

AI Arms Race and Geopolitics of Semiconductors – Part One



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Generative AI is the rage nowadays. It has captured our imagination, and we can't seem to be able to pass a day without reading about how it will redefine our world. Companies that make chips that make Generative AI happen are the hottest things right now, led by Nvidia. If you woke-up from a Rip van Winkle sleep, you would be forgiven for believing that AI and robots have taken over the world. Look at some of the titles of books or reports or articles that have been published in the past year: Chip War, Four Battlegrounds, Gen AI and the Future of Innovation Power, Unleashing AI and AI Arms Race, Microchip Tech War etc. This article is part one of my journey to make sense of what Generative AI and associated Compute means for us. In this post, I start by

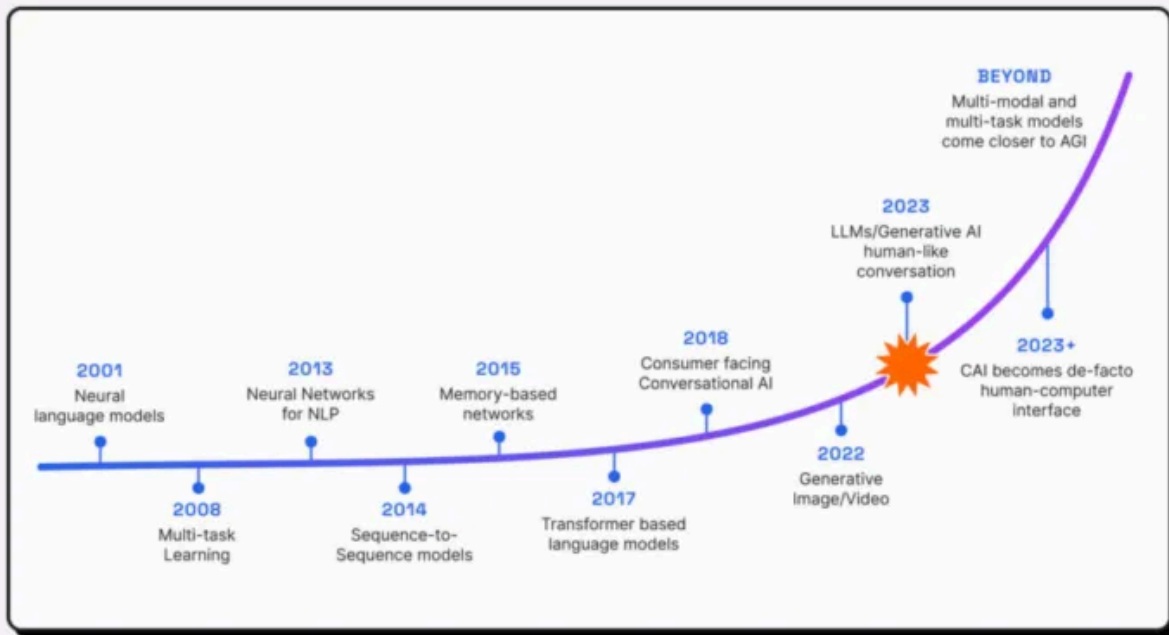
painting a broader picture and in the forthcoming posts, I will deep dive into specific aspects, which I highlight below.

There is no denying the fact that, Generative AI has the potential to redefine our world, be it work, business, war, or geopolitics. While the phrase Industrial Revolution 4.0 has been around for a few years and was thrown around loosely to garner attention, what we probably are witnessing is the real dawn of that era. Why am I saying this?

Ever since Chat GPT burst on the scene in November 2022, the progress has been exponential. We have seen the coming of GPT-4 and a number of other state-of-the-art models. The tech giants seem to be in a race to develop faster and better models and the rate of progress in Generative AI models in creating new content, be it text, images, code, audio, or video has been rapid. By using training models with billions of parameters and deploying advanced hardware and architectures and ever-increasing quantities of data, the latest models are becoming increasingly capable of producing realistic outputs.

We are at an inflection point! As I had pointed out in the article, [“Understanding Change – Second Half of the Chessboard”](#), we are bad at understanding exponential change and Gen AI is on an exponential growth path.

AI's exponential growth: The Foundation Model inflection point



Are we seeing the first steps towards the evolution of Artificial general Intelligence? Well, that is a loaded question, and I am not sure if anyone can answer it with any conviction. But if history has any pointers, it was very well articulated by two people who know the subject and domain, Blaise Agüera y Arcas of Google research and Peter Norvig of Stanford:

- “Artificial General Intelligence (AGI) means many different things to different people, but the most important parts of it have already been achieved by the current generation of advanced AI large language models such as ChatGPT, Bard, LLaMA and Claude.
- Nevertheless, today’s frontier models perform competently even on novel tasks they were not trained for, crossing a threshold that previous generations of AI and supervised deep learning systems never managed. Decades from now, they will be recognized as the first true examples of AGI, just as the 1945 ENIAC is now recognized as the first true general-purpose electronic computer.”

While most of the mainstream news seems to be about Gen AI and its impact on jobs, organizations, and businesses, what is more interesting and of critical importance is how countries around the globe are reacting to developments in the broader AI space.

Generative AI – Future of Power and Innovation

In the past two and a half centuries, there have been three technology inflection points that changed society, but have also propelled countries at the forefront of those technologies towards greater power, prosperity, and plenty: Steam Engine, Electricity and Computing. These previous game changing innovations drove economic prosperity, changed social and economic structures, and shifted the international balance of power. On similar lines, the current AI boom invites a geopolitical question with profound implications: who will benefit and how? We are already seeing the beginnings of a transformation as AI changes our understanding of knowledge and services. It has already started featuring in the strategic plans of militaries around the world and will change warfare. It will have a huge impact on the cyber world through engineering of cyber-attacks and cyber defence and crucially, it will lead to a world of large-scale social disinformation.

Any serious observer of global affairs can see this already happening in how countries are reacting to it. There is a scramble or to rekindle history, a new game great game to develop and deploy AI and take the crucial lead in geostrategic competition. Countries are competing to secure the economic, political, and military advantages of AI in an increasingly fragmented and polarized geopolitical environment.

The USA and China competition and standoff in matters of Semiconductors and AI related matters garners the attention today, be it the US Chips Act or China's regulations on Generative AI. While leadership in semiconductors and AI has become the new frontier in the US-Chian struggle, its not just a two-way race or even three-way if we include EU, which seems to have woken up to the challenges, though more as a regulator. Diverse countries like, UK, Canada, France, Singapore, India, South Korea, and Israel have ambitions to become significant AI players. Not to be left behind, Russia also aims to be at the forefront of AI influence. Countries have started implementing strategies to bridge the gap by developing sovereign large language models (LLMs), funding companies that would become national champions, creating AI hubs,

improving their digital infrastructure, and strategically protecting and using data. This was highlighted by Lazard in a recent report.

Countries beyond the US and China Are Investing in and Attempting to Regulate AI		
Country	National AI Strategy	Select Government Funding Initiatives for AI
Canada	✓	Pan-Canadian Artificial Intelligence Strategy (\$93mn)
France	✓	AI for Humanity (\$1.6bn); IA-Clusters (\$523mn)
Germany	✓	Federal Artificial Intelligence Strategy (\$3.2bn)
India	✓	National Strategy for AI (\$944mn)
Israel	✓	N/A
Japan	✓	Included in New Energy and Industrial Technology Development Organization Fund (\$875mn)
Russia	✓	National Strategy for AI Development (\$6.1bn)
Singapore	✓	Included in Services and Digital Economy Program (\$366mn)
South Korea	✓	Artificial Intelligence R&D Strategy (\$1.95bn)
United Arab Emirates	✓	G42 Expansion Fund (\$10bn)
UK	✓	AI Sector Deal (\$1.2bn)

Future Battlegrounds

While it is anybody's guess on how the technical advancements in Generative AI and the associated Geostrategic competition will play out in the future, there is definite clarity on the domains they will payout.

- Advanced Semiconductors.** A significant arena in the quest for dominance will be a country's capability in advanced semiconductors and they will be at the forefront of geopolitics in the coming decade. This will be akin to geopolitics of oil in the twentieth century, where sufficiency and dependency defined their world view. To put it mildly – AI is about compute stupid! This will involve Graphics Processing Units (GPU) and other Application Specific Integrated Circuits (ASIC) with specific custom designs to handle AI workloads. This brings into play, two important factors: Access and Availability. Considering the fragmented and global nature of semiconductor value chain, no one country or company can produce the required chips. Geopolitics of semiconductor value chains will be an issue of great importance.

- **Data.** Large data sets are another key ingredient of generative AI. Data can be either proprietary or open source. The questions that will define the future would be: What kinds of data? How to use the data? Where and how can we get the data? While an LLM like Chat GPT was trained on a number of open-source repositories of text scraped from Wikipedia and other sources, as applications become customized and custom LLM's become more common, getting access to data and the regulations surrounding it will play a significant role in defining strategies.
- **Talent:** Be it the LLMs behind Generative AI or the advanced semiconductors being designed for specific purposes, they are being built by people. Human talent is needed to design and implement AI technology, not only today, but it will be crucial in the future to unlock the next generation of advancements. Talent will prove to be a major source of advantage for countries, and we should expect to see competition for talent as a potential differentiator for achieving the edge in national AI power. Currently the United States, Europe, and China all have robust AI research and the US leads in quality and China is the fastest growing in both quantity and quality. Expect other countries to make this a priority and not only develop talent internally, but also attract talent from elsewhere.
- **Regulation:** For the past few years, we have already seen concerns being raised and in some cases a backlash in many countries against the influence and power of big-tech and platforms, and about privacy, fairness, and safety of AI systems. So far, the regulatory impact has been country specific, but as geostrategic competition intensifies, we should expect to see an emergence of distinct commercial and regulatory AI ecosystems. For the foreseeable future, US, China, and EU will stay at the forefront of regulation and will lead the efforts to create an ecosystem favourable to their objectives and goals. Other countries will align with different blocks to ensure their access to critical inputs. What we might see evolving is a patchwork of competing regulatory frameworks.

What is in the coming posts?

The next two posts will be about:

- Geopolitics of Semiconductor Value chain.

- Importance of Compute, AI Chips, and associated issues.

At this point, I have not figured out what will follow. While I have been tuned into the happenings and the contentious nature of the semiconductor industry over the past few years and have followed the developments, to be honest, I completely avoided the hype and news around Generative AI. I was just weary of it being another one of those hype cycles, having seen so many in the past three decades.

But it was a simple question: Is Gen AI really revolutionary and what does it mean for the companies in my investment portfolio? which made me dig deeper and enter the proverbial rabbit hole on this subject. I have no idea, where this ends, but I am sure given the nature of it, I will definitely write about data and regulations, which I think go hand in hand.

I understand the importance of Talent for this whole thing but having spent more than two decades in that space in the IT industry, there is huge amount of fatigue coupled with biases and strongly held opinions that I have to overcome to be able to write about it. I might overcome the fatigue part at least and might just bite the bullet 😊

Till the next article then



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