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India's Indigenization and Modernization of Defence and Military Technology: Strategic Ramifications for Pakistan

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Abstract

India is arming and modernizing its military with its land forces receiving equipment in an unprecedented manner while its navy is growingly becoming a blue water navy capable of projecting power way beyond its shores and is rapidly arming its air force to become a strategic force capable of playing an independent role. The international environment is favourable for India, which is further adding impetus towards indigenization and modernization of Indian defence and military capabilities while providing an opportunity for the economy to flourish even more. The paper is an endeavour to analyze, assess, predict and prescribe the potential upshots and outcomes of indigenization, local and licensed manufacturing and joint ventures initiated by India in defence and military sectors – and the likelihood of such choices and actions in becoming a vital strategic and security concern for Pakistan.

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Introduction

International politics is an arena where states compete with potential rivals. Therefore, states are exposed to threats and challenges. It cannot rely on any other state or institutions for its security since no state or institution can guarantee its safety. In order to protect themselves and ensure their survival, states have limited options. It enhances its power to protect itself. States enhance their power either through internal sources or either through external sources. India is doing the former in a conducive external environment with a strong *cause belli*. In this era of globalization, states are privileged to have access to various technologies which can be tapped while bringing them for local manufacturing. This transformation, apart from many of its dimensions, have caused states to opt for reliance on the foundational concept put forward by Kenneth Waltz for a state to rely on its own muscles in order to ensure its survival in the international system where prevailing conditions lead towards anarchy – while enhancing its security so that the balance of power may not be disturbed. Quite contrary to this, John Mearsheimer favoured bullish behaviour of states and argued that "In the anarchic world of international politics, it is better to be Godzilla than Bambi." Mearsheimer also argued that states could transform their economic wealth into offensive military capabilities and power projection. For Mearsheimer, states must enhance their power while turning their 'latent power' into formidable military power – in turn, to increase their chances of survival. Either the case security or power – states mobilize their economic means into military might.

A state aspires to resist the pressure coming from the international system. Sometimes the international circumstances go in favour of a state and quite often the other way around. Perhaps, in India's case, the former seems more relevant than the latter. To enhance a state's military capabilities certain approaches can be employed. One of those approaches is to bring the requisite level of technological sophistication, equipment and know-how locally, while manufacturing the military hardware indigenously. This policy to locally build the defence and military equipment and hardware requires certain strategies. Among other strategies, perhaps, indigenization can be said as the best strategy to realize the policy of self-reliance and self-sufficiency.

Realism assumes that there is no supranational authority that can maintain and ensure the survival of nations and states – called anarchy. It dictates states to take necessary measures to guarantee the enhanced

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chances of a states' survival in the anarchic international system. Subsequently, states under the influence of anarchy tend to mobilize internal resources to enhance the chances of their survival.

India is among the fastest growing economies in the world projected to be amongst three largest in Asia by 2050 having the highest economic growth rate. Its foreign reserves are higher than that of Russia and are growing steadily. Geographically and geo-strategically India is in the vicinity of a rising power i.e. Peoples Republic of China and India's arch-rival – a regional power which is its Western neighbour i.e. Pakistan that does possess nuclear weapons along with various delivery vehicles. India has a history of fighting conventional wars with both of its neighbours. India has also an enormous shoreline to protect from the Pacific Ocean to the Indian Ocean. Realism dictates that a state must always be obsessed with preserving its wealth – since the latter is a pivotal dimension of power. To safeguard its wealth and economic wellbeing, military power can be said as an instrument in fulfilling the needful.

Nationalism is a realist contention since Mearsheimer declared nationalism and realism to be 'kissing cousins'. Mearsheimer argued nationalism to be the binding force of a nation that provides fuel to resist subversion even in the case of a defeat. Contemporary India is the true manifestation of nationalism flanked by a realism which is actually setting the trajectory for India to follow a certain path. The incumbent *Bharatiya Janata Party* (BJP) is the political wing of *Rashtriya Swayamsavek Sangh* (RSS) and is relentlessly pursuing the ideology of *Hindutva* – the extreme right-wing philosophy preaching for Hindu Nationalism. Why the *Hindutv*-driven Indian Government seems to be doing shopping for its military? What are the possible threats to the Republic of India which are to be deterred, contained and ultimately fought to be eliminated using military power? If Indian weapons are for defensive purposes, then why Indian Military Forces are maintaining aggressive force posture and offensive doctrines? It is conceivable that there exists an inherent dichotomy between rhetoric and reality; however, in India's case, the gap between the two is wide and is widening further.

Indigenisation and Modernisation – What and Why?

Indigenization is a systematic process in which the manufacturing of certain products is brought to one's own state by transferring the technology, requisite level of know-how and required sophistication from the parent country. Indigenization is essentially carried out to modernize one's production and manufacturing industry and can be employed in all sectors, including the defence and military sectors. Lobell, Ripsman and Taliaferro cited Waltz, who argued that "Those who do not help themselves, or who do so less effectively than others, will fail to prosper, will lay themselves open to danger, will suffer."

Ghosh argued that "Indigenization is the key to self-sufficiency and strategic capability." It maintained that the Indian Armed Forces from 2011 till 2015 remained the largest importer of defence and military equipment in the world, and now it is modernizing itself in almost every field "aircraft, submarines, helicopters, tanks, long-range guns, Unarmed Aerial Vehicles (UAV's) and missile systems, some of which are coming with Maintenance Transfer of Technology (MTOT) to include MRO while modernization is looking at the operational and technological upgrades to overcome obsolescence."

The fall of the Soviet Union and the end of the Cold War in 1991 deprived India of a credible and dependable defence equipment supplier. With the U.S.-led military operations against Saddam Hussein and unprecedented show of firepower along with an unparalleled use of information warfare during Operation Desert Shield and Desert Storm in 1991 and later on advanced airborne electronic warfare operations in Haiti in 1994 coupled with NATO's Operation Deliberate Force in 1995 and the Kosovo War in 1999 – provided some remarkable examples of the use of military power in all domains of war especially the air power. U.S.-led Allied military operations set the trajectory for China to enhance its military capabilities, while the uncertainty prevailing in the international system and the unpredictable intentions of states with an important aspect of India's hostile relations with its Western neighbour Pakistan – India was left with little or no choice but to resort to indigenization and modernization of its military – essentially to enhance the chances of its survival.

Phadke stressed while keeping in view its experience and service in Indian Air Force that India must have a modern air force and a local industry to fulfil its aerial needs and secure its airspace. However, it also averred that India showed little interest in indigenization - perhaps due to overreliance on foreign supplied equipment. The former argument has its foundations in India's geography and to strengthen its geopolitical position.

Nevertheless, Phadke also argued that foreign suppliers played their role in preventing India from indigenization by hindering the way with cheap supply of equipment.

Indian scholars and especially its military thinkers quite vehemently labelled Pakistan's practice of "beg, borrow or steal" – in acquiring military equipment and technology – however, Pakistan while having a weak economy, political turmoil and instability, irredentist claims of Afghanistan, illegal influx of Afghan refugees, a frontline state in fighting Communism in Afghanistan and apparently foreign fuelled ethno-national tensions – successfully strengthened its armed forces. Most importantly, the international environment went abruptly against Pakistan after the War against Soviets in Afghanistan in the late 1980s when U.S. not only abandoned Islamabad but also waged diplomatic warfare in the form of Pressler Amendment of October 1990. The amendment not only deprived Pakistan of financial assistance but US also took away nine naval ships which were previously given on lease. Prior to this, Glenn-Symington Amendment was also invoked to hurt the nuclear capabilities of Pakistan.

It is quite unfortunate or perhaps a deliberate attempt on part of Indian authors which declare Pakistan's nuclear capabilities to be a result of stolen blueprints – nevertheless, they are utterly ignorant of Operation Paperclip in 1945, when Nazi Germany's scientists were secretly taken in to Allied custody that realized the true essence of Manhattan Project.

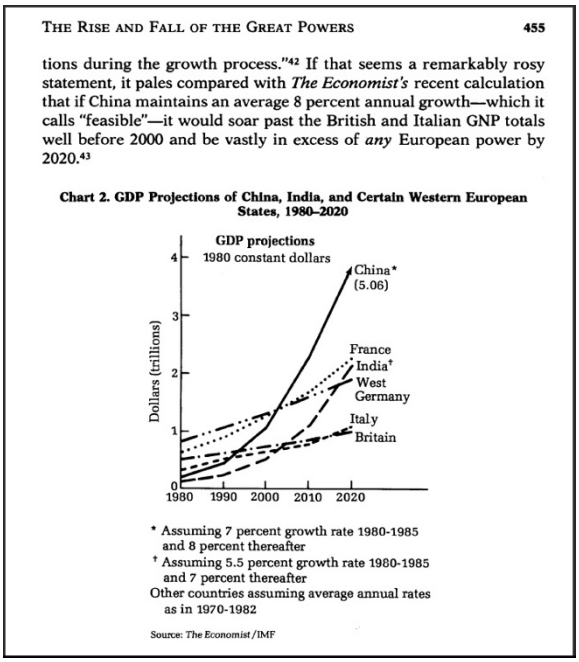
Indian indigenization is not something of a novel idea but a reactionary approach is having its foundations in fear emanating from Pakistan and China. For instance, the much-hyped or perhaps overblown Indian Army's 'Cold Start Doctrine' or 'Pro-Active Strategy' is fundamentally pivoted upon a stolen German idea i.e. Blitzkrieg that was spearheaded by Heinz Guderian in his book *Achtung Panzer* (Attention Tank) published back in 1937. Ladwig argued while citing Patel that Cold Start was similar to Soviet operational manoeuvre groups. Yet, the authors believe that Cold Start is inherently based upon German Blitzkrieg. Nevertheless, though it is the German way of war or Soviet operational thinking – Cold Start Doctrine is not a brainchild of the Indian Military mind. Interestingly, *The Economist* put it quite right when it argued that "India's armed forces still lack a brain."

In response to the Indian Army's former Lt. Gen. Philip Campose's remarks of "beg borrow or steal" about Pakistan, the authors argue that India's indigenization and modernization of defence and military technology can be summed up in three words "collusion, collision and conspiracy." Since India is likely to use its military force against Pakistan in the same collusive and conspiratorial manner while creating a new version of *Mukti Bahini* as it did in East Pakistan in 1971 and is moving towards collision either with Pakistan or China.

The Sino-Indian War of 1962 was an eye-opening moment in Indian military history. Indians could not resist the overwhelming military power and prowess of the Chinese and met a humiliating defeat. The authors believe that apart from equipment, training and skill, one intervening variable was perhaps the relative level of nationalism prevailing in both military forces. Over the next three years, the Indo-Pak War of 1965 again realized Indians to enhance their military power in order to enhance the chances of their survival. The 1971 Indo-Pak War displayed a remarkable use of military force for political objectives, and it seemed that the Indian military actually learned from its past mistakes.

Indigenization and Economy Strengthens One-Another

It was predicted by Kennedy in his worldwide best-seller book that if the Indian economy continues to grow at 5.5 percent of its gross domestic product (GDP), it might enter into the trillion-dollar club well before the start of the 21st century. However, Narasimha Rao's trade liberalization along with indigenization and modernization realized this prediction in the mid-1990s. The Indian progress in the economy was acknowledged by Cheema and argued that India was heavily investing the fruits of economic well-being in the military sector by allocating in excess of $31 billion towards defence. Likewise, Ghosh cited *SIPRI Yearbook 2015,* which noted that India comprises 15 percent of the global share when it comes to arms imports. All these developments were made possible due to transfer of technology, indigenous manufacturing and modernization – which in turn, is resulting in the strengthening of economy and military – altogether.



THE RISE AND FALL OF THE GREAT POWERS 455

tions during the growth process."[42] If that seems a remarkably rosy statement, it pales compared with *The Economist's* recent calculation that if China maintains an average 8 percent annual growth—which it calls "feasible"—it would soar past the British and Italian GNP totals well before 2000 and be vastly in excess of *any* European power by 2020.[43]

Chart 2. GDP Projections of China, India, and Certain Western European States, 1980–2020

* Assuming 7 percent growth rate 1980-1985 and 8 percent thereafter
† Assuming 5.5 percent growth rate 1980-1985 and 7 percent thereafter
Other countries assuming average annual rates as in 1970-1982

Source: *The Economist*/IMF

Figure 1: GDP Estimate made by Paul Kennedy

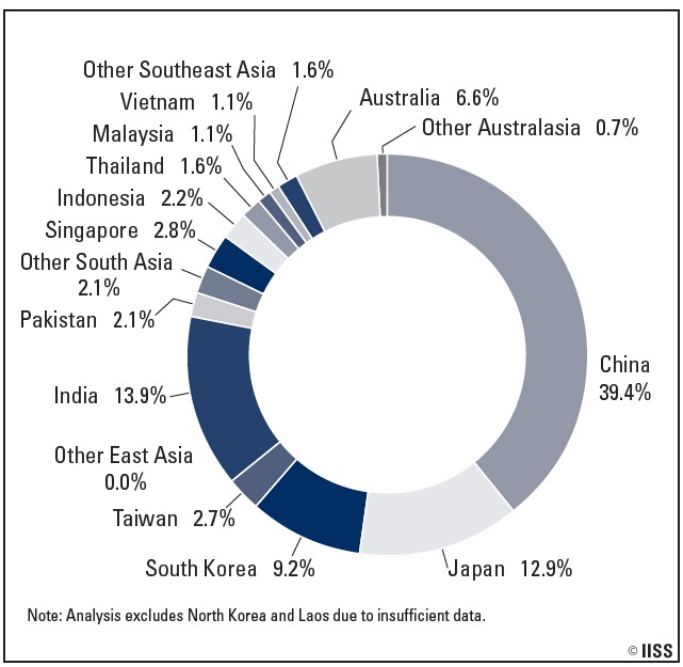


Figure 2: Defence Spending in the Asia-Pacific region.

In the Asia-Pacific region, India makes the second most spending on defence and military, only next to China and followed by Japan. This huge military spending is ostensibly due to India's indigenization policy which is

strengthening the economy. It was noted by *The Military Balance* that India's 7.8% sustained growth rate was a direct result of trade liberalization, which in turn strengthened the defence and military sectors.

"Make in India" – To Spearhead Indigenization

"Make in India" was the initiative of Prime Minister Modi launched on September 25, 2014. The initiative identified 25 sectors under the slogan of "Make in India" – that was an attempt to manufacture the desired products and equipment within India – with special attention to create jobs and raise the manufacturing growth rate to 10 percent at a sustainable footing. Defence and military sectors were among those 25 domains which were identified by the Indian government. It can be argued that the initiative taken by India was primarily a deliberate effort to overcome the hurdles faced in the procurement of advanced technology and to circumvent the complex bureaucratic web – resultantly, using "Make in India" as a catalyst in accelerating the soft as well as hard power of India by mobilizing local and domestic means as a base.

Indian Army

The Indian Army, primarily due to its versatile role to safeguard the borders, suppress insurgencies and secessionist and separatist movements along with maintaining operational readiness – demands a leading or perhaps dominating role over the rest of uniformed services. In the aftermath of Operation Parakram of 2001-02 and the lethargic and indolent mobilization of the Indian Army, the element of operational readiness has gained much strength and relevance. The Indian Army, due to its numerical superiority, used to take the bigger chunk of the defence budget while the other branches of the Indian Armed Forces seemed to be complaining; however, gradually, this practice is fading, and other services are also receiving considerable attention.

The Soviet Union has remained a reliable provider of defence and military equipment to India. Ray noted that India bought 450 T-54 and T-55 tanks along with 150 PT-76 amphibious tanks from the Soviet Union from 1967 to 1971. To further this legacy, the Indian Army has selected Russian built T-90S Main Battle Tank (MBT) to be its main workhorse. It will also be manufactured inside India as T-90 *Bheeshma*. T-90 retains the capability to fire 9K119 Refleks anti-tank guided missile (ATGM) from its 120mm smooth-bore canon besides firing a variety of shells which gives it considerable firepower. India opted to buy 310 Russian T-90S tanks in the year 2000 and signed an agreement to 'assemble' 190 of them in India. Its engine produces 840 horsepower and has a top speed of 64km/h while weighs around 48 tons. More than 950 T-90S are in service with the Indian Army. Interestingly, Ghosh cited the Indian government's report on the indigenous production status of T-90, which was almost 75 percent.

Tucker pronounced tanks as the symbol of a strong fighting force and cited Indian Prime Minister Narasimha Rao, who in January 1996 declared 56.5 tons heavy Arjun to be the India's first indigenously produced MBT. India felt the importance of an indigenous tank right after the Indo-Pak War of 1971, and in 1974 design work for Arjun was started. It took twenty-two years for India to indigenously produce Arjun having a rifled 120mm gun, armed with thermal imaging, day and night capability, laser ranger finder, and that still uses a 1400 horsepower German engine producing a top speed of 72 km/h. Almost 124 Arjun MBTs are currently in service with the Indian Army.

Tucker believed that contemporary anti-tank guided missiles (ATGM) are a danger for tanks. India is well aware of this reality put forward by Tucker and is on its way towards the indigenization of ATGMs as well. Ghosh noted that Bharat Dynamics Limited (BDL) manufactures Konkurs-M with 90 percent, Invar having 80 percent and Milan-2T up to 71 percent with indigenous components. Similarly, the Nag ATGM and Nag Missile Carrier (NAMICA), along with Helina ATGM, are among those efforts made by India to pose a credible threat towards any incursion by Pakistani armour. Khattak argued that Israel modernized Indian Army T-72 tanks while making them capable of operating at night – while there are around 1950 currently in service with Indian Army.

Apart from its armour, India is also focusing on its artillery platforms to provide the land forces with lethal fire support in offensive as well as defensive roles. India chose British BAE Systems 155mm M-777 towed artillery which is surprisingly light weight and can be transported with much ease. On the other hand, Dhanush is indigenously produced towed artillery which fires 155mm shells and employs an advanced concept known as Multiple Rounds Simultaneous Impact (MRSI).

While keeping in view rocket artillery being its legacy, the Indian Defence Research and Development Organization (DRDO) indigenously developed (8 x 8) truck-mounted *Pinaka* 214mm (12-round) multiple rocket

launch (MRL) system that has the range of almost 38 to 40 km. *Pinaka* had a devastating impact on Pakistan Armed Forces during the Kargil Conflict in 1999. India also indigenously developed 122mm (40-round) MRL system based upon the Russian BM-21 Grad and has almost 150 such systems in service. India also acquired Russian-built BM-30 Smerch 300 mm MRL systems as well.

India signed a deal amounting to $700 million with South Korea to acquire K-9 *Vajra* 155 mm self-propelled howitzer guns. The South Korean defence company Samsung-Techwin and Indian private firm Larsen & Toubro would jointly produce 30 percent of the system in India. The howitzer has an operational range of 450 km and a firing range of up to 40 km. The authors share the same fear as it was argued by Gady that the acquisition of these guns is likely to be India's pursuit of materializing the Cold Start Doctrine.

India is also focusing on modernizing its air defence and communications systems. Israeli built Spyder and Barak-8 Surface to Air Missiles (SAMs) Jointly producing Barak with Israel. Ghosh argued that Bharat Dynamics Limited (BDL) was established in 1970, and now it is working on the Akash Surface to Air Missile (SAM), Medium Range Surface to Air Missile (MR SAM) and Long Range Surface to Air Missile (LR SAM) being jointly developed by DRDO and Israeli defence firm Israel Aircraft Industry (IAI). Cohen and Dasgupta argued that Russian advanced S-300 and S-400 anti-air missile systems are on India's wish list. Spyder and Barak-8 are not only employed by Indian Air Force for air defence purposes, but they are likely to be used by the Indian Navy to protect its warships. The Israeli system is manufactured by IAI Elta and is called M-2248 Multi-Function Surveillance, Track and Guidance Radar (MF-STAR) S-band active electronically scanned array (AESA) radar that scans both surface and air targets. The Indian Navy installed these radars on Kolkata and Visakhapatnam class destroyers and also on Vikrant aircraft carrier.

India acquired an Israeli IMI Tavor bull pup 5.56mm assault rifle to equip its special units. It is likely to be produced indigenously by India. Similarly, the Future Infantry Soldier as a System (F-INSAS) is an advanced concept to turn infantry soldiers into feedback providers for better situational awareness. It is comparable to modern battle management systems (BMS). India is also indigenously developing Light Combat Helicopter (LCH) along with other rotary-wing aircraft such as HAL *Rudra*, HAL *Dhruv*, HAL *Cheetah* and HAL *Chetak*. Indian Army and Air Force are also considering buying Kamov KA-226T from Russia.

Indian Navy

Sobia noted that there is a constant transformation in the Indian Navy's doctrine since 2004, again in 2009 and recently in 2015. Indian Navy is looking for a larger role, especially in the Western Pacific. Mazagon Dock Limited (MDL) is an indigenous firm tasked with the construction of missile destroyers for the Indian Navy and is also constructing P-17A frigates while it is chosen for the development of Project 75-I for future submarines. Similarly, Garden Reach Shipbuilders and Engineers Limited (GRSE) is building anti-submarine warfare corvettes and delivered INS Kamorta in July 2014.

Khan argued that the Indian Navy (IN) under its doctrinal transformation is moving from a brown water navy to a blue water naval force capable of projecting power way beyond its Exclusive Economic Zone (EEZ). The researchers believe that IN perhaps would have the most demanding role in the years to come while keeping in view India's Act East Policy and its participation in Malabar Naval Exercises.

Indian Navy has acquired Boeing P-8i for maritime security in November 2015, capable of firing Harpoon missiles. AGM-84 Harpoon is an anti-ship having a range of almost 148 km; however, the Block-II version has more range than the predecessor. INS *Arihant* is the first indigenously developed nuclear-powered submarine of the Indian Navy, capable of firing indigenously developed *Sagarika* submarine-launched ballistic missile (SLBM) up to a range of 700 km. Likewise, *Shaurya* SLBM is also aimed to equip these submarines.

India acquired a Russian-built Akula II submarine, now commissioned as INS *Chakra*. The Soviet Union provided India with 6 Petya-class frigates from 1967-1971. Akula II is considered to be super silent due to design features and nuclear-powered air-independent propulsion, which in turn makes it difficult to be detected by sonar. The Indian Navy's new aircraft carrier *INS Vikramaditya* which did around $3 billion in 2015, is equipped with Mig-29K Fulcrum fighter-bomber aircraft. Currently Indian Navy operates some 11 Mig-29K along with 11 Sea Harrier aircraft. Though, Indian Navy plans to order some 45 additional Mig-29K aircraft from Russia.

Indian Navy is paying close attention towards point defence system to protect its warships from anti-ship cruise missiles and other low-level terrain-hugging threats including aerial target drones and UAVs. Russian built AK-630 is a close-in weapon system (CIWS) which is now 48 percent indigenously produced in India. BrahMos supersonic Cruise Missile was jointly developed by Russia and India have a range of 290 km. However, now both states are jointly developing Brahmos-II cruise missile having a speed of 2380m/s – almost Mach 7.

India, under its "Make in India" banner, indigenously manufactured torpedo and attained the status of being the 8th state to possess such capability in June 2016. The torpedo named "*Varunastra*" was argued to be capable of operating in all waters though it is deep or shallow and was able to withstand decoys and countermeasures. Before it, in 2012 Indian Navy also received an indigenously developed advanced light torpedo named "*Shyena*" – a torpedo with 95% indigenous components. India exported its indigenously produced light torpedoes to Myanmar in a 37.9 million USD deal. The deal included locally produced USHUS-2 submarine sonar suite, related gear and inertial navigation system for Myanmar's naval surface ships, including Kyan Sittha-class frigates. *Sputnik* reported that the torpedoes would be manufactured by government-owned Bharat Dynamics and a private company L&T.

It is Mearsheimer's notion of 'stopping power of water' that India has never been invaded from its naval shores. However, Khan argued while citing James Goldrick that the very first naval ships harboured Indian port on September 5, 1612, and the Battle of Swally took place on November 28-29, 1612 between Portuguese and Brits – nevertheless, it was not a fight of Indians with a foreign invading force. While keeping in view this historical fact, the Indian Navy's transformation from a brown water navy to a blue one – is not understandable. Perhaps, India has learnt a lot from 'stopping power of water' and is on its way to overcome while making the best use of that concept. Khan is right in assessing while citing Alfred Thayer Mahan that declared the Indian Ocean to be the "ocean of destiny" – while the Indian Navy is arming up itself to project power way beyond its shores.

The authors would like to argue that Indian Naval indigenization and modernization can be interpreted as India's attempt to gain such naval mastery by virtue of its equipment and weapons that it could be able to enforce the Indian version of the Monroe Doctrine – while turning the Indian Ocean into India's Ocean. However, it might sound a pessimistic argument that such ambitions are likely to create conflicts since the Chinese 21st Century MSR passes through the Indian Ocean; nevertheless, the authors consider that military and defence indigenization and modernization is a pessimism-induced approach to bring optimism.

Cohen and Dasgupta argued that the Indian Naval vision is dependent on U.S. Naval presence in the region. Quite interestingly, Rehman declared Indian Navy to be "India's most politically minded – and resource-deprived – armed service to lay out a clear path for its desired future." U.S. Navy and Indian Navy are already a part of Malabar Naval Exercises; nevertheless, even U.S. Navy's presence at Diego Garcia cannot be interpreted as solely for Indian Navy.

Indian Air Force

Indian Air Force (IAF) considers itself to be the most deprived one amongst the four uniformed services. It is not only frustrated in terms of equipment and technology but as Ladwig argued Indian Army's Cold Start Doctrine envisages a supporting – not independent role – for the IAF. The IAF is to receive 36 French built "omni-role" 4.5th generation Rafale aircraft, more Russian-made Su-30 MKI aircraft, , AH-64 Apache gunship helicopters, CH-47 Chinook utility helicopters, air-launched version of BarhMos cruise missile, Israeli built Phalcon airborne early warning (AEW) radar system and the indigenous Tejas fighter aircraft built by Hindustan Aeronautics Limited (HAL). IAF under Arun Singh Task Force on Management of Defence envisioned envisaged a vision for 2020 while aiming for arming itself with 50-55 fighter squadrons from 39 as it was argued by Shamsi.

Ray noted that during 1960s India signed an agreement with the Soviets to produce Mig-21 in India. These aircraft served IAF in wars against Pakistan. Phadke referred to Gnat to be one of the indigenously produced fighter aircrafts of IAF. It also argued that HF-24 Marut twin engine aircraft was another attempt by IAF and HAL to indigenously produce fighters and was inducted in IAF in 1967; however, it was abandoned primarily due to unavailability of Rolls-Royce engine. Ray argued that India bought 150 Su-7 fighter aircraft from Soviet Union from 1967 to 1971. India started working on its indigenously developed Light Combat Aircraft (LCA) now called Tejas in 1987 and the first maiden flight took place in February 2001. However, Phadke declared LCA Tejas to be

"underpowered" and falling short in meeting IAF's requirements while criticizing its much-delayed full operational induction in IAF

India acquired Su-30 MKI thrust vectoring enabled fighter aircraft in the mid 1990s that has significantly improved IAF's operational capabilities. IAF Mig-21 Fishbed was upgraded to Bison in 2006, and IAF plans to replace them with indigenously built Tejas. India's Medium Multi-Role Combat Aircraft (MMRCA) competition chose French Dassault Rafale and is likely to enter service by 2017-18. India signed an agreement with France in September 2016 for 36 Rafale aircraft.

IAF procured U.S.-built six C-130J Hercules for medium transport and three C-17A for heavy transport roles. It was envisaged by India to induct a total of twelve C-130 aircraft and sixteen C-17, thus significantly increasing India's rapid force deployment capabilities. Ghosh argued that India concluded a $4.1 billion deal with the U.S. for buying 10 C-17 Globemaster III transport aircraft while Boeing agreed to build a facility for the high-altitude engine. C-17 and C-130 are combat-proven aircraft since Radvanyi argued about the performance of C-130 aircraft during Operation Eagle Claw to be remarkable.

IAF and HAL worked to produce an indigenous attack-navigation system for its Jaguar aircraft known as DARIN and DARIN III. The navigation system greatly helped in enhancing the attacking capabilities of Jaguar. IAF has 3 A-50 Phalcon AEW&CS. IAF also has indigenously developed ERJ-145 Netra AEW systems. Similarly, the indigenously built DRDO AEW&CS is currently in service with the IAF. IAF acquired UK-built BAE Hawk and indigenously built HAL HJT-16 Kiran trainer aircraft to help train IAF pilots. It also acquired armed unmanned aerial vehicles (UAVs), mostly Israeli-made Heron, Harpy and Searcher-II. IAF indigenously produced *Rustom* UAV to enhance its real-time imaging and video capabilities.

IAF employed indigenously built *Nirbhay* air-launched cruise missile and has also acquired BrahMos cruise missile. To enhance the precision, a $500 million deal between India and Israel was concluded to acquire Rafael *Litening* aerial targeting pods. India also acquired Israeli Rafael Spice 250 precision guided munitions. For air to air engagements, IAF procured Israeli-made Python-5 and Python-4 BVRAAM, U.K.-built AIM-132 ASRAAM and R-27 BVRAAM from Ukraine. India indigenously produced *Astra* BVRAAM to equip its air to air aircraft with the capability to engage aerial targets.

Indian DRDO is in the process of indigenously manufacturing *Maitri* quick reaction surface to air missile (QRSAM) with French assistance. Indigenously built *Akash* and *Pechora* SAM are already in service with IAF. India's Electronics and Radar Development Establishment (LRDE) indigenously developed Israeli Elta M-2084 radar as *Arudhra* and placed an order of 34 radars which is considered to be the major component of the new air defence network and employs an active electronically scanned array (AESA) platform which gives it an edge over the old ones. India intends to employ these radars primarily to have an early warning in case Pakistan employs its tactical nuclear weapons (TNWs) and cruise missiles. In order to further boost its air defence capabilities, India acquired 19 Thales Ground Starter GS-100 radars in 2009, 9 of whom were to be assembled at HAL. DRDO and Bharat Electronics Limited indigenously developed S-band *Aslesha* radar to counter low-level flying UAVs and helicopters.

IAF's quest to find a fifth-generation fighter aircraft seems in disarray; however, HAL is likely to conduct license manufacturing or at least production of several parts of Russian PAK-FA fifth-generation fighter aircraft. Nevertheless, Soami argued about the widening gap between Indo-Russian relations.

Ballistic Missile Defence System and Space Platforms

India acquired Green Pine fire control radar from Israel. Similarly, Israeli Arrow anti-ballistic missile components helped Indians in developing their own ballistic missile defence system. It is believed that Russian S-300PMU is capable enough to detect, intercept and counter ballistic missiles; nevertheless, India is aiming to acquire S-300 and S-400 from Russia. India launched an indigenously developed Mars mission in space while joining the elite group of such capable nations. Singh reported that the Indian Space Research Organization (ISRO) launched its own version of the global positioning system (GPS) and named it as Indian Regional Navigation Satellite System (IRNSS). India also launched the RISAT-2 satellite to enhance its communications.

Command and Control, ISR and NCW Capabilities

With the latest command and control platforms and their inherent need to bridge the gap between command

and the commanders, India is also modernizing its command and control capabilities. Indian Armed Forces conducted Hind Shakti Exercise in April 2009 while evaluating its information and network-centric warfare capabilities. India also acquired Long Range Reconnaissance and Observation System (LORROS), Weapon Locating Radars (WLRs) and Battlefield Surveillance Radars (BFSRs) to enhance communications and synergy among the attacking forces.

In 2017, Indian Army Chief General Bipin Rawat unveiled that the Indian Army is capable of fighting a 'two and a half front war'. This concept overtly declared two foreign fronts involving two different states, i.e. Pakistan and China, while the half one represented internal secessionist movements. This aggressive statement has its roots in the Indian Military modernization and indigenization. There is no doubt that Indian military has been fighting against freedom fighters, insurgents and secessionist movements across India. These irregular fighting forces apart from their ideology and objectives have left little choice for Indian government to use modern technology and sophisticated weapons in eliminating the former.

Cyber and Electronic Warfare Capabilities

Ostensibly, war has mainly four domains; i) air, ii) land, iii) sea, and iv) space; however, with the increased reliance of military forces on cyberspace, the latter has become the fifth domain of war. Quite interestingly, India is aiming to modernize its military capabilities in all four domains of war with a special focus on the fifth one.

India while on its drive to modernize its armed forces through indigenization and joint ventures is specifically paying attention on cyber and electronic warfare capabilities. Cyber and electronic warfare have become pivotal components in modern war due to the reliance of military forces on computer and electronic components to ensure communications, to get a better picture of the battlefield using ISR platforms and the analysis of information to enhance situational awareness of the command and commanders. The jamming, sabotage, misinformation, disinformation and disruption of communications – to name a few aspects of cyber and electronic warfare – have earned them massive relevance in the modern war. While exploiting their asymmetric capabilities the attempts made by North Koreans in the cyber and electronic domains – and quite recently, the effective Russian employment of these relatively new tactics in warfare during the Annexation of Crimea in March 2014 – have made them a permanent and rapidly growing subject which have brought a revolution in military affairs.

The Military Balance noted that Indian Computer Emergency Response Team (CERT) and Defence Information Assurance and Research Agency (DIARA) deal with the cyber-security issues and pursue information security strategies. It also cited the Army Cyber Security Establishment which was enacted in 2005 and in 2010 Cyber Security Laboratory was established at the Military College of Telecommunication Engineering of the Indian Army Corps of Signals. These organizations are relying on indigenously developed skills to counter cyber threats, the latter which can jam, sabotage, and manipulate information, and can lead to national security crisis.

It was reported by *Ernst & Young* that under the banner of "Make in India" the indigenous production and manufacturing of electronic components reached a sum of total $61.08 billion in 2015 and 7 percent of this produce went to strategic, aerospace and defence industry – helping India in indigenous production of avionics, radars, tactical gears, communication equipment, sensors and command and control platforms. The manifestation of Indian advancement, modernization and indigenization in cyber and electronic warfare domains can be seen in an enhanced number of cyber-attacks on Pakistani official Government websites.

Non-Conventional and Un-Conventional Modernized Capabilities

India conducted its first nuclear test named as Peaceful Nuclear Explosion (PNE) in 1974. Ayesha argued that Indian Prime Minister in its statements in Parliament did shed light on economic benefits of conducting underground nuclear explosions; nevertheless, the "non strategic use of nuclear technology" – driven nuclear tests shocked the world. Likewise India established Andaman-Nicobar Islands Tri-Forces Command – primarily to survive and strike back in case of any nuclear decapitation first strike. The US-Indo Civil Nuclear Deal made it clear that the indigenization did not remain solely in the realm of conventional defence or corporate industry, but India also made best use to benefit it in the non-conventional domain. In March 2006 Indian Prime Minister Singh and U.S. President Bush signed a milestone deal that was to help India in acquiring fissile material. Logistics

Exchange Memorandum of Agreement (LEMOA) was signed between US and India as a part and parcel of enhanced strategic partnership.

India is moving towards establishing a Mountain Strike Corp to enhance its war-fighting capabilities. The German paratroopers *Fallshirmjaegers* laid down the foundations of airborne forces during the Second World War and on September 12, 1943, Operation Oak or the Gran Sasso Raid saw a remarkable use of *Fallshirmjaegers* that was intended to rescue the deposed Italian dictator Benito Mussolini.

Possible Ramifications on the Armed Forces of Pakistan

The Nehruvian-Fabian strategic restraint policy in using military force is nothing more than a myth – since, Cohen and Dasgupta argued that it was Nehru that ordered the acquisition of princely states of Hyderabad and Junagadh in 1948 using brute force of Indian military. Cheema also acknowledged Indian use of force in annexing Hyderabad and Junagadh. It was Nehru who ruthlessly tried to crush Naga tribes located in India's North-East in 1955 and used Indian Military against Portuguese in Goa in 1961. Before these incidents, Nehru deployed Indian Military in Kashmir triggering the Kashmir War in October 1948. Again, it was Nehru who went to war with Maoist China in 1962 – perhaps, considering China to be another Pakistan; however, Chinese taught a bitter lesson to Indians which kept India from employing its horns against China – until now. The quite recent Doklam incident is a testament to that assertion. While keeping in view India's offensive strategic behaviour and Pakistan's pursuit to ensure its existence and survival by employing other means, it is pertinent to analyze the strategic ramifications of India's indigenization and modernization of its military.

Pakistan primarily due to its relatively undersized economic base, defence budget constraints and untapped natural resources owing to lack of technological know-how – does possess a professional and battle hardened yet comparatively small conventional fighting force armed with mostly foreign supplied weapons and equipment. Due to this very fact, Pakistan has have relied on its nuclear deterrent and deliberately kept its 'red lines' or nuclear threshold quite low in relation to India. Having a relatively smaller conventional force does not mean that it cannot deter, defend and repel any attack. The manifestation of this assertion can historically be seen when relatively fewer NATO forces successfully deterred the Soviets and quite amazingly guarded the indispensable Fulda Gap during the Cold War. Similarly, in the contemporary era the fate of Suwalki Gap can also be said as an example that keeps NATO is a constant state of fear. It can be argued quite adamantly that Indo-Pak boundary is a 3,190 km long Suwalki Gap for Pakistan that has to be protected, guarded and deterred from any attack by the Armed Forces of Pakistan – which seems quite demanding with the increased war fighting capabilities of India.

As mentioned earlier, Pakistan's situation is comparable to NATO forces in Europe during the Cold War, since Pakistan faces the same dilemma of less strategic depth from its East towards West – consequently, cannot afford to fight a deep battle. The authors would rather suggest that Pakistan must adapt and enhance its anti-access and area denial (A2/AD) capabilities to match that of India's. Some might think that A2/AD strategies are something new in the realm of warfare; however, Ben-Ari argued that A2/Ad strategies are ancient in nature, since Iron Caltrops were used against Alexander the Great by Darius III in 331 BCE in Persia at the Battle of Gaugamela.

Among other options, Pakistan can adopt German Grand Admiral Alfred von Tirpitz's 'risk strategy' and can fully rely on its conventional strength and striking capabilities. The term "missile gap" was coined by the U.S. scholars and strategists to indicate the gap between the U.S. and USSR during the Cold War in terms of missile technology, range and payload capacity. While applying the same concept on India and Pakistan, it can be observed that the technological, defence and war fighting "capabilities gap" between the two is decisively shifting against Pakistan.

Former U.S. Secretary of State George Schultz argued that "When you utter the word conventional, you utter the word expensive." It is conceivable that to build up and maintain a formidable conventional fighting force it is imperative to allocate a large chunk of budget. However, the relevance of conventional forces is undeniable even in the nuclear and missile age. While keeping in view the history of India and Pakistan, it can be argued confidently that every weapon system that India acquires can be interpreted as a threat for Pakistan. The acquisition of weapons readily enhance the offensive as well as defensive capabilities of the fighting forces and

due to the uncertainty prevailing in the intentions of states and the Clausewitzian Trinity – leave little choice for states but to arm themselves in a reciprocal manner.

The weapon acquisitions, modernization along with indigenization make one thing clear that in the coming decade India would have a formidable conventional fighting force at its disposal that could be used for power projection even beyond its shores. It would be entirely a fallacy to assume that these weapons are for peaceful purposes – since it is our mutual contention that peace is something very much of a relative entity. It is one's assertion that while keeping in view the ongoing strengthening of Indian Armed Forces and its defence industry, Pakistan has a number of options which it can employ to reduce or deter the level of threat emanating from Indian military capabilities.

IAF acquired U.S. built C-130 and C-17 strategic airlift cargo airplanes which are likely to assist India in realizing its dream to have a Mountain Strike Corps and its rapid deployment for military operations. C-17 can rapidly deploy paratroopers along with considerable equipment which surely makes them an important element in creating an expeditionary force. It is pertinent to mention here that, Russian-built IL-76 and IL-78 are also in Indian possession and the former was used to deploy Indian Paratroopers during Operation Cactus in 1988 at Maldives. Historically, the use of German paratroopers *Fallshirmjaegers* helped them in capturing the formidable fortress of Eben Emael in Belgium during the Invasion of France and the Low Countries on May 10, 1940. The fortress was heavily fortified and was considered difficult to capture otherwise. Similarly, the Battle of Crete on May 20, 1941 was another example of the use of paratroopers. Interestingly, in the latter's case, the deployment of airborne forces was made possible due to Junkers Ju-52 transport aircrafts. These historical precedents of using airborne forces in combat with striking results are encouraging India to employ such platforms for rapid force deployment.

Indian ground artillery platforms, naval artillery and its artillery in the air (the flying artillery) – are growing momentously yet generating considerable lethal firepower and mobile fire support. As it is argued before that India acquired Russian-built Smerch 300mm rocket artillery, while Pakistan acquired Chinese-built A-100 300mm rocket artillery; nevertheless, Russian rocket artillery mainly draws its bloodline from the Second World War *Katyusha* and can be regarded as more reliable and vigorous.

The indigenously developed DRDO AEW&CS and the use of local electronic components in its manufacturing points fingers towards a dangerous direction. In a possible Indo-Pak future conflict, Indian Armed Forces are likely to have better chances in ensuring improved and superior communications and the processing of information. While, they would be in a better position to jam, sabotage and hinder Pakistani communications. The future contours of aerial domain of war are very much likely to be shaped by cyber and electronic warfare capabilities due to the induction of armed UAVs and unmanned combat aerial vehicles (UCAVs). Apart from various anti-air systems including guns and missiles, cyber and electronic warfare retain the potential to fight automated systems and robotic warfare. Since it was noted by Sypott that India intends to modernize its military in six domains including land, sea, air, missile/nuclear, outer-space and cyber space.

It is noteworthy that India's indigenization and modernization of military equipment and technology would not only have severe security repercussions on Pakistan but it would also help India in achieving a 'great power' status.

Analysis

Joshi noted that Indian defence imports from Russia fell from 85 percent to 51 percent – loss of 45 percent overall. Perhaps the widening distance between Russia and India was felt by Soami as well who feared the two historic allies parting ways. Many Indian scholars including Joshi in their optimism, argued that Russia will provide India with Fifth-Generation Fighter Aircraft (FGFA); nevertheless, it would not be a surprise that Russia while displaying its great power behaviour changes its mind.

Rehman argued that "The path to greatness, however, does not lie in the dusty plains and frozen passes of its northern reaches. If it is to be found at all, it will be at sea – out in the great dark blue of the Indian Ocean." Lagwig cited Tellis who argued that India's aspirations of becoming a great power would remain a dream until it achieves such a capacity and capability to project military power – perhaps in a forceful manner. The assertions made by Rehman, Ladwig and Tellis make it clear that India needs a strong naval force to project power and

India's future lies in the Indian Ocean; nevertheless, due to Chinese 21st Century Maritime Silk Road and India's boycott of Belt and Road Initiative is likely to raise temperature in the region.

Fair cited Cohen that Ashley Tellis argued on the Indo-Pak relations and maintained that "Pakistan has to recognize that it simply cannot match India through whatever stratagem it chooses… …now, while it still can, and shift gears toward a grand strategy centered on economic integration in South Asia." It is understandable that it is hard for Pakistan to match with that of India; however, the former's A2/AD strategies in relation to the latter's Cold Start Doctrine and offensive force posturing are actually what are worrying Indian Armed Forces. Moreover, India is continuously boycotting Chinese Belt and Road Initiative (BRI) and has declined or shown no interest over Pakistan's invitation to India to join China-Pakistan Economic Corridor (CPEC) – a potential milestone towards economic integration in South Asia.

According to the Joint Doctrine of the Indian Armed Forces, India has a coastline of over 7,516 km and it is pretty much understandable that a strong naval and littoral maritime force is needed to protect this shoreline. However, it is a huge question mark on the credibility of Indian Navy, Air Force and Coast Guards, that in the presence of these watchmen – in 2008 how Ajmal Qasab and his fellows slipped pass through them in a boat that was not even capable to pass through river Ganges – as it argued by Indian State – made it to Mumbai and conducted attacks which resulted in the deaths of almost four hundred people and brought the two nuclear-armed rivals of South Asia on the brink of a war or perhaps a nuclear war?

Prakash mentioned that "In 1993, explosives from a neighbouring country arrived on India's west coast via boat, and were used to trigger serial blasts that created mayhem in Mumbai." Prakash outlined the weaknesses of Indian Navy in countering "boat men" and also did shed light on the criminal negligence. After sowing the seeds of perpetual hostilities in Afghanistan while toppling Taliban in 2001 – an almost two-decade-long war that has left Vietnam War behind in terms of losses, while afterwards unilaterally invading Iraq in 2003 against the dictates of realist scholars – now, United States intend to move its focus towards Asia-Pacific region.

Indian procurement of defence and military equipment saw a corruption scandal when Indian officials received bribes from Swedish military and defence equipment manufacturer Bofors in 1989 – however, the authors fear that the ongoing indigenization and modernization is also ridden by corruption which is perhaps given a formidable cover by the incumbent BJP-led government and this alleged corruption is likely to uncover in the years to come.

India's Indigenization and Modernization of Military – A Bulwark Against China?

Apart from the Indian rhetoric, it would not be an overstatement to argue that the rapid modernization of the Indian Armed Forces is actually a deliberate and well-calculated attempt by the United States and its allies to contain China and hinder its 21st Century Maritime Silk Road (MSR). India's continued boycott of the Chinese Belt and Road Initiative (BRI) and the rumours of an Allied-version of BRI – concrete our belief. If that's not the case – then what compels India to enhance its military capabilities – especially in the naval domain?

The authors believe that Indian Tri-Forces Command at Andaman and Nicobar Islands, along with U.S. presence at the islands of Diego Garcia, have the same or perhaps more value in relation to what was argued by Mearsheimer about the islands in South China Sea being a lot of aircraft carriers for projecting power. Quite interestingly, with the increased Indian Naval presence at the Andaman and Nicobar Islands, the hypothetical chances of choking the Strait of Malacca have dramatically increased. It is to be remembered here that the latter serves as the main sea lines of communication for Chinese imports as well exports especially the supply of energy resources to China primarily from the Middle East. Also, the said strait is an important route of the Chinese 21st Century MSR – which India is opposing.

It is observable that the "Make in India" initiative took by India attracted many companies and corporations from those states which are US-allied with an exception of a relatively small number of Chinese companies. This inclination of specific companies to invest, initiate joint ventures and local manufacturing of goods and products inside India points fingers towards one specific direction that this inclination is perhaps a part and parcel of a wider attempt to strengthen India while making it a regional hegemon – ostensibly, against China. It is too early or probably a fallacy to declare Chinese hegemony to be benign since realists argue that every great power behaves in the same manner. Nevertheless, American liberal hegemony under its grand strategic slogan of "American Exceptionalism" – the world has seen Operation Desert Shield and Desert Storm in 1991. Similarly,

Operation Just Cause (1989) in Panama, Operation Uphold Democracy (1994) in Haiti, Operation Restore Hope (1992) in Somalia, and Operation Deliberate Force (1995) in Bosnia and Herzegovina – were signs of American domination. Operation Enduring Freedom (2001) intended to bring down Taliban in Afghanistan, and Operation Iraqi Freedom (2003), while removing Saddam Hussein from power in Iraq, were also demonstrations of uninfringeable American power.

Conclusions

Besides the debate, the authors fully acknowledge and understand Indian strategic necessities and compulsions. Consequently, while considering China's rise, India's balance of threat is completely understandable. Fascinatingly, many authors believe that Pakistan, apart from its many-fold small economic base, geography and many other aspects of national power – has been behaving like a great power right from its inception in 1947. Arguably, the race of relative gains between India and Pakistan is the largest compulsion for both states to pursue certain strategies – fundamentally to enhance their respective chances of survival; nevertheless, India opted for indigenization, whereas Pakistan resorted to making the best use of its geography, i.e. China-Pakistan Economic Corridor (CPEC) while providing the Chinese with the shortest or perhaps relatively most secure and feasible access to Persian and Middle Eastern hydrocarbon resources. Nevertheless, in the neo-realist perspective, Pakistan in arms with China and India alongside the U.S., is destined to be on a path of rivalry – primarily due to geographical and geopolitical reasons.

Mearsheimer declared 'latent power' to be the instrument including the "socio-economic ingredients that go into building military power ... and a state's latent power refers to the raw potential it can draw on when competing with rival states." Ostensibly, India is mobilizing its latent power, e.g. under the banner of 'Make in India' while turning itself into military power. Mearsheimer maintained that "Wars are won by big battalions, not by armadas in the air or on the sea. The strongest power is the state with the strongest army." Mearsheimer's argument satisfies the 'the structural dilemma' in Indian Armed Forces and why land forces have always given preference and arguably a dominating role from the fruits of indigenization and modernization. However, as we have argued before that in a future conflict, the IAF is likely to not only support ground operations but would have a decisive, independent role to play – perhaps even more crucial than the Indian Army's. Since, the authors agree with the concept of strategic context of airpower and its unavoidability as it was argued by Hippler.

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