Brief number 4: Talent management key to tech innovation
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Talent is critical to innovation. All corporations need to recognize that creativity and innovation are linked. Human capacity for innovation has been driven by a complex mix of biological and social factors, increased motivation, ideas we have taken from other people, failures we have learned from, and we stitch them together into new forms and come up with original ideas. Innovation is often response to new challenges or old problems that remain unsolved.

Faced with the daunting prospects of increasing Western sanctions and controls over patents and advanced machinery in the production of cutting-edge semiconductor chips, China began to innovate to overcome these obstacles. Chinese chip manufacturer Semiconductor Manufacturing International Corporation (SMIC), a foundry established to catch up on semiconductor manufacturing, developed new chip manufacturing capabilities to power the new Huawei Mate Pro 60 smartphone features. Huawei itself was subject to sanctions that banned it from using cutting edge smart chips and access to Western Android software. The new phone is a technological marvel that is powered by Chinese chip technology, the Kirin 9000s, which can boost 5G connectivity and make satellite calls. Many users celebrated the capability of Mate Pro 60, especially the chip inside, when Chinese foundries hold less than 2% of total wafer fabrication equipment market share[1]. Moreover, the Western and Japanese semiconductor manufacturers, especially Dutch manufacturer Advanced Semiconductor Materials Lithography Ltd (ASML) deny SMIC and Huawei access to extreme ultraviolet lithography (EUV) machines.

If we do things the way others have always been done, nothing changes. Mr. Liang Mong Song, a former Chief Technology Officer (CTO) from Taiwan Semiconductor Manufacturing Corporation (TSMC) who also worked in Samsung, and today a key innovation leader in SMIC, understood that it is possible to make powerful chips using older generation machines like deep ultraviolet lithography (DUV) machines by improving the software designs so that it can reach similar chip performance level as the Apple iPhone. Without the best machines and equipment, SMIC tweaked the older generation DUV machines by stacking 14 nm chips to get the equivalent of 7nm effectiveness.

The first mover always captures most of the market share. Within the first week of its product release, Mate Pro 60 garnered the highest sales of 800,000 unit over the previous Mate series[2]. China President Xi Jinping has called talent "the first resource" in the country's technological ambitions. This depends largely on high-end research and development (R&D), namely the quality and quantity of human talent in each company. As Huawei founder Ren Zhengfei explained, his strategic priorities draw lessons from United States history: "attract talent". More than half of Huawei's total workforce of just under 200,000 works in R&D. About 24,000 workers are recruited abroad, of which 6,000 are graduates from the world's 200 top ranked universities and 45% have a master's degree[3].

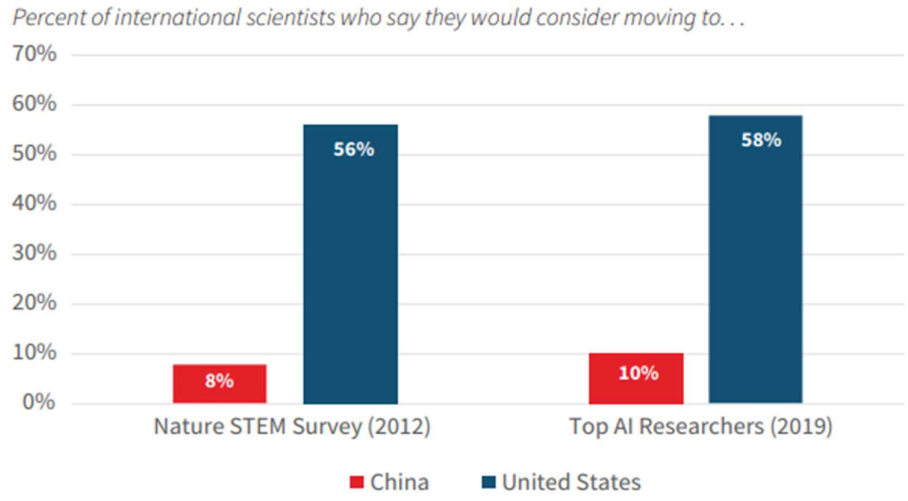
Firms, either large or small, are highly dependent upon knowledge systems. Consequently, universities have become the fundamental engines for converting a country's demographic assets into high-tech talent advantage through innovation clusters. In the United States, San Francisco Bay Area is the most successful cluster of high-tech firms which are also the location

[1] European Commission JRC Technical Report, Semiconductors in the EU
[2] https://www.gizmochina.com/2023/09/04/huawei-mate-60-pro-china-sales/
[3] https://www.timeshighereducation.com/hub/huawei/p/building-talent-ecosystem-growth-and-innovation

of the top universities. This is mirrored in China, specifically Beijing, Shanghai, and Shenzhen. Talent comes from the synergy between university and industry where rich beneficiaries from tech investments fund R&D in the top universities. University of California, Berkeley and Stanford are key recipients of Silicon Valley private investments, increasing the amount of solutions-based scientific research in alliance with industry. This phenomenon is also evident in China, with $441 billion invested in R&D in 2020 to groom local talent (technician, computer scientists, engineers) to spur innovation [source of information].

By 2019, China's domestic talent investment resulted in 50,000 science, technology, engineering, and mathematics (STEM) graduates compared to 34,000 in the United States. The quantity of human talent increased in tandem with the quality of Chinese education, especially at the PhD level. Between 2010 and 2020, 71 Chinese universities moved up the rankings from 23 to 71 in the top 500, whilst United States universities fell from 102 to 82. This indicates that the higher number of STEM PhD graduates suggest that research productivity has improved. However, the United States remains a far more attractive destination for international talent, less than 10% of top researchers indicate preference for moving to China compared to nearly 60% for the United States.

Figure 5: The United States is much more attractive to international scientists than China



Source: Richard Van Noorden, "Global Mobility: Science on the Move," *Nature*, October 17, 2012, https://www.nature.com/articles/490326a; and Remco Zwetsloot et al., "Skilled and Mobile: Survey Evidence of AI Researchers' Immigration Preferences," 2021 AAAI/ACM Conference on AI, Ethics, and Society, https://arxiv.org/abs/2104.07237.[15]

High-skilled talent is a key factor of success in today's knowledge economy. China is luring back home their own talents who have been studying and working in Silicon Valley and other technological hubs by paying attractive annual salaries as much as US$150,000 per annum[4]. As the current chip production tensions between United States and China escalates, the battle for international talent will intensify. This implies that all semiconductor and technology centers, like in Malaysia will face an imminent fierce talent competition across technology companies, especially those currently engaging in the semiconductor and AI field.

[4] Chatham House, China's new scientists

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