LEX LOCALIS-JOURNAL OF LOCAL SELF-GOVERNMENT
ISSN:1581-5374 E-ISSN:1855-363X
VOL. 22, NO. 2(2024)

FROM CONSTRAINT TO CAPABILITY: LESSONS FROM THE UNITED STATES FOR INDIA'S DEFENCE ASPIRATIONS TOWARDS VIKSIT BHARAT 2047

Saumya Jangid[1], Dr. Kanika Bakshi[2], Sakshi Gupta[3]

[1]DR. B.R Ambedkar University Delhi, India
[2]Dr. Bhim Rao Ambedkar College, University of Delhi, India
[3]Dr. Bhim Rao Ambedkar College, University of Delhi, India

Abstract
India's defence aspirations under Viksit Bharat 2047 require a shift from import dependence to indigenous capability and export competitiveness. This study compares defence expenditure and industrial development trends in India and the United States, highlighting structural differences in budgeting priorities. While India remains personnel-intensive, the United States focuses more on R&D, procurement, and technological modernization. This study compares defence expenditure patterns and defence development in India and the United States over 2013–2023, using various data sources from SIPRI, the Ministry of Defence (India), and the U.S. Department of Defence, DRDO, and the Open Government Data Platform, showing India's personnel-intensive structure versus the U.S. emphasis on R&D, procurement, and technological modernization.

For the period 2015–2023, Principal Component Analysis (PCA) is applied to different defence-related variables such as defence exports, defence production, research and development expenditure, total military expenditure, and private sector contribution. The results indicate that defence investment intensity and defence production capability are the most important components driving defence sector growth. The findings further emphasize that enhanced investment in innovation, stronger government–industry collaboration, and streamlined acquisition reforms are essential for India to achieve defense self-reliance and strengthen its global position by 2047.

Keywords: Defence expenditure, India–USA comparison, Principal Component Analysis, Vikshit Bharat 2047.

Introduction

India and the United States of America (USA) represent two of the strongest defence systems within the global environment, with their own defence spending trends, manufacturing capacities, and perspectives. Currently, India stands at a paradox in the global weapons trade as it is one of the largest importers of weapons and a potential weapons exporter. As of today, India possesses one of the world's largest armies, comprising more than 1.44 million personnel, and demands large-scale investments for the procurement of equipment and technologies. The defence spending for the year 2023 is approximately ₹5.9-6.0 trillion, or 13 percent of the overall country's spending, putting it on the list of top military spenders worldwide. Despite growing indigenization, India has remained near the top of the global arms import rankings, accounting for a significant share of world imports in recent SIPRI assessments (Table 1). This high import dependence reflects long-standing gaps in domestic design, manufacturing capability, and technology access, especially in complex platforms like combat aircraft, submarines, and air defence systems (Ghosh, 2016, 2019).

Table 1: Arms import to the top 10 largest importers, 2022-2023 (in USD millions)

Rank in 2022	Rank in 2021	Recipient	Import value

1	2	Qatar	3,342
2	**1**	**India**	**2,846**
3	63	Ukraine	2,644
4	3	Saudi Arabia	2,272
5	9	Kuwait	2,249
6	6	Pakistan	1,565
7	8	Japan	1,291
8	14	Norway	848
9	11	United States	837
10	16	Israel	829

Source : SPIRI, 2022

The last decade has seen the commencement of the conversion of the vast domestic base into export capability, from a marginal to an emerging export country position in the SIPRI list. India currently exports to more than 80-85 countries its defence goods, such as artillery systems, armored vehicles, radars, avionics components, and protection gears (IDSA, 2023). The defence export figures have increased substantially each year, reaching almost Rs 16,000 crores (approximately US$ 1.9-2.0 billion) in the year 2022-23, which is a ten-fold escalation from the mid-2010s (IDSA, 2023). Public sector undertakings such as Hindustan Aeronautics Ltd and Bharat Electronics Ltd, along with ordnance factories, contribute to a major chunk of the overall defence exports and are ranked among the top defence companies globally based on revenue (Indian Defence Review, 2023). As the Indian Government and the defence industry work together to meet the export target of Rs 35,000 crores by 2025, it is necessary to economically transform from reverse-engineering to development (Ministry of Defence, 2023). There are certain initiatives by the Ministry of Defence (MoD) that indicate the broad vision of self-reliance, which is to promote its defence sector as an export-oriented sector of its economy by designing, developing, and manufacturing defence equipment indigenously. The key efforts by the Indian government to make its defence sector an export-led locomotive for the economy are related to promoting self-reliance through indigenization, innovation, or proper planning, along with collaborative efforts. Over the past decade, there can be no denial that there has been a lot of emphasis on designing, developing, making, or managing, along with sustaining/repairing, defence equipment by means of indigenous innovation. The major vehicles of the new policy include giving preference to indigenous sources in defence procurement, allocating 75% of the defence capital budget for 2023-

24 to Indian companies, and the Defence Acquisition Procedure 2020, which includes preferring types such as Buy (Indian Designed, Developed, and Manufactured), Buy and Make (Indian), which require large indigenous component levels, and facilitating technology transfers from foreign OEMs, along with the Strategic Partnership Model for developing indigenous supply and manufacturing networks (Ministry of Defence, 2023).

The government has launched innovation-focused ecosystems, such as iDEX, to support startups, MSMEs, and academia, fostering technological advances, including AI, through bodies such as the Defence AI Project Agency and Defence AI Council. The Positive Indigenization Lists specify thousands of defence items to be manufactured domestically (Ministry of Defence, 2023). Simplified industrial licensing and dedicated indigenization platforms, such as SRIJAN, further ease the manufacturing landscape. The creation of defence industrial corridors in Tamil Nadu and Uttar Pradesh supports infrastructure and skilled job growth in these states. "Made in India" remains a central pillar, with capital defence spending expected to hit ₹15-18 lakh crore ($200–250 billion) over ten years, pushing procurement heavily towards domestic production (Ministry of Defence, 2023). Defence exports surged from ₹4,682 crore ($0.66 billion) in 2017-18 to ₹16,000 crore ($1.93 billion) in 2022-23. The government targets ₹35,000 crore ($4.87 billion) in exports in the near term, aiming even higher under the Defence Production Policy 2018's goal of $5 billion annually by 2025 (Ministry of Defence, 2023).Foreign Direct Investment (FDI) policies have been progressively liberalized, allowing up to 74% FDI automatically and 100% through government approval, attracting increased inflows and technology transfer critical to industrial growth (IDSA, 2023). MSMEs play a crucial role as specialized suppliers integrated into global and offset supply chains, with about 12,000 activeactives in the aerospace and defence domains, and poised to expand further (IDSA,2023). It witnessed more engagement by the private sector, wherein 25% of the budget for Defence R&D expenditure is allocated to the private sector, startups, and academia, which encourages the development of the platform and equipment along with the DRDO (DRDO, 2022). Skills in information and communication technology are selectively developed to upgrade the operations of the defence and financial management of the country. The Indian model of multi-facilitated reform, which covers Defence Reform of Procurement, Innovation, Infrastructure, FDI Reform, and Export, seems to have a proper vision to develop this nation from a large importer of arms to a competing nation in the export of defence products in the coming days. The vision fits the nation's aim of making a "Self-Reliant India–Atmanirbhar Bharat."

Our opportune position to effectively capitalize on potential sourcing opportunities can be attributed to our talent strength in multi-domain engineering, lower production costs, and harmonious relations with most foreign nations. It is against this background that the potential opportunity for a lesson-learned exercise, with respect to the military strategies, technological developments, and organizational setup applied by the USA, as a superpower in military strength, has emerged. In this respect, the USA can be considered as the country for the case study. The USA's defence system, with its decades of involvement in various military operations, investment in technology, and collaborative relationships with other nations and organizations, encompasses numerous experiences that would greatly benefit India's defence framework. In its rapid adoption of technology and its innovative approach, its flexibility in embracing new models of military operations, and its strong ties with other nations in terms of collaborative defence efforts against threats posed by various factors in our complex and rapidly changing environment.

2.1 USA and Indian Defence Industry Overview

The U.S. defense industry is the largest and most advanced in the world in terms of technology. This industry has been influenced by geopolitical scenarios that occurred after World War II, including the Cold and Korean Wars. The industry grew fairly fast between 1948 and 1960 owing to rising defense budgets that made R&D and procurement easier. By 1958, the private sector dominated weapon manufacturing, resulting in rapid innovation in military aircraft and weapons. Defence budgets rose considerably during these years; RDT&E grew at a rate of more than 18% each year, procurement budgets at 8.3%, and defence spending hovered around 9.3% to 13.2% of GDP (Department of Defence, 2023). Such investments have placed the defence sector at the forefront of technological innovation. In 1962, bureaucratic hurdles started influencing the acquisition processes but were overcome by the corporate sector due to personnel and management issues. The defence sector had new priorities from 1961 to -1990, which focused on maintaining a technological advantage over the Soviet Union, including standard and reliable systems. Budgetary changes were caused by the Vietnam War and the Reagan administration's build-up.In addition, there was a reduction in the number of large contractors after the Cold War, leading to large and diverse defense companies, including Boeing and Lockheed Martin (RAND, 2022). There was also a shift in technology from military to industrial technology, followed by large spending on procurements in 1998. Additionally, there was monopolistic demand because there was only one purchaser, that is, the government. Table 2 describes the budget spending of India and the USA in comparison with the indigirites of both India and the USA.

Table 2: Budgetary Allocation: India and USA

Category	**USA (2022–2028) Share in Dept. of Defence Outlay (%)**	**India (2017–2020) Share of Total Defence Budget (%)**	
Military Personnel	23.74% (2022) to 22.36% (2028)	56.74% (2017) to 55.12% (2020)	USA shows declining personnel share; India maintains majority personnel share reflecting different force structures.
Operation & Maintenance (O&M)	Spike at 167.54% (2022), stabilises ~36-40%	-	USA O&M stabilizes, reflecting operational readiness focus.
Procurement	18.62% (2022) to	Not separately given; capital	Growing procurement emphasis in both,

	19.99% (2028)	outlay includes procurement	especially USA's modernization focus.
Research, Development, Test & Evaluation (RDT&E)	14.68% (2022) rising to 17.10% (2024), then declining to 15.71% (2028)	5.58% (2017) to 6.30% (2020)	USA invests heavily in R&D; India's R&D share growing but still much lower.
Army	—	56.74% (2017) to 55.12% (2020)	India dedicates over half budget to Army.
Navy	—	14.25% (2017) to 15.03% (2020)	Incrementally growing share indicating naval focus increase.
Air Force	—	22.86% (2017) to 22.84% (2020)	Fairly stable allocation, showing sustained aerial capability.
Total Defence Budget	Approx. $834B (2023) to $889B (2028)	₹272,560 crore (2017) to ₹301,866 crore (2020/)	USA budget much larger; India showing steady growth.

Source: Compiled from National Defence Budget Estimates, 2023 and Ministry of Defence, Annual Report, 2020,2022, 2023

The budgetary allocation for the defence of India from 2017 to 2020 indicates a substantial emphasis on conventional forces, with more than 55% of the total budget allocated to the Army. The share of the Navy stands at 14-15%, while the Air Force gets a share of 22-23%, indicating an increase in naval power parallel to ground power. Lower shares are allocated to supporting services such as the Directorate General of Ordnance Factories (DGOF) and Quality Assurance (DGQA), which receive less than 1% each in the budget. The research and development (R&D) budget allocation shows a substantial increase from 5.58% to 6.30%, indicating an increased focus on innovation in the Indian defence sector.

In contrast, the budgetary outlays of the USA's Defense Department from 2022 to 2028 signify a relatively lower percentage for personnel spending, easing from approximately 23.74% to nearly 22.36%. This is an indication of the strength and resilience of the U.S. military, which is able to function effectively regardless of the lesser allocation compared to the others with respect to spending on personnel, owing to their better technology and appropriate force structuring. The USA presents a higher allocation within the Procurement category (increasing from 18.62% to nearly 20%) as well as Research, Development, Test & Evaluation (peak above 17% during the

early term of spending but remaining at approximately 15.7%). This implies that the force had a massive emphasis on lines such as modernization, procurement of the latest systems, and so forth. It is observed that the allocation for Operation & Maintenance (O&M) in the USA shows some weird patterns with a massive spike in the allocation for 2022 (167.54%), predominantly because of some irregular operating expenditure or accounting adjustments, with the figure stabilizing at around 36-40% thereafter. The information regarding the share for O&M of the allocation for India is not presented in the same manner, though the allocation indicates an increased share to meet the operations expenditure.

India's defence budgeting approach focuses on having a vast conventional forces structure (personnel-intensive) and a gradual increase in budgets for R&D and acquisition to modernize the defence force's structure. This rise in budget percentages for the Naval and Air Forces is indicative of a new requirement for securitization and related threats to the national security agenda. The USA's defence budgeting approach embodies "military greatness built on tech supremacy and efficiency." The reduction in the share of personnel cost expenditure indicates a smaller military force benchmarked by technology automation transformation and innovation in military acquisition and research and development expenditures. The large defence spending share in GDP ratio percentage terms for the USA (approximating 3.2-3.3%) signifies that defence holds a prime position in the USA's strategy and economics. India's large personnel cost share and escalating R&D expenditure index the transition happening in India; they have large ground forces but are required to innovate their defence bases. On the other hand, the emphasis on innovation, procurement, and the smaller number of personnel signifies the USA's defense preparedness and structure, which could be centered on high technology and mobility, and continuous modernization of the forces. If the Indian government wishes the nation to progress faster towards becoming an exporter of defence hardware and an independently producing nation, then imbibing the R&D outlay and the simplicity involved in the personnel spending of the USA could be beneficial. In conclusion, the defence budgets of India and the United States reflect the specific strategy each has adopted in their unique environment and resource situation in India and the technological supremacy strategy the United States has adopted in its environment and resources. Both approaches offer valuable lessons in strategic defense expenditure and competitiveness in the global arena.

Section 3: Principal Component Analysis of Key Indian Defence Investment Variables

Principal Component Analysis (PCA) was used in this study to comprehend the dimensionality of this complex data containing correlated variables such as overall exports, overall production, research budget, military spending, and private sector contributions. The application of PCA offers efficient summarization techniques by creating a new vector space in which all variables are converted into uncorrelated variables known as principal components. The application of PCA helps identify hidden factors responsible for military spending and production in Indian businesses and assists in more efficient decision-making regarding the Indian military investment strategy.

Table 4: PCA of Indian Defence Investment Variables: FY 2023(in INR, Crore)

Total export	Total production	Research budget	Military expenditure	Private sector contribution
1521	74054	8475	396673	14104

4682	78820	10148	429033	15347
10745	81120	9893	460896	17350
9115	79071	9841	517022	15894
8434	84643	10610	547071	17268
12814	94845	9893	569177	19920
15918	108684	9841	647534	21083
21083	127265	10610.2	704232	26506
15526	25144	10610.2	704232	26506

Source: SIPRI, 2023 and Open Government Data Platform India, 2023

Kaiser-Meyer-Olkin (KMO)		0.7
Bartlett's Test of Sphericity	Approx. Chi-Square	30.992
	df. And Sig.	10 and 0.001

The Kaiser-Meyer-Olkin (KMO) measure of 0.7 and significant Bartlett's test ($p = 0.001$) indicated sampling adequacy and sufficient correlations among variables, justifying the PCA.The analysis revealed two principal components explaining approximately 88.76% of the cumulative variance. In table 5, **Component 1** , accounting for 67.8% of the variance, strongly loads on variables related to defence investment—namely, the research budget (0.792), military expenditure (0.965), and private sector contribution (0.960)—indicating that this component primarily captures the dimension of defence spending intensity and investment dynamics. **Component 2** , explaining an additional 20.9% of the variance, was almost exclusively associated with total production (loading 0.992), representing defence output capacity. Such an identification indicates that the research and innovation budget is an important determinant and is closely associated with defence expenditure. In contrast, the production capacity dimension is quite separate and represents the capacity for investment to be turned into actual defence sector products.

Table 5: Interpretation of Component Matrix and Rotated Component Matrix

Total Variance Explained	**Initial Eigenvalues**	**% of Variance**	**Cumulative %**	**Rotation Sums of Squared Loadings**	**% of Variance**	**Cumulative %**
Total export in crore	3.39	**67.85**	67.85	3.33	66.77	66.77
Total production in crore	1.04	**20.90**	88.76	1.09	21.99	88.76
Research budget in crore	0.46	9.35	98.12			
Military expenditure	0.05	1.09	99.21			
Private sector contribution in crore	0.03	0.78	100			

Rotated Component Matrix	Component 1	Component 2
Total export in crore	0.92	0.31
Total production(crore)	0.04	0.99
Research budget (crore)	0.79	-0.09
Military expenditure (crore	0.96	0.08
Private sector share (crore)	0.96	0.01

Thus, PCA underscores the pivotal role of the research and innovation budget in driving defence spending behavior, alongside production capacity as a key but distinct factor. This insight directs policymakers to focus primarily on increasing R&D investment and private sector engagement to effectively influence defence expenditure while also scaling production capabilities for a balanced, robust defence ecosystem.

Conclusion:

The United States and Indian militaries are among the world's top defence powers, each displaying a unique defence expenditure trend, research and development processes, and strategies. While the United States displays a higher defence expenditure, thanks to a great deal of research and development activities, advanced defence technologies, and a wealthy defence-industrial base, the Indian military is gradually modernizing itself through collaboration, local manufacturing, and reforms. The research and development process used the PCA test to examine the defence variables of total defence export, defence production, research budget, defence expenditure, and private defence contribution, which demonstrated that the main driver of the defence expenditure process was research and development. The PCA revealed that the encouragement of innovation and the development of government-industry interactions are the most important factors for the Indian objective of promoting self-reliance and raising the country's presence in the global defence sector. This comparative study highlights the need for the Indian government to learn from the US approach regarding increased R&D investments, the creation of strategic partnerships, simplification of acquisition procedures, and promotion of innovation networks. In this manner, the Indian government will not only be able to improve the nation's autonomy but also make the nation a major stakeholder in the global export market of the defence sector. This study makes it clear that a holistic and multi-dimensional approach is necessary for the growth of the Indian defence sector in the future.

References:

1. Behera, L. K. (2009). India's defence public sector undertakings: A performance analysis. *IDSA Journal of Defence Studies, 3*(4), 118–141. https://www.idsa.in/sites/default/files/jds_3_4_lkbehera.pdf

2. Ghosh, R. (2016). *Indigenisation: Key to self-sufficiency and strategic capability: Global defence industrialisation and re-modelling the Indian programme*. Institute for Defence Studies and Analyses. https://www.idsa.in/publisher/book/indigenisation-key-to-self-sufficiency-and-strategic-capability
3. Ghosh, R. (2019). India's defence exports: Status, strategy and solution (*Manekshaw Paper No. 83*). Centre for Land Warfare Studies. https://www.claws.in/publication/indias-defence-exports-status-strategy-and-solution/
4. Ghosh, R. (2023). India's defence exports on the rise. Institute for Defence Studies and Analyses. https://www.idsa.in/publisher/comments/indias-defence-exports-on-the-rise
5. Gupta, A. (2011, October 20). A national security strategy document for India. *IDSA Comment*. Institute for Defence Studies and Analyses. http://www.idsa.in/idsacomments/ANationalSecurityStrategyDocumentforIndia_arvindgupta_201011
6. Ministry of Defence, Government of India. (2018). *Defence production policy 2018*. Government of India. https://mod.gov.in
7. Ministry of Defence, Government of India. (2020). *Annual report 2019–20*. Government of India. https://mod.gov.in
8. Ministry of Defence, Government of India. (2022). *Annual report 2021–22*. Government of India. https://mod.gov.in/documents/annual-report
9. Ministry of Defence, Government of India. (2023). *Defence acquisition procedure 2020* (updated 2023). Government of India. https://mod.gov.in
10. Stockholm International Peace Research Institute. (2022). *SIPRI arms transfers database*. SIPRI. https://sipri.org/databases/armstransfers
11. Stockholm International Peace Research Institute. (2023). *World military expenditure*. SIPRI. https://sipri.org/publications/2023/sipri-fact-sheets/world-military-expenditure
12. U.S. Department of Défense. (2023). *Summary of the 2023 National Defense Strategy of the United States of America*. https://media.defense.gov/2023/Mar/15/2003173553/-1/-1/1/NATIONAL-DEFENSE-STRATEGY-2023.PDF
13. U.S. Department of defence. (2024). *National defense budget estimates for FY 2024*. U.S. DoD, Office of the Comptroller. https://comptroller.defense.gov
14. Manohar Parrikar Institute for Defence Studies and Analyses. (2025). India-US defence cooperation [Special Issue]. *Journal of Defence Studies, 19*(1). https://idsa.in/journalofdefencestudies
15. RAND Corporation. (2022). *U.S. defense industrial base: Trends and challenges* (Report No. RR-4734). RAND. https://www.rand.org/pubs/research_reports/RR4734.html
16. Allied Market Research. (2023). *Global defense industry size, share & trends analysis report*. Allied Market Research. https://www.alliedmarketresearch.com/defense-market
17. Indian Council of World Affairs. (2022, November 10). India's arms exports: Progress and prospects. https://www.icwa.in/show_content.php?lang=1&level=1&ls_id=7766&lid=5832
18. Institute for Defence Studies and Analyses [IDSA]. (2023). Strategising India's defence exports. https://www.idsa.in/publisher/comments/strategising-indias-defence-exports
19. Defence Research and Development Organisation[DRDO]. (2022). *DRDO annual report 2022: Innovations and achievements*. DRDO. https://www.drdo.gov.in/sites/default/files/drdo_annual_report2022.pdf

20. Indian Defence Review. (2022). Self-reliance in defence: Recent initiatives and policy updates. *Indian Defence Review*. http://www.indiandefencereview.com/news/self-reliance-in-defence-recent-initiatives-and-policy-updates/
21. National Security Council Secretariat. (2023, August 20). India's national security strategy: Latest recommendations. https://nscs.gov.in/press-releases/india-national-security-strategy-2023/
22. Australian Strategic Policy Institute. (2023, September 15). *Indo-Pacific defence industry partnerships: Developments in 2022-2023*. ASPI. https://www.aspistrategist.org.au/defence-industry-partnerships-indo-pacific-2023/