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AN ANALYSIS OF DEFENSE SECTOR FOR A PERIOD FROM 2020 TO 2024

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ABSTRACT
This paper studies the growth in defense sector due to rising geopolitical tensions which creates a threat for most of the global economics. The paper first focusses on economic analysis of the top four countries in defense sector followed by the industry analysis which highlights the increase in production and exports in this sector. The paper also covers the comparative analysis among the top 3 defense companies as per the market capitalization. A past research paper suggested the impact of geopolitical risk index on the volatility of Nifty 50 thus considering that paper a regression analysis is performed between geopolitical risk index and Nifty defense index.

Keywords: *defense, geopolitical risk, EPS, P/E*

INTRODUCTION
The defense sector plays a vital role in safeguarding a nation's sovereignty, maintaining internal stability, and supporting international peace efforts. It includes all government and private initiatives related to the production, development and maintenance of military forces and equipment's. This includes armed forces, defense manufacturing companies, research and development related to innovation in defense, intelligence services, and cybersecurity operations. With increasing geopolitical tensions, the development of defense sector has become crucial, complex and need of the hour. Today, the defense industry is not only crucial for national security but also contributes significantly to employment generation and economic development.

India's defense sector is responsible for protecting the country's borders, maintaining peace, and responding to both internal and external threats. It comprises the Indian Armed Forces—Army, Navy, and Air Force—along with various paramilitary forces and defense production units. Over the years, India has made significant progress in strengthening its defense capabilities through modernization, indigenous production, and strategic partnerships. With initiatives like "Make in India" and "Atmanirbhar Bharat," the focus has shifted toward self-reliance in defense production, encouraging domestic innovation, reducing dependency on imports and focusing to increase exports.

This research paper aims to study and analyze the growth of defense sector for few large global economics, then moving towards industry analyzes of our own country and comparative company analysis of the top 3 companies as per market capitalization. It also covers to study and analyze the impact of geopolitical risk index on the India's Nifty Defense sector index.

OBJECTIVES OF THE STUDY
1. To study and analyze the rise in military expenditures of the top four countries in defense sector.
2. To measure India's production in this sector due to increasing geopolitical crisis.
3. To analyze the export of India.
4. To study the impact on company's performance of defense sector due to increasing investments made in this sector.
5. To examine the relationship between geopolitical risk index and Nifty defense index.

REVIEW OF LITERATURE
Numerous studies investigate how defense expenditure influences India's economic landscape. One notable analysis (*Economic Policy Uncertainty Index*, n.d.)(2017) employed econometric tools to analyze the impact of military expenditures on national income, GDP, employment levels, and industrial output. While defense spending has shown positive effects on job creation and industrial stimulation, its overall contribution to GDP remains less significant compared to sectors like information technology, agriculture, or general manufacturing.

Another key study (*Home | Department of Defence Production*, n.d.)(2018) examined the evolving roles of the public and private sectors in defense production. It acknowledged the traditional dominance of public-sector undertakings like Hindustan Aeronautics Limited (HAL) and Bharat Electronics Limited (BEL), while also recognizing the increasing participation of private players such as Tata Advanced Systems and Larsen & Toubro.

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However, it highlighted several challenges faced by private firms, such as regulatory complexities and slow procurement procedures.

A (*Press Release: Press Information Bureau*, n.d.)2020 paper examined the Defense Procurement Procedure (DPP) and the Strategic Partnership Model. While these policies aim to enhance indigenous production and reduce import dependency, implementation has been obstructed by procedural delays and administrative inertia.

Another study (*India's Defence Industry: Achievements and Challenges*, n.d.)(2019) assessed the impact of initiatives like Make in India (Atmanirbhar Bharat) and the increase in foreign direct investment (FDI) limits. While these reforms have led some developments, challenges remain in ensuring meaningful technology transfers and achieving self-reliance in critical areas.

A (Behera, 2021) study assessed innovations by the Defense Research and Development Organization (DRDO), such as the Tejas Light Combat Aircraft, BrahMos missile, and Astra air- to-air missile. This paper demonstrated technology development particularly in high-end systems like advanced radar, jet engines, and long-range air defense.

Another evaluation (*Press Release:Press Information Bureau*, n.d.)(2019) looked into India's capabilities in aerospace and naval innovation, analyzing efforts like the INS Vikrant aircraft carrier and Scorpène-class submarines.

A 2020 paper examined India's military posture in light of its strategic competition with China and persistent tensions with Pakistan. The research underscored India's emphasis on a balanced defense strategy, combining conventional military readiness with nuclear deterrence and cybersecurity measures.

Another key analysis (Bibi & Lee, 2023) compared India's defense budget with those of neighboring countries, noting the difficulty India faces in modernizing its forces amid budgetary pressures and increasing threats along its borders.

Research from (*India Pledges Record 9.5% Increase in Defence Budget*, n.d.)2019 evaluated public- private partnerships (PPPs) in the sector. Examples like the collaboration between DRDO and Larsen & Toubro highlighted potential benefits from the partnerships but also revealed challenges faced by it.

Due to rising geopolitical crisis, another important research includes impact of geopolitical crises on the financial markets. A 2025 paper assess the impact of geopolitical risk index on volatility of Nifty 50. In his paper, he emphasizes the time varying impact of changes in geopolitical risk on the Nifty 50 volatility.

DATA INTERPRETATION

Note: Figures in blue are SIPRI estimates.

Table 1: Military expenditure in millions of US$

Year	USA	CHINA	RUSSIA	INDIA
2020	778379.2	257973.4	61712.5	72937.1
2021	806230.2	285930.5	65907.7	76348.5
2022	860692.2	291958.4	102366.6	79976.8
2023	916014.7	296821.4	109203.6	82293.3
2024	997309.0	313658.3	148967.3	86126.0

Source: SIPRI

Between 2020 and 2024, it is been observed that major powers have shown an increase in their defense expenditure due to rising geopolitical tensions and ongoing defense modernization. The United States continues to dominate the largest military budget with an increase of 28% in the last 5 years followed by China with a 21.6% increase. There is a sharp rise in the expenditure of the Russia since 2022 this increase is largely attributed towards the war with Ukraine. The total rise for Russia accumulates to 141.8%. For India, a rise of 18.1% is observed for a period of 5 years. Overall, the rising defense budgets signifies the rising tension among the countries due to rising geopolitical risk.

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Table 2: Military expenditure as percentage of GDP

Year	USA	CHINA	RUSSIA	INDIA
2021	3.40%	1.61%	3.58%	2.47%
2022	3.31%	1.63%	4.61%	2.38%
2023	3.30%	1.66%	5.40%	2.36%
2024	3.42%	1.71%	7.05%	2.27%

Source: SIPRI

Military expenditure as a percentage of GDP offers a clearer picture of how much a country prioritizes defense relative to the size of its economy, rather than simply looking at total spending. The United States has maintained a relatively steady share of GDP between 2020 to 2024 whereas China military spending relative to GDP remains low as compare to other global peers. Russia has seen a dramatic rise of 70% in its military spending as a proportion of GDP. The rise is due to ongoing war between Russia and Ukraine. On the other hand, India has stabilized its defense spending as a percentage of GDP between 2.3% and 2.5%. These trends reveals that US sustains proportionate budget, China move cautiously, Russia commits a larger share whereas India maintains a moderate proportion.

Table 3: Military expenditure per capita in millions of US$

Year	USA	CHINA	RUSSIA	INDIA
2020	2295.2	181.0	421.1	52.2
2021	2373.1	200.4	450.8	54.2
2022	2527.0	204.7	703.6	56.4
2023	2674.7	208.4	749.6	57.5
2024	2895.1	220.7	1025.9	59.6

Source: SIPRI

Military expenditure per capita offers insight into how much each citizen, on average, contributes to national defense spending. The United Nations shows the highest increase by 26.1%. There is a rise of 22.1% observed in the country China. The average per capita remains low as compare to US due to its enormous population. Russia has seen a jump of 143.8% whereas India remains the most restrained in per capita income, an increase of 14.2% is been observed. This low level reflects India's large population and a defense budget that remains tightly controlled.

Table 4: Military expenditure as percentage of government spending

Year	USA	CHINA	RUSSIA	INDIA
2020	8.18%	4.90%	10.59%	8.76%
2021	7.99%	4.93%	10.31%	8.04%
2022	9.11%	4.88%	12.96%	7.99%
2023	9.11%	5.03%	14.79%	7.90%
2024	9.11%	5.06%	18.90%	7.63%

Source: SIPRI

Military spending as a percentage of a government's total budget reveals how heavily defense is prioritized relative to other public services. From the above table, it is been observed that the United States has maintained a significant proportion between 2020 and 2024. China has allocated a smaller share towards defense expenditure as compare to other countries. Russia shows a jump of approximate 79% in its expenditure whereas India has experienced a decline in its expenditure towards defense sector.

Table 5: Industry analysis

Year	Indiadefense production (Amount in US$ billion)	Value of production by defense PSUs (Amount in US$ billion)	Defense exports (Amount in US$ million)
2019-20	11.3	6.8	1293
2020-21	11.6	6.4	978
2021-22	12.7	7.5	1565
2022-23	13.1	7.7	1944
2023-24	15.3	9	2546

Source: IBEF

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It is been witnessed from the above table that India has increased its production in the defense sector. A rise of 35% increase is been observed between 2020 and 2024. The reason behind this upward trend is due to increasing government commitment towards the manufacturing sector. PSU continue to play a major role in the production of defense equipment's; they account for more than 58% of total production. A notable development has been the surge in defense exports. Export growth has risen by 62% in last 2 years.

6.1 Hindustan Aeronautics

Table 6: Company Analysis

Year	Sales (in crores)	Operating Profit (in crores)	EPS (in Rs.)	P/E	ROE(%)	Price to book value	EV/EBITDA
2021	22,882	5,344	48.53	11.6	21.05	2.17	4.58
2022	24,620	5,415	75.96	12.9	26.40	2.58	5.38
2023	26,927	6,686	87.14	15	24.72	3.88	8.52
2024	30,381	9,752	113.96	36.2	26.14	7.66	16.85
2025	30,981	9,608	125.07	32.1	23.86	8.02	19.82

Source: Screener & Money control

6.2 Bharat Electronics ltd

Year	Sales (in crores)	Operating Profit (in crores)	EPS (in Rs.)	P/E	ROE (%)	Price to book value	EV/EBITDA
2021	14,109	3,214	2.87	16.8	19.11	2.82	7.70
2022	15,368	3,344	3.28	19.2	19.60	4.29	12.38
2023	17,734	4,090	4.08	25.9	22.13	5.25	14.36
2024	20,268	5,051	5.45	41.3	24.99	9.16	23.69
2025	23,769	6,834	7.28	44.1	26.84	11.18	27.97

Source: Screener & Money control

6.3 Bharat Dynamics ltd.

Year	Sales (in crores)	Operating Profit (in crores)	EPS (in Rs.)	P/E	ROE (%)	Price to book value	EV/EBITDA
2021	1,914	346	7.03	20.2	9.6	2.27	10.32
2022	2,817	727	13.64	21	16.49	3.31	9.70
2023	2,489	409	9.61	37.2	10.96	5.64	25.31
2024	2,369	537	16.71	67.4	16.84	8.83	31.02
2025	3,345	472	14.99	83	13.71	11.71	51.97

Source: Screener & Money control

Hindustan Aeronautics Ltd. (HAL) revenue surges by 35% during the period taken for the study. Its earnings per share (EPS) is also rising from ₹48.53 to ₹125.07, while return on equity (ROE) remains stable between 24% and 26%. Valuations have also surged, with the price-to-earnings (P/E) ratio increasing from 11.6 to 32.1 and the price-to-book (P/B) ratio from 2.17 to 8.02. HAL has relatively reasonable when compared to peers like Bharat Electronics Ltd. (BEL) and Bharat Dynamics Ltd. (BDL), particularly on metrics like P/E and EV/EBITDA. However, such jump in valuation signifies investor's interest in the future growth of the company.

The sales of Bharat Electronics Ltd. (BEL) have expanded by 68% from FY21 to FY25. Its EPS has increased by 2.5 times over the same period, and ROE has shown an upward trend, reaching 26.84% in FY25—indicating strong capital efficiency. BEL's valuation, however, is on the higher side, with a P/E of 44.1, a P/B of 11.18, and an EV/EBITDA of 27.97. These figures reflect high investor expectations for continued growth. If the increase in the valuation does not matches with the future growth, we may expect a correction in the same.

Bharat Dynamics Ltd. (BDL) presents a more mixed picture. While its EPS grew from ₹7.03 in FY21 to ₹14.99 in FY25, the growth has been inconsistent, and FY23–24 saw a dip in both revenue and profit. ROE remains comparatively modest at 13.71%. Despite these weaker fundamentals, BDL's valuations are extremely high—its

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P/E stands at 83 and EV/EBITDA at 51.97 for FY25. The mixed performance shows that the stock is already trading at a premium as the valuation are not supporting fundamentals.

There was a study done analyzing the impact of geopolitical crisis on the Nifty index. Thus, in this paper we try to examine the relationship between the two through regression analysis.

Table 7: Geopolitical risk index and Nifty Defense index

Period	Geopolitical risk index	Nifty India defense
7/1/2022	117.18	1489.57
8/1/2022	132.86	1675.16
9/1/2022	131.99	1948.22
10/1/2022	143.16	2043.09
11/1/2022	116.72	2193.3
12/1/2022	111.20	2297.55
1/1/2023	104.27	2206.48
2/1/2023	120.99	2174.38
3/1/2023	105.38	2109.31
4/1/2023	106.81	2131.67
5/1/2023	108.47	2300.32
6/1/2023	110.53	2410.06
7/1/2023	107.45	2722.13
8/1/2023	101.14	2965.9
9/1/2023	98.63	3215.72
10/1/2023	197.89	3272.91
11/1/2023	156.70	3184.31
12/1/2023	142.28	3646.49
1/1/2024	160.16	4175.46
2/1/2024	146.60	4310.63
3/1/2024	133.21	4448.97
4/1/2024	163.74	4636.14
5/1/2024	130.52	5399.43
6/1/2024	112.88	6641.43
7/1/2024	92.39	7283.69
8/1/2024	140.76	7633.79
9/1/2024	130.14	6928.69
10/1/2024	130.68	6658.36
11/1/2024	128.48	6347.4
12/1/2024	142.13	6706.75
1/1/2025	112.33	6493.85
2/1/2025	136.20	6394.15
3/1/2025	174.24	5131.8
4/1/2025	140.33	6393.9
5/1/2025	165.78	7128.8
6/1/2025	207.74	8685.6
Source: Policy uncertainty.com & NSE		

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.355124							
R Square	0.126113							
Adjusted Square	0.100411							
Standard Error	2020.419							
Observations	36							
ANOVA								

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	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	20029361	20029361	4.906638	0.033556			
Residual	34	1.39E+08	4082095					
Total	35	1.59E+08						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	591.9278	1714.733	0.345201	0.73207	-2892.83	4076.684	-2892.83	4076.684
geopolitical risk index	28.15562	12.71081	2.215093	0.033556	2.324155	53.98709	2.324155	53.98709

Nifty defense Index = 591.93 + 28.16 * Geopolitical Risk index

Dependent Variable: Nifty India Defense Index Independent Variable: Geopolitical Risk Index

1. Coefficient for Geopolitical Risk Index: It implies that with 1 point increase in geopolitical risk index the Nifty defense index will increase by 28.16 units.
2. Statistical significance: p-value = 0.03356 which is < 0.05 so the relationship between the dependent and independent variable is statistically significant at the 5% level.
3. Correlation = 0.355: It means both dependent and independent variables are positively related and the percentage of their relation is 35.5%.
4. R – Square = 0.1261: This means only 12.6% of the variation in the dependent variable is explained by the geopolitical risk index.
5. Standard error: 2020.42: It indicates the deviation of the actual data from the regression line. The higher standard error indicates huge deviation and a weak model.

CONCLUSION

The rising geopolitical tension have led to increase in the volatility of the defense sector. From the above paper, we can observe that the top countries are continuously increasing their defense expenditure to cover up the possible threat faced by their country. We could already see a huge rise in Russia's expenditures due to its ongoing war with Ukraine. India have also expanded a lot in the defense sector which has made it reach at the 4th position.

Due to the various initiatives taken by the ruling government for home production through AtmanNirbhar it can been seen that not only the production has increased in defense sector to make it self reliant but it has also led to increase in exports. Thus, making our country ready for any threat pose by our neighbors.

In comparison among the top 3 defense companies as per the market capitalization, HAL emerges as the most balanced and fundamentally sound investment, offering steady growth, strong profitability, and moderate valuations. BEL shows high growth potential with excellent ROE but is already priced for continued outperformance. BDL, meanwhile, carries the highest risk, with inconsistent results and valuations that appear excessive relative to its financial track record.

In summary, the geopolitical risk index is a statistically significant predictor, but the model's low R^2 suggests it captures only a small portion of the variation in the outcome. The standard error is also very large indicating huge data variability.

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