBTs than light tanks. Moreover, the IA operates over 100 indigenously built Arjun battle tanks and has ordered an additional 118 of them (called the Arjun Mk-1A and with significant upgrades) at a cost of INR 84 billion.⁵⁹ Regardless of its native origin, the Arjun is "overweight" and exorbitantly priced,⁶⁰ and has less military value against China than either the T-72s or T-92s. Unlike the PLA, whose decision to develop and deploy light tanks was borne out of a clear rationale to use them in mountain terrain and especially in a military contingency against India, the IA has not displayed the vision or foresight to acquire from abroad these platforms, let alone develop light combat tanks indigenously. Indeed, as will be elaborated in latter sections of this paper, the service has sought to substitute existing MBTs such as the T-90s and T-72s largely geared for offensive operations on the desert plains against Pakistan for armoured operations in mountain terrain. At present, the IA deploys its MBTs in three areas along its nearly 4,000-km Line of Actual Control (LAC) with China – Eastern Ladakh, Sikkim, and Arunachal Pradesh. Three armoured brigades consisting of 175 to 200 tanks are deployed in each of these locations.⁶¹

Consider the acquisition of T-90 Main Battle Tanks (MBT), which are the most advanced tanks in the IA's current armoured corps and mechanised forces and primarily aimed to bolster India's offensive arm against Pakistan. They were ordered as part of a deal with Russia in 2001 for the supply of 310 T-90 MBTs.⁶² India got 124 of these tanks in completely assembled form and the remainder were delivered in two batches in semi-assembled and non-assembled form.⁶³ As noted, the objective behind their acquisition was primarily motivated by the threat posed by Pakistan.⁶⁴ In order to pack more lethality in the tank, the IA went in for an upgrade of a new third-generation missile system for the platform.⁶⁵ The missile is expected to achieve a Depth of Penetration (DoP) of 800 mm and be capable of striking

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targets at a distance of 8 km.⁶⁶ The IA sought to order an additional batch of T-90MS dating back to at least 2012 as opposed to acquiring the indigenously built Arjun MBT,⁶⁷ which in any case at a weight of 60 tonnes is heavier than its Russian counterparts and unsuited for operations in mountainous and high-altitude plateaued terrain. Regardless, the 354 T-90MS worth an estimated INR 100 billion were intended partially to be deployed on India's borders with China.⁶⁸ These T-90s were not envisioned or expected to be deployed against exclusively the PRC; they were, however, to be deployed as part of the IA's two armoured brigades and the mountain strike corps against the PLAA.⁶⁹ A potent tank which is the mainstay of the offensive arm of the IA's armoured corps, T-90 MBT suffers from liabilities. It is a 46-48 tonne weight class tank, and is too heavy for operations in mountain terrain.

More recently, the T-72s, the oldest battle tank platforms in the IA have undergone an upgrade. The IA's first batch of over 1,800 T-72M1 Ajeyas (the Indian variant of the T-72) were first acquired from the erstwhile Soviet Union between 1982 and 1986.⁷⁰ In 2018, the Ministry of Defence went in for further upgrades especially to the engines for a thousand Ajeya tanks.⁷¹ Supplementing these engine upgrades, the T-72s are also undergoing additional improvements to its fire control systems, fire detection, suppression system, and reactive armour.⁷²

Moreover, it is unclear if the two Russian-origin MBTs— T-72s and T-90s— are capable of effectively performing sustained military operations in the rarefied air with low oxygen levels, high altitude and -40 degrees sub-zero temperatures of Eastern Ladakh. There is reason to question their effectiveness. As a serving Colonel officer of a T-90 tank unit of the IA deployed in Ladakh observed, long before the current Sino-Indian boundary crisis in 2016: "The air is rarefied and temperatures go down to -45 degrees Celsius, these affect the performance of the tanks."⁷³ Engines are especially vulnerable and the IA uses special lubricants and fuel to keep them operating and twice every single night the engines are turned up to prevent the tanks' subsystems from freezing.⁷⁴ Notwithstanding the fact that the IA knows how to make the tanks work, there are difficulties and

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challenges in making the armoured platforms function efficiently.⁷⁵ When put to the test in *actual* combat against the PLAA, the IA's MBTs may not perform efficiently and only reinforce why they are not for high-altitude warfare. Again, the IA's commitment has been to the improvement of its older-generation MBTs, and not of the light tanks. This pattern has continued with the Arjun series of MBTs to the extent that the IA and the larger defence establishment has privileged investment in heavy armoured platforms as opposed to light and high-mobility armoured capabilities.

The Arjun Mk-1A, as noted, is a heavy battle tank geared for operations against Pakistan. Even in the case of the latest variant of the Arjun, it is a more unusable battle tank in mountain terrain than the two Russian-origin MBTs which are part of the IA's armoured and mechanised corps. The tank's developmental history goes back to 1974;⁷⁶ however, it was not until 1996 that the IA moved and the Ministry chose to pursue mass production. The IA placed an order in 2010 for 124 of the Mk 1 variants of the Arjun tanks.⁷⁷ The Arjun MBT is a symbol of self-reliance. As India's premier defence research and development agency observed: "The Arjun MBT Mk IA is a state-of-the-art weapon platform with superior firepower, high mobility, excellent protection and crew comfort with 14 major upgrades on Arjun MBT Mk I."⁷⁸ The IA already operates 124 Mk I variant of the Arjun MBT. But the Arjun battle tank has run into serious cost overruns and there are reservations about whether it can form the nucleus of the armoured corps.⁷⁹

In 2010, despite field trials showing that it outgunned and outran the T-90, the IA has generally been lukewarm to integrating them in greater numbers.⁸⁰ For years the IA and DRDO have run around in circles and traded charges with the former, charging the latter for not meeting qualitative requirements specified by the IA. Conversely, the DRDO has seen IA's shifting requirements to be unrealistic. The IA operates roughly 124 of the M1 variant, has received an additional batch of 124 Mk-1A variant in February 2021, and is unlikely to shelve further development of the more advanced MK-2 version in the future. Table 2 provides summarises the salient features of existing Indian MBTs.

India's Main Battle Tanks: Limited Value Against China

**Table 2:
Indian Tanks**

Tank Name	T-72 - Ajeya	T-90 - Bhishma	Arjun Mk 1A
Type	Main Battle Tank. Three-man crew	Main Battle Tank. Three-man crew.	Main Battle Tank. Most advanced version of the Arjun series. Four-man crew.
Weight	48 tonnes	48-52 tonnes	65+ tonnes (Heaviest battle tank in the IA)
Key Features	Suited for warfighting in the plains and low altitude plateaus. Equipped with night vision technology and thermal sensors. Fitted with Explosive Reactive Armour (ERA) Mk-1 against anti-tank guided missiles. Can strike tank targets up to three kms with night vision.	Suited for warfighting in the plains and low altitude plateaus. Quipped with night vision equipment and 125mm smoothbore gun. Fires APFSDS. Capable of firing Refleks missile. Shtora self-protection system. Advanced communication system and "hunter-killer" capability. Can strike targets up to four kms with night vision.	Most advanced battle tank in the IA. 120 mm gun. Fires APFSDS. Computer controlled integrated fire control system. 7.2mm anti-personnel co-axial gun and 12.7 mm anti-aircraft gun. Hydropneumatics suspension system. Commander and gunner equipped thermal imaging system. Panoramic sight for commander. Suited for warfighting in the plains. Most effective in desert terrain. In contrast to T-72 and T-90, cannot be deployed at high altitude. Cross country mobility is constrained due to weight. Production rates are still very low.
Deployment Status	Some units deployed along the LaC. Deployment numbers unknown.	Some units deployed along the LaC, especially the Depsang plains. In 2016 at least a 100 tanks were deployed in Ladakh. Current Deployment numbers unknown.	Unknown.

Sources: Amrita Nayak Dutta, "Army tanks now have sharper night vision equipment developed by DRDO", *ThePrint*, 27 September, 2019, "Explosive Reactive Armour (ERA)", *Defence Research and Development Organisation (DRDO)*, New Delhi, accessed 10 July, 2021, "MBT Arjun Tank", *Defence Research Development Organisation (DRDO)*, accessed 10 July, 2021, "T-90s – Main Battle Tank", *Army Technology*, accessed 10 July, 2021.

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There are other issues that afflict the Arjun MBT irrespective of whether one agrees with the DRDO or detractors of the Arjun within the IA and outside. Being a 68-tonne battle tank, it is one of the heaviest armoured platforms built and in operation currently. There are other battle tanks of a similar weight class in the world today, such as Type 99A and the M1 Abrams. But this puts the Arjun MBTs in a weight class that is even greater than the T-90s and the T-72s. Indeed, while the IA has been tepid in inducting the Arjuns in greater numbers for several reasons, it is also resistant to deploying existing ones in the IA's inventory even in the plains of Punjab due to their weight,⁸¹ let alone in the mountain terrain of the LaC. The Arjun has a four-person crew. It is equipped with a powerful 120mm gun, making it amongst the largest of its kind. However, the Arjun's cross-country mobility is significantly compromised by the weight of the tank, which stands at roughly 62.5 tonnes and ill-equipped to traverse terrain in Punjab where some of the biggest and decisive tank battles were fought between India and Pakistan in the 1965 and 1971 wars.⁸² Even worse, the Mk-2 variant of the Arjun is likely or expected to be 67 tonnes—almost five tonnes heavier than the variants presently in the IA.⁸³

If anything, the armoured corps' officers see a restricted operational role for the Arjun MBTs in which the latter are confined to operations in the deserts of Rajasthan, rather than the plains of Punjab.⁸⁴ This is due to the fact that the Nominal Ground Pressure (NGP) of the Arjun exerts constraints on both variants of the Arjun' cross-country mobility.⁸⁵ Despite the weight reduction efforts by the DRDO, CVRDE and Heavy Vehicles Factory (HVF) to the M1 and MK-1A versions of the Arjun to widen the tank's tracks to distribute its weight evenly at 0.85kg/cm, the extensive bridges in Punjab are incapable of absorbing the pressure generated by the weight of the tank.⁸⁶ Thus, the platform is of limited utility in the Punjab plains against India's Western adversary – Pakistan, let alone in the high-altitude terrain the IA faces against the PLAA. Consequently, the Arjun provides no relief for the IA's armour-related woes against the PRC. In any case, its weight and dimensions make it undeployable along the LAC. Ease of deployment is a critical criterion for fielding weapon systems and platforms.

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However, the cumulative investments made by the Indian state over several decades in developing the Arjun tank means that its unlikely to be abandoned and several units of the tank will be produced and integrated into the IA's armoured corps. The newer variant of the tank called Mk-2 is already under development, obviating any attempt to shelve the enterprise and divert resources for the development of light tanks.

The point is not to suggest that light tanks are an alternative to the Arjun MBT, but rather the continued investment in the latter will persist regardless of whether India acquires light armour for mountain warfare against China. The significance of lighter combat platforms, which include light tanks, for high altitude ground operations cannot be overemphasised and appears to be understood by the senior leadership of the IA, but yet to translate to concrete capabilities. Although the T-90 and T-72 MBTs have been deployed in specific areas along the LAC and will remain relevant to armoured operations against the PLAA, they must ultimately complement light tanks. Indeed, China too, sees heavier MBTs such as the Type 99A and Type 96B performing complementary function to the Type 15.

“The PLA's decision to develop and deploy light tanks was borne out of a clear rationale to use them in mountain terrain; the Indian Army has not displayed the same vision or foresight.”

Implications: What Should and Can India Do?

It is evident from the foregoing that the weight and bulk of ground platforms for high-altitude missions and operations is a serious weakness facing the IA. Nowhere is this weakness more glaring than in the development and deployment of light armour. Given the denouement the service faces today, the IA has missed the opportunity in the short to medium term to develop light tanks. In addition, going by the current state of tank indigenisation, which is glacial, a native light tank capability will take years to build.

One plausible if not a perfectly satisfactory option would be to convert the “Vajra K-9” 155mm/52 calibre Tracked, Self-Propelled Howitzer Guns into a lighter platform.⁸⁷ The DRDO’s Central Vehicle and R&D Establishment (CVRDE) claim they can reduce the 28-tonne chassis of the Vajra by bringing its total weight down to 30 tonnes, which will put it in the same weight class as the Type 15.⁸⁸ Unfortunately, and unsurprisingly, the IA is unenthusiastic. A hundred of these Vajra platforms were delivered to the IA by Larsen and Toubro (L&T) in January 2021. The current weight at roughly 45-50 tonnes makes the Vajra K-9 with its 155 gun too heavy, yet powerful with limited mobility. Nevertheless, the IA appears to have gone ahead and deployed some of the existing Vajra K-9s in Ladakh⁸⁹ and a few were subject to trials in February 2021 in mountain terrain.⁹⁰ However, the IA sees the deployment of the Vajra-K9s suited primarily for the desert environment facing Pakistan.⁹¹ With no option left, the growing Chinese build-up in Xinjiang and Tibet, the IA has been forced to deploy them despite their weight, mobility disadvantage and engine limitations in high altitudes, which are essentially identical to the problems afflicting the IA’s MBTs. In the long term, if the IA is to develop a credible light tank capability, the service will have to specify, as one defence analyst and former Armoured Corps officer observed: “A major hurdle to the tank’s design is that the army has not yet shared with the DRDO its notion of what design features and performance it would like. This is usually shared in a document called the “preliminary staff qualitative requirements”, or PSQR. Without this, the DRDO’s designers are groping in the dark.”⁹² Consequently, there is little available by way of an indigenous light tank capability for the IA for the foreseeable future.

Implications: What Should and Can India Do?

If the IA wants to muster the wherewithal to counter China's light-tank capability with greater urgency, it has no choice but to import, at least an initial number of light tanks. Since import is the only route available, the obvious candidate for a light tank today is the Russian-built 18 tonne SDM1 Sprut. The Russians have already offered the Sprut light tanks to New Delhi,⁹³ yet delivery will take a while as the Russian Army does not have enough of them within their existing inventory. There must be greater urgency in getting Moscow to deliver at least a limited number of them at the earliest. Domestically, the IA must work closely with the DRDO and private sector enterprises to accelerate domestic development of light tanks. The GoI will have to step up and make funds available.

Regardless of when the IA acquires light tanks for deployment against the PRC, the service will need to tailor and gear the tank for combined arms operations and missions as the PLAA has done and is doing with the Type 15. The Type 15 tanks units are bound by a tight digital network with other platforms and integral Intelligence, Surveillance and Reconnaissance (ISR) capabilities. In a nutshell, Indian light tank forces must be well-networked with other platforms as the PLA has done. This is what will give the IA's light tanks considerable potency and operational effectiveness when they are acquired and deployed.

However, light tanks cannot be acquired without sufficient funds for new platforms. The capital budget for the IA will need to be expanded. This acquires an added urgency given the fraught state of land warfare capabilities against the PLAA. Since armour is likely to play a pivotal role at least in the Ladakh sector of the LAC in a potential Sino-Indian boundary war, more monies will need to be added as part of total government expenditure for financing light-tank capability. The defence allocations for new weapons systems and platforms in the coming year's national budget must be greater than what has been given in the last few years. Given the nature of the land-related missions confronting India against China, it might be wise to impose defence cess as some analysts have proposed.⁹⁴

Implications: What Should and Can India Do?

Table 3 provides a breakdown of the revenue and capital budget for the IA in the last five years. The capital budget which finances the purchase of new weapons systems and platforms has not exceeded 23 percent of the revenue budget that covers salaries and pensions in any single year. Less than a quarter of the allocations go for capital acquisitions, making the capital budget too low to fund a credible light-tank capability.

Table 3:
**Revenue and Capital Budget of the
Indian Defence Budget**

Indian Army Budget				
Revenue Budget		Capital Budget		
Years	Budget	Years	Budget	Capital Budget as % of Revenue Budget
2020-21	1469.4051	2020-21	323.9238	22.0446
2019-20	1479.1664	2019-20	296.669	20.0565
2018-19	1419.4092	2018-19	274.4019	19.3321
2017-18	1210.2705	2017-18	251.7563	20.8017
2016-17	1074.1983	2016-17	237.0917	22.0715

Note: Both Revenue and Capital budget sections (crores converted to INR billions by author)

Source: Union Budget

Implications: What Should and Can India Do?

Finally, it is imperative for the elected Indian leadership and the civilian bureaucracy within the MoD to be more proactive and pay close attention to capabilities developed by the IA specifically and armed services, generally. Civilian intervention about what capabilities the IA needs is equally necessary, rather than merely rubber-stamping the IA's leaders and force planners on key acquisitions. The failure to develop and integrate light tanks into the IA's armoured forces is as much a product of civilian abdication as it is of IA's nonchalance. Indeed, the lack of Indian light tank capabilities is symptomatic of the problems that afflict military acquisitions borne out of civilian apathy, indifference, lack of expertise, or a plain proclivity to abdicate responsibility. The IA's effort to acquire light tanks today makes it imperative for civilians to press the service's leadership on why it is overlooking some acquisitions in the face of the military threats India confronts. The IA's leadership and the civilian leadership need to tailor acquisitions and specifically in this case, to the nature of the high-altitude land warfare missions the IA will be executing. Light armoured forces are crucial for contingencies against the PLAA along the LAC.


“The failure to integrate light tanks into the Army's armoured forces is as much a product of civilian abdication as it is of the IA's nonchalance.”

Conclusion

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The state of armour in India's ground forces requires significant attention. The IA faces a difficult reality today – much of it self-inflicted. Although the military threat from China is real and more pronounced than it has been in decades, the recent RFI by the Indian government for light tanks is a step in the right direction, but it could fall apart as has happened in the past.

Using heavier Russian-origin MBTs in high-altitude terrain, particularly against a foe that has gone about methodically investing, developing and deploying light tanks, is more a function of the IA's leadership's ignoring the essence of its own doctrine, historical amnesia about the light tank's utility, and *Jugaad*—which, as American armoured corps officer John H. Gill remarked, was more “improvisation” and less “innovation”.⁹⁵ To be sure, Gill's observation was more related to technological matters specific to weapons systems and platforms and India's poor or at least inadequate performance and record in military technological innovation. However, *jugaad's* meaning could be extended and expanded to cover tactical improvisation on the battlefield as General Kodendera Subbayya Thimayya demonstrated with Stuart tanks to mount an offensive in a terrain not conducive for tank operations during the 1947-48 war against Pakistan. Nevertheless, Thimmaya's tactical virtuosity with light armour was impelled by limited resources, operational circumstances, and military objectives. That apart, he had excellent brigade commanders with combat experience from the Second World War to execute his offensive at Zoji La,⁹⁶ which the current IA may or may not have. In any case, the only way to ascertain the combat performance of the IA's deployed armoured units is in battle. Even worse is that it has ignored its own use of light tanks in 1962 war in Ladakh where it is today deploying heavy tanks.

The IA's armoured corps needs real teeth in the form a strong light-tank capability. This follows from the Clausewitzian dictum: that numbers and strength still matter. The IA cannot rely exclusively on force morale, command competence, and well-trained forces. Further, there is an unstated assumption within the IA that *jugaad* as practice will suffice and will continue with the existing inventory of MBTs when confronting the PLA. But this need not have been the case as analysed in the foregoing. The absence of light tanks is a scarcity, which the IA has deliberately created and is now compelled to resort to *jugaad* in the event war breaks out in the immediate future. 

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