PRESS RELEASE

Foundation for Advancing Science and Technology (FAST India) releases State of Industry R&D in India for Aerospace and Defence sector in collaboration with IIFL Securities

Key Takeaways

- Of the four parameters studied, selected Indian Defence firms perform competitively with Global companies on three - R&D Intensity, the proportion of PhD qualified employees and publications per USD billion revenue, but lag in patents per USD billion revenue.
- Overall, Indian Defence firms perform **2x** better than Global firms for publications per USD billion revenue.
- Of the 19 firms studied (10 Global and 9 Indian), Hindustan Aeronautical Limited (HAL) had the highest R&D Intensity for FY 2022-23 at 9.3%[1]. It leads Safran SA which ranks second for R&D intensity by a factor of **1.5x**.
- Indian firms Sika Interplant and High Energy Batteries (which fall in the low-revenue cluster of Indian companies) rank topmost amongst all global and Indian firms for the proportion of PhD qualified employees. However, this is likely due to the low overall number of employees in these firms.
- Three Indian firms, High Energy Batteries, Bharat Electronics Limited (BEL) and Bharat Forge occupy the top three ranks for publications by revenue.
- Indian defence sector firms lag significantly in patent by revenue output, with 7.3 patents per USD billion revenue compared to the global average of 240.0.
- Bharat Forge leads patent output relative to its size amongst Indian firms. However, L&T has the largest number of patents in the high-revenue cluster.
- The low-revenue cluster firms lack significant patent data, with most of the firms showing zero patents.

20 June 2024, New Delhi: FAST India released its sectoral brief on the Aerospace and Defence sector for its series on the State of Industrial research and development (R&D) in India in collaboration with IIFL Securities. The latest brief presents an in-depth analysis of R&D trends, innovation outputs, and comparative performance metrics of major Indian defence firms against their global counterparts. The report underscores significant disparities in R&D intensity, the proportion of PhD employees, patent output, and publication rates, providing important insights for policymakers and industry stakeholders.

The report reveals critical insights into the performance of Indian defence firms in various domains of R&D and innovation, comparing them with their global counterparts as well as categorising Indian firms into high-revenue and low-revenue clusters to provide a more nuanced analysis:

[1] R&D Intensity is the ratio of a firm's R&D investment to its revenue

1. ***R&D Intensity:***
    a. Overall, Indian defence firms exhibit lower R&D intensity (1.2%) compared with their global counterparts (3.4%).
    b. Hindustan Aeronautics Limited (HAL) leads all firms studied with a notable R&D intensity of 9.3%, significantly higher than many global peers.
    c. L&T shows relatively low R&D intensity due to its broader industrial footprint beyond defence and consequently, high revenue.
2. ***Proportion of PhD Employees:***
    a. The proportion of PhD employees in Indian defence firms is markedly lower (0.1%) than the global average (0.3%).
    b. Despite the overall low proportion, firms like Sika Interplant and High Energy Batteries, which fall under the low-revenue cluster Indian firms, rank first and second for the parameter amongst all firms. This is likely due to the small number of employees in these firms.
3. ***Publications:***
    a. Indian defence firms produce more publications per USD billion revenue (88.5) compared to the global average (37.9).
    b. High Energy Batteries, BEL, and Bharat Forge occupy the top three ranks in publications per USD billion revenue, respectively, indicating a robust output in terms of research publications.
4. ***Patent Output:***
    a. Indian firms significantly lag in patent output, with only 7.3 patents per USD billion revenue compared to the global average of 240.0.
    b. L&T, with 193 patents between 2015 and 2023, leads in the high-revenue cluster for the absolute number of patents, followed by Bharat Forge with 39 patents. However, when adjusted for revenue, Bharat Forge demonstrates a stronger patent output relative to its size.

The high-revenue firms show exceptional performance in R&D Intensity and Publications per billion USD revenue. The low-revenue firms display mixed performance, with some excelling in specific areas such as publications (e.g., High Energy Batteries), but generally lagging in patents and advanced research personnel.

Conclusion

The report concludes that while Indian defence firms show promise in areas such as publication output and select high-revenue firms demonstrate strong R&D commitments, there remains a significant gap in patent outputs and the proportion of PhD employees compared to global standards. The findings suggest a need for targeted strategies to enhance R&D intensity and innovation outputs, particularly in low-revenue firms, to elevate India's standing in the global defence sector.

For a detailed analysis and further information, the full brief is available for stakeholders and interested parties.

About FAST India:

The Foundation for Advancing Science & Technology (FAST India), a nonprofit initiative co-founded by Ashish Dhawan (Founder, of Ashoka University and The Convergence Foundation) and Varun Aggarwal (Co-founder, of Aspiring Minds and The Change Engine), is dedicated to enhancing the Science and Technology ecosystem in India.

In the coming decade, FAST India aims to position India as one of the top three global giants in Science and Technology, harnessing India's immense potential to drive progress on the economic and societal fronts. In the short term, FAST India's objectives include propelling five Indian universities into the top 100 research ranks, tripling the R&D expenditure in the industry, and ensuring that five Indian firms feature in the world's 100 most innovative companies list.

To learn more about FAST India and its transformative initiatives, please visit **https://fast-india.org/**. For press inquiries, please reach out to **info@fast-india.org**