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Operation Red Carpet: A Human Capital Approach to Aerospace Capability

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In 1983, Morris Chang, a Chinese engineer who had worked at Texas Instruments, USA, for over two decades, was passed over for promotion. He quit. After two years of working in different places, he received a call from Mr K T Li, a minister in Taiwan, inviting Morris to Taiwan to work in the semiconductor industry. He accepted the invitation and founded Taiwan Semiconductor Manufacturing Company (TSMC) in 1987.¹ This single decision altered the entire semiconductor industry landscape. Today, TSMC produces more than 90 per cent of the world's most advanced chips² – a huge progress for a country with almost negligible technical background when it began.

A 2008 study by RAND compared the education systems of China and India. It found that India outperformed China in higher education, and China outperformed India in primary and secondary education. This was largely due to the Indian government's greater focus on and funding for higher education institutes like the IITs, with limited emphasis on lower levels since independence. The study also found that this capacity of higher education without a supporting technological infrastructure created human capital that could not be absorbed within the country. This caused high-skilled emigration.³ A paper published in 2023 states that 67 per cent of the top 100 JEE rank holders and 36 per cent of the top 1,000 ranks have migrated.⁴ Further, a popular study estimated the fiscal impact of this high-skilled migration to be a net loss of 0.5 per cent⁵ of the Gross National Income of India after compensating for remittances and FDI. The lack of high-quality human capital is a leading cause of the lack of progress in the country. A lot of sustained hard work is required to build the infrastructure. However, in exceptional circumstances, some short routes to success do spring up purely by chance.

A lot of modern technologies emerged during the Second World War. Jet aircraft, missiles, and glide bombs owe their origin to Germany. After Germany surrendered in 1945, Operation Paperclip was launched by the US.⁶ It was designed to coerce German scientists and engineers to move and work in the US. The engineering and scientific achievements that resulted from this operation are exemplary. To quote one example, US missions to the moon were largely attributed to Von Braun, a German scientist. About 120 Germans from this operation worked on the moon mission. The US benefitted immensely from this sudden influx of scientific talent. The key takeaway is that the US realised the existence of this opportunity at the right time. It developed the right policies at the highest level of government and made the best use of the situation. India also benefitted from this mass exodus of German engineers. Dr Kurt Tank and his team were invited by the Prime Minister to join HAL.⁷ They went on to develop the HF-24 Marut, the first operational jet fighter designed and developed in Asia.

In November 2024, NASA's Jet Propulsion Laboratory is laying off 5 per cent of its workforce.⁸ This is the second lay-off this year after an 8 per cent reduction in February.⁹ Boeing is likely to lay off 10 per cent of its workforce too, amounting to 17,000 people.¹⁰ Strong anti-immigration sentiments are also on the rise globally. Therefore, it would be reasonable to expect that a lot of highly qualified and experienced Indians in the aerospace industry are likely to become unemployed soon. These are people who have work experience on the factory floors with insight into the latest technology and modern industrial practices. These lay-offs could trigger a moment of homesickness. Decisions to relocate to another foreign country while already living abroad are challenging and would require careful thought and deliberation. Home is a safe bet in times of uncertainty. Thus, there is a brief period where India, with its right approach, can absorb this large influx of talent before they are lured away by other countries. Countries like Germany and Japan, with ageing populations, have already initiated measures to absorb this talent. Recently, Germany increased the number of annual visas for skilled Indian workers from 20,000 to 90,000.¹¹ Thus, while a window of opportunity exists, it is also shutting soon.

To exploit this opportunity, the first step is to identify and reach out to top-quality talent. The second is to provide adequate freedom to build the desired capabilities. This selective approach with wide leeway could attract criticism as lacking fairness. The argument is valid but must be temporarily ignored in the national interest. The results from good talent spotting will speak for itself in the future. In the past, people like Dr Homi Bhabha and Dr Vikram Sarabhai enjoyed this freedom. The results they produced in atomic energy and space are evident. Lateral entry into government departments must not be attempted as the skillset required and available is technical and not managerial. Instead, new entities devoid of hierarchy and bureaucratic procedures need to be imagined. One option is for the Indian Armed Forces to identify such people and offer them honorary ranks. They can be employed to build and run military innovation facilities. These facilities can develop cutting-edge products that compete with those of DRDO, HAL, the private sector and international counterparts. Alternatively, these people can also create the necessary technical infrastructure with abundant government backing. Who else would know the deficiencies better than the ones who moved abroad for a lack of them? On the question of finance, a NASA study estimated the cost of constructing the Falcon 9 rocket using the traditional approach at 4 billion USD – SpaceX did it at just 390 million.¹² Thus, the issue is not money but ideas.

Morris Chang turned around the fate of the Taiwanese industry. Welcoming back Indians who went abroad is nothing new. Mahatma Gandhi returned to India after 21 years in South Africa and led India to freedom. It is the right time to roll out the Red Carpet. Any delay would result in a costly lost opportunity.

NOTES:

¹ Miller, Chris, Chip war: The fight for the world's most critical technology (Simon and Schuster, 2022), Pp 163-169.

² Ibid.

³ Goldman, Charles A., Krishna B. Kumar, and Ying Liu, "Education and the Asian Surge: A Comparison of the Education Systems in India and China. Occasional Paper," RAND Corporation, 2008.

⁴ Choudhury, Prithwiraj, Ina Ganguli, and Patrick Gaulé, "Top talent, elite colleges, and migration: Evidence from the Indian Institutes of Technology," Journal of Development Economics 164 (2023): 103120.

⁵ Desai, Mihir A. et al., "The fiscal impact of high-skilled emigration: Flows of Indians to the US," Journal of Development Economics 88.1 (2009): 32-44.

⁶ Jacobsen, Annie, Operation Paperclip: The secret intelligence program that brought Nazi scientists to America (Hachette UK, 2014), p. 575, <https://www.cia.gov/resources/csi/static/Review-Operation-Paperclip.pdf>. Accessed on November 13, 2024. [Quoted in Studies in Intelligence Vol 58, No. 3 (Extracts, September 2014)]

⁷ Manisha Mondal, "What happened when Nehru and a former Nazi Germany engineer built first & only India made operational combat jet," The Print, September 24, 2018, <https://theprint.in/defence/when-nehru-and-nazi-germany-engineer-built-first-india-made-operational-combat-fighter/123749/>. Accessed on November 20, 2024.

⁸ NASA Jet Propulsion Laboratory, "JPL Workforce Update," [https://www.jpl.nasa.gov/news/jpl-workforce-update -/](https://www.jpl.nasa.gov/news/jpl-workforce-update-/). Accessed on November 14, 2024.

⁹ Jason Wells, "NASA Jet Propulsion Laboratory lays off another 5 percent of workforce," MSN, <https://www.msn.com/en-us/news/technology/nasa-jet-propulsion-laboratory-lays-off-another-5-percent-of-workforce/ar-AA1tY2Ux>. Accessed on November 14, 2024.

¹⁰ Daniel Catchpole and Allison Lampert, "Boeing to lay off over 2,500 workers in US as part of sweeping cuts," Reuters, November 19, 2024, <https://www.reuters.com/business/aerospace-defense/boeing-lay-off-nearly-2200-workers-washington-state-warn-notice-shows-2024-11-18/>. Accessed on November 19, 2024.

¹¹ "Germany increases visa quota for skilled Indian workers to 90,000 from just 20,000 earlier," Hindustan Times, November 14, 2024, <https://www.hindustantimes.com/business/germany-increases-visa-quota-for-indian-skilled-workers-to-90-000-from-just-20-000-earlier-101729908834534.html>. Accessed on November 19, 2024.

¹² Zapata, Edgar, "An assessment of cost improvements in the NASA COTS-CRS program and implications for future NASA missions," AIAA Space 2017 Conference, No. KSC-E-DAA-TN44427, 2017.