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The Role of Emerging Technologies: Battle for Digital Supremacy

***S. M. Azharul Islam**

Introduction

The emerging technologies in the form of the Internet of Things (IoT), Fifth Generation (5G) mobile network, Artificial Intelligence (AI), Blockchain, Robotics, Biometrics, Three-dimensional (3D) Printing, among others, are crucial in terms of transforming our world. The IoT refers to the process of interconnection via the internet of computing devices embedded in everyday objects, and this will be a competing platform for the tech giants. 5G is supposed to deliver the highest internet speeds, which will largely influence the battle for digital supremacy. AI has helped to execute human tasks, and it will challenge the status quo. Blockchain refers to a system where a record of transactions can be made in cryptocurrency and maintained across numerous computers. Blockchain has been a hypercompetitive factor in terms of achieving technological prowess. Robotics is concerned with the design, construction, operation and application of robots. The robotics industry is linked with advanced scientific research, and it will determine the world leader in technological innovation. Biometrics refers to the usage of statistical analysis to biological data, and it has already been in use to maintain airport security. 3D Printing has the ability to create 3D objects, which may provide a strategic advantage in scenarios concerned with warfare. Such groundbreaking technologies pave the way for the next big thing, and this commentary will assess how they would play a critical role in determining the front runner in the global spectrum.

The Battle for Artificial Intelligence (AI) Supremacy

Let us first assess the narrative concerned with Artificial Intelligence (AI). Figure 1 shows a glimpse of how the battle for Internet of Things (IoT) supremacy will surface in the real world. AI is a rare technology that has extensive scopes of innovation for several nations of the earth. There is even an inner battle for certain countries of the world in order to win this AI competition. Various factors such as Research & Development (R & R&D), raw materials like silicon, and human beings' ability to learn are essential for further advancements in this sphere. The narratives concerned with this race carry the utmost importance in acquiring a strategic advantage. For instance, China-based companies are making a wide range of investments in the AI sector of nations such as the USA, UK, Canada, Australia, New Zealand, UK and others. China has a total AI market equivalent to approximately US$ 10.8 billion as of 2020, and the

investment is geographically diversified. There is a considerable level of investment in the following sectors: semiconductor, telecom equipment and consumer electronics industries. Nowadays, the standard frameworks of leadership do not provide a competitive edge anymore.

The universities are also working hard to produce the latest publications in the field of AI. During 2015-2021, Tsinghua University located in Beijing has published the most number of papers concerned with AI while the Carnegie Mellon University of Pennsylvania holds the second spot. This does not denote Tsinghua University has done a better job in terms of quality as it is challenging to evaluate the commercial application of such papers. Furthermore, the number of citations depends on the following factors: the resources in use, the native language, and their worldwide contacts. On account of such factors, the American papers usually receive approximately 40% more citations. The Chinese papers receive approximately 20% fewer citations, while the European papers receive about 10% more citations. Hence, it is intriguing to see which nations will play a dominant role in this sector in the distant future.

The Battle for Robotics Supremacy

Robots can perform human tasks at a more effective rate. It can replace human beings at the workplace. In addition, robots also can perform as lethal autonomous weapons. At least six nations, namely, USA, United Kingdom (UK), China, Israel, Russia, and South Korea, are developing fully autonomous weapons. Approximately 44 nations have already expressed their ambitions to create fully autonomous weapons. Killer robots can be a lethal weapon in warfare, although there are a lot of crucial concerns. It is still not clear how human control can be exerted on the killer robots. There are further concerns about who will be held accountable for the killer robot's actions. USA, UK, Israel and several other nations are already using lethal autonomous weapons. For example, drones and missiles can attack the target without any human involvement. Figure 1 illustrates the rising trend between 2015 and 2019. The total investment was $ 71 billion in 2015, and it increased to $ 83 billion in 2016. It rose to $ 98 billion in 2017, which further increased to $ 115 billion in 2018. The amount of global investment has further increased by approximately 17.39% in 2019. Hence, the rising trend in robotics is concerned with the battle for digital supremacy.

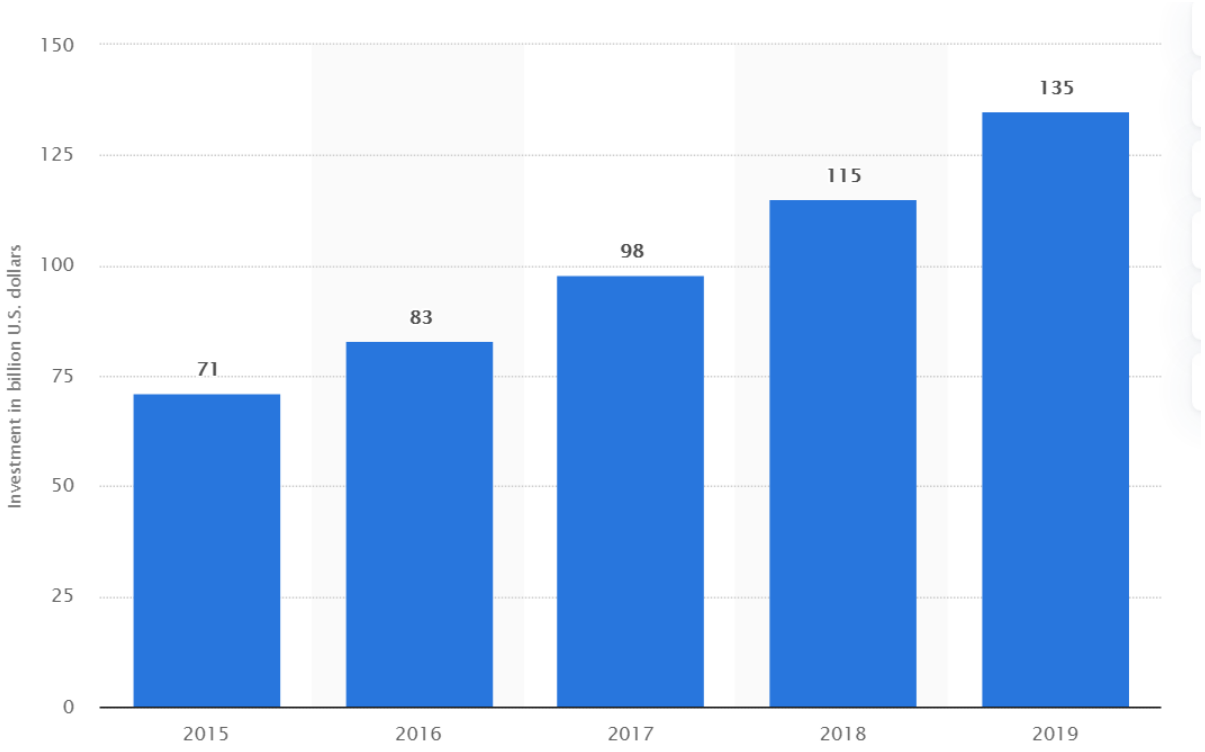

Figure 1: Global Annual Investment in Robotics (Source: Statista)

The Battle for Fifth Generation (5G) Supremacy

5G is the latest cellular network, and it can deliver the highest speeds with improved reliability. Moreover, there is a vast network capacity. 5G will produce a total economic output equivalent to $ 13.1 trillion. It will further add 22.8 million jobs generating employment in the economy. 5G will revolutionize the following key areas: enhanced mobile broadband, mission-critical communications and massive IoT. The total net worth of the 5G market will be $8 trillion by 2030. China is already leading the race of 5G by installing 1 million 5G base stations, while the USA was able to install only 20,000 as of December 2020. If China becomes the superior entity in this sector, there might be a shift in the world order. The Huawei case also accounts for the new US-China cold war over 5G. European nations are lagging far behind in terms of 5G tower stations. Interestingly, at least 60% of Huwaei's contracts are based in the European nations. Figure 3 shows how one-third of the 5G connections hail from China. Therefore, China is likely to lead the way in this endeavour.

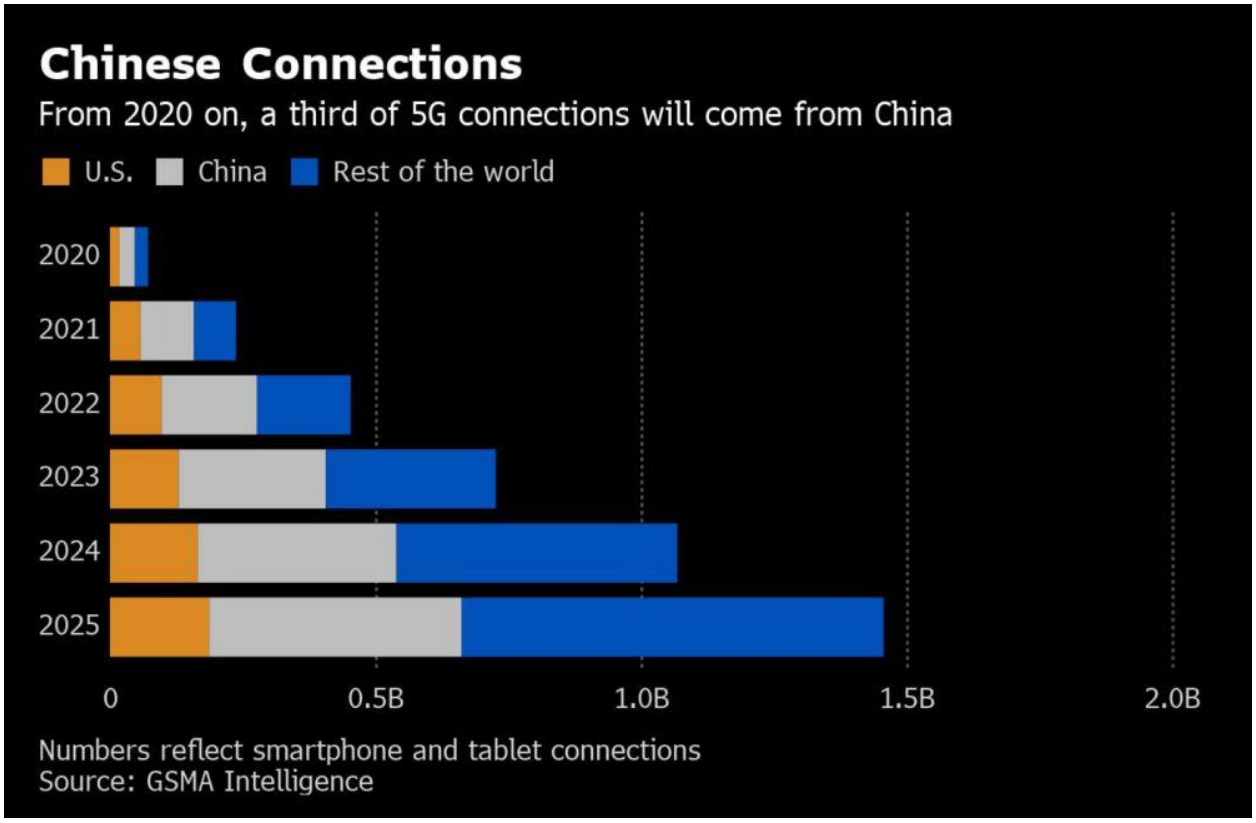

Figure 2: Chinese Connections in the 5G World (Source: Global System for Mobile Communications Intelligence)

The Battle for Internet of Things (IoT) Supremacy

Figure 3: Battle for Internet of Things (IoT) Supremacy (Source: Meemoori Research AB)

There is an ongoing battle among nations as well as companies in order to achieve supremacy in the sector concerned with the Internet of Things (IoT). IoT has always been a game-changer, and the same has been prevalent in terms of fighting COVID-19. According to a study based at the Massachusetts Institute of Technology (MIT), IoT has the capacity to monitor high-risk patients through sensors, and it will be instrumental in reducing the infectious spread of COVID-19. IoT has significantly contributed to the industrial revolution. Half of the IoT solutions are expected to be introduced by start-up companies. The total net worth of IoT enabled devices is forecasted to hit 25 billion as of 2020. Now the number of human beings has been outweighed by the number of connected devices. The number of connected devices is twice in number than the whole of

humanity. IoT does not have a common connectivity language irrespective of the device; hence the wireless technologies such as Wi-Fi, Bluetooth, cellular and radiofrequency are on the verge of competition, leaving a convoluted communication landscape. The top ten players in the current IoT market belong to the United States of America (USA) and Germany. The total net worth of the market was $250.72 billion as of 2019, and it is expected to become $1,463.19 billion by 2027. From the perspective of Asia Pacific, India has generated a large portion of the total $98.86 billion revenue as of 2019. Therefore, nations all over the globe will vie for achieving international competitiveness in the IoT arena.

The Battle for Semiconductor Supremacy

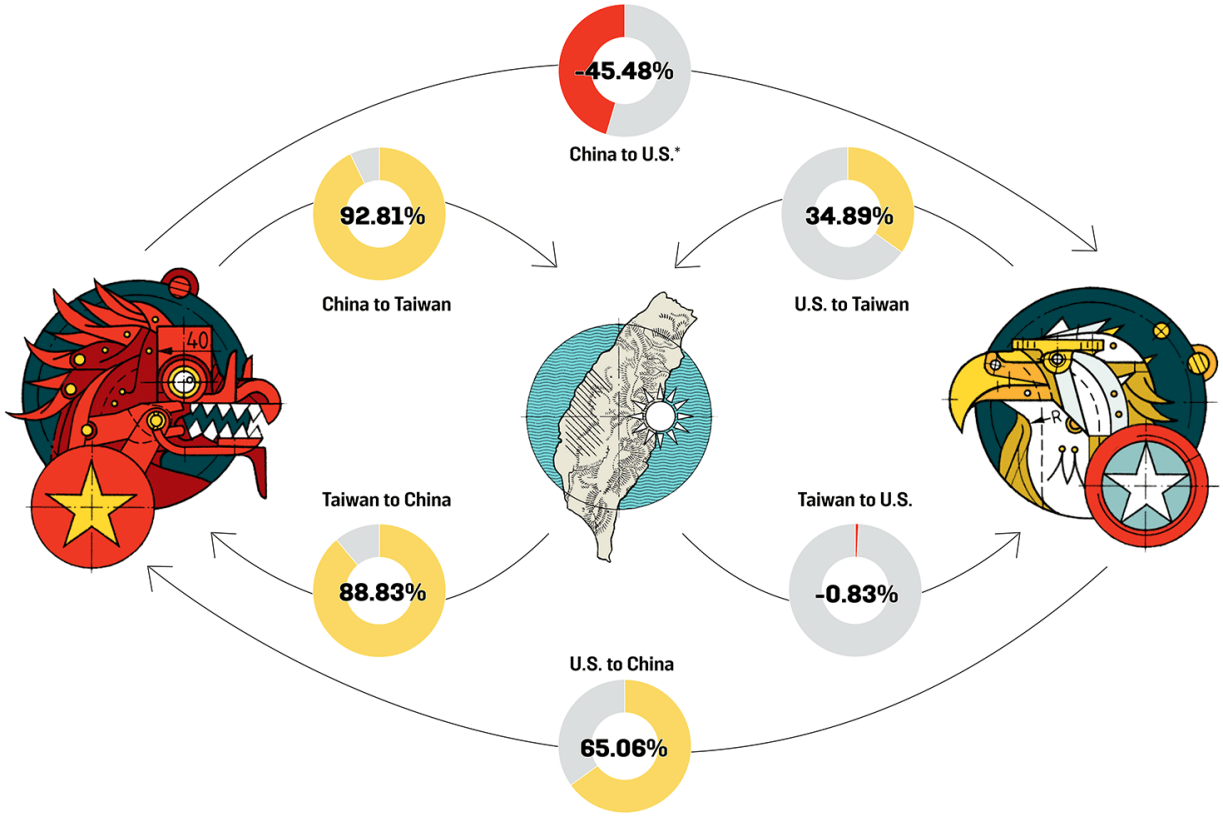

Figure 4: Semiconductors and the U.S.-China Innovation Race (Source: Foreign Policy)

The semiconductor industry has become the epicentre of technological innovation. Figure 2 depicts how the USA and China are involved in this competition, where the involvement of Taiwan is a notable factor. It poses numerous implications for the future of the global economy.

It is beyond imagination that nano-semiconductors which are even thinner than a small strand of human hair, can impact the net worth of the total economy. The demand for chips is soaring as it is present in all forms of devices such as personal computers, mobile phones, cars, data centre servers, gaming consoles and others. The semiconductor chips have also influenced the geo-political aspects concerned with the USA and China. Semiconductors in America Coalition (SIAC) involve 64 global semiconductor companies complying with the "American First" principle, which has repercussions for the world. This is because the prices of semiconductors made in America will not cost less compared to the prices when they are made globalized industrial supply chain system. Furthermore, Washington has been vocal about cutting off the supply of chips for the Chinese tech giant Huawei, functioning in the USA. This has been done to increase the production of chips made in America. The USA maintains the largest market share in the semiconductor industry, equivalent to 48% of the total revenue. Over recent times, the Chinese government has provided subsidies equivalent to $50 billion to the chip producers based in China to enhance their semiconductor production and exports. Hence, the contest for semiconductor supremacy will be vital in terms of achieving digital superiority.

The Battle for Blockchain Supremacy

Figure 5: The Battle for Bitcoin Mining Supremacy (Source: Wall Street Journal)

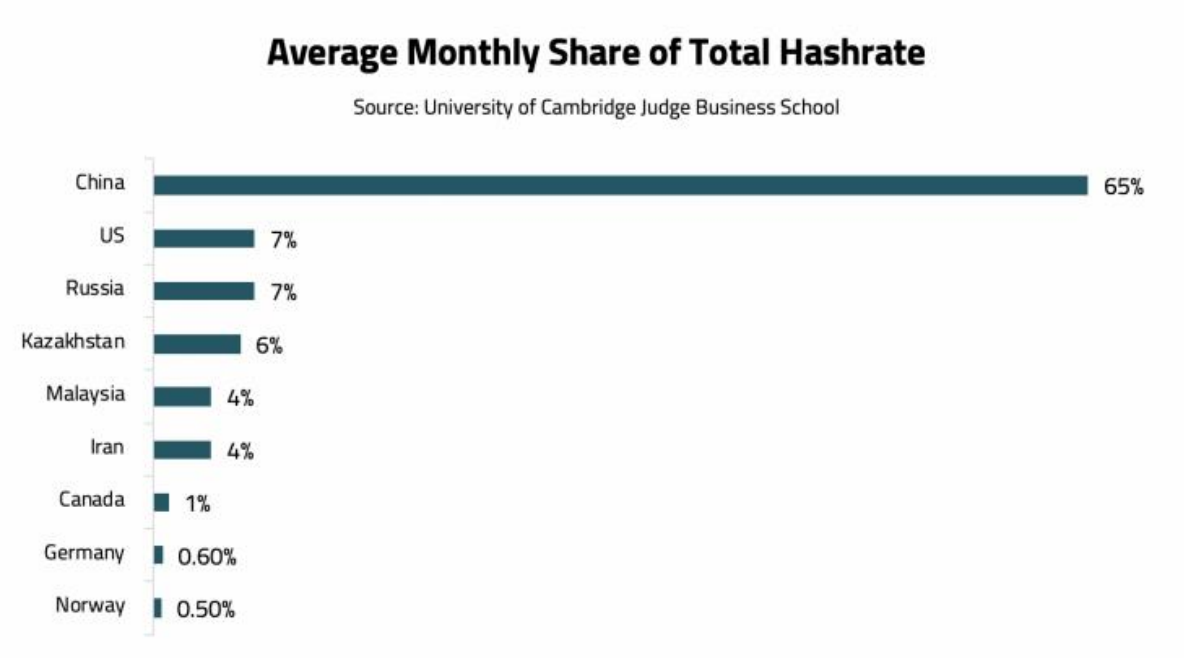

Figure 6: Average Monthly Share of Total Hashrate (Source: University of Cambridge Judge Business School)

Blockchain technology has a wide range of critical functions such as executing smart contracts, maintaining a transparent records system, supply chain audits, maintaining a decentralized digital currency, and providing insurance shreds of evidence. In order to understand the battle for blockchain supremacy, there is a need to delve deep into the aspect of Bitcoin as the application of blockchain technology was first implemented in this sector. As Figure 3 portrays, the largest share of the bitcoin world lies with China, followed by small shares held by the USA and Russia, respectively. As of 2020, China controlled at least 80% of the global processing power for Bitcoins. Furthermore, 65% of the mining concerned with cryptocurrency happens in China. China is also opting for digital currencies through the blockchain revolution as the Chine central bank has filed for at least 80 patents regarding its digital currencies. Figure 4 also illustrates the Chinese dominance in the average monthly share of total Hashrate, equal to 65%. In simple terms, Hashrate is the computational power that determines the mining speed. The USA and Russia have an average monthly share equivalent to 7%, while Kazakhstan has 6%. Malaysia and Iran jointly hold the fifth position in this regard equal to 4%. Hence, China has a competitive edge in applying blockchain technology in the sector concerned with cryptocurrency.

Conclusion

The emerging technologies will impact the future economic models, and they have the ability to influence the world order. The major impact of technology on the international world order will

depend on these two factors: the cosmopolitan trait of communication and the reluctance of the nations to adopt the latest technological means. The nations acquiring technological prowess will have a strategic advantage in the geo-political sphere. Hence, all the world countries will compete with each other to come out as victors in the battle for digital supremacy.

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**S. M. Azharul Islam is currently working as a Research Assistant at the Bangladesh Institute of Peace and Security Studies.*

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