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What Does the Smarter Future Entail? 5G Technology: its Application, Limit, and Future

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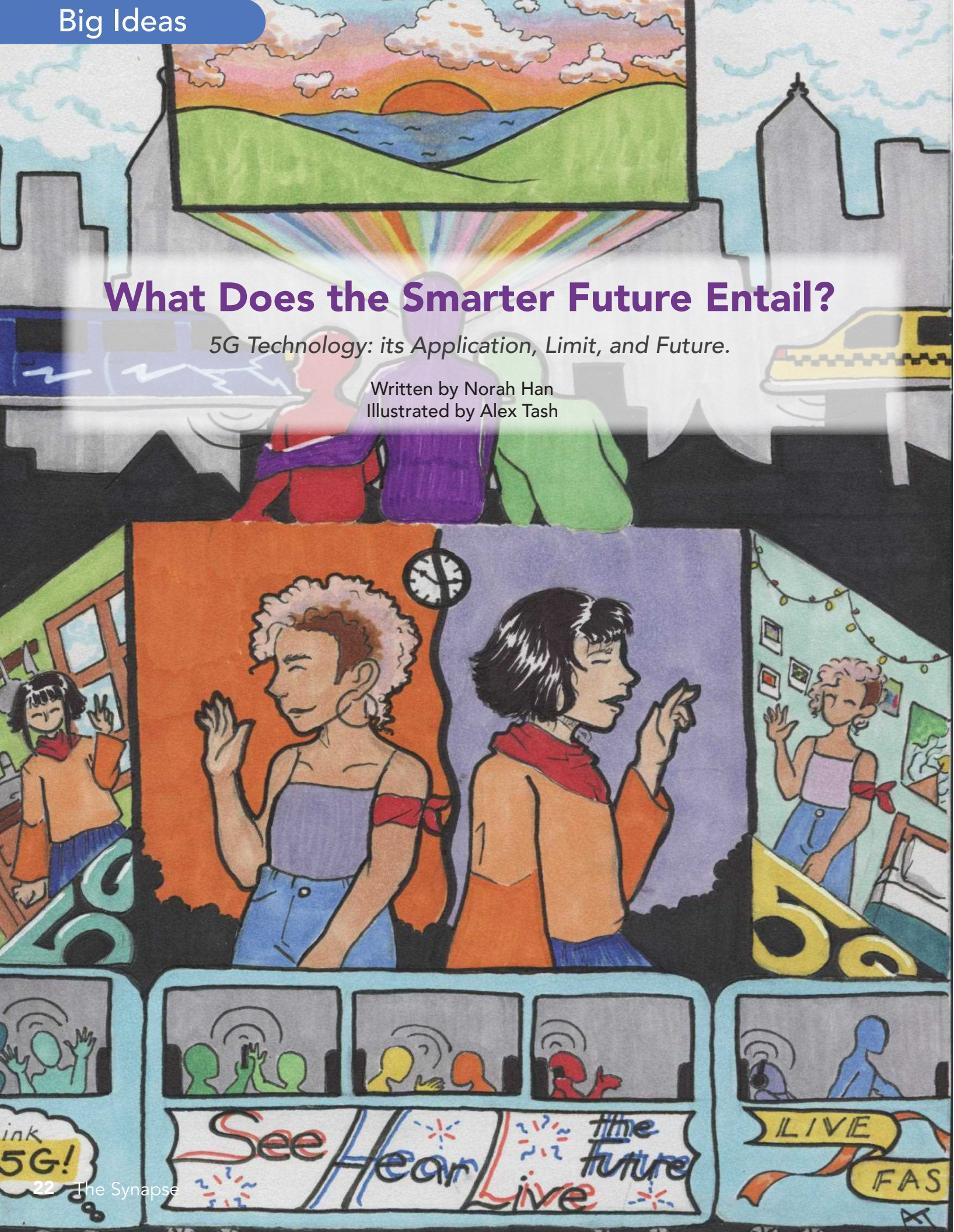

What Does the Smarter Future Entail?

5G Technology: its Application, Limit, and Future.

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Have you ever wanted Tony Stark's Jarvis robot? Or dreamt of sipping your morning latte while downloading an HD movie in seconds, all from a self-driving car? That's the magic of 5G, the fifth generation of wireless technology. One of the fastest technological inventions in the world, 5G promises quicker downloads, outstanding network reliability, and an immense influence on how people live, travel, and communicate. We are going to explore the infinite possibilities behind 5G: how it propagates the development of Internet of Things, enables true high-resolution video streaming without any latency, and makes the dream of immersing ourselves in an augmented reality world come true.

Before 5G, there were four generations of mobile network. The first generation (1G) had a limited bandwidth of 2.4 Kbps and only supported voice calls. Next there was 2G, which enabled SMS and picture messages, and had a maximum speed of 50 Kbps. Then 3G, first introduced in 1998, made video calling and other mobile functions come true. Finally, the 4G network was developed. Not only did 4G have the features of 3G, but it also enabled gaming services, HD TV, and video conferencing by providing a max speed of 100 Mbps.

You might ask, "Then how big is this leap in data transmission?" Launching 5G is like constructing an airport in a metropolitan area. Not only does it ameliorate the problem of data transmission latency (total time the data requires to be transferred from one device to another), but it also opens the gateway to new technological advancement such as Internet of Things (IoT) and improved Augmented Reality (AR) experience.

IoT technology will bloom along with 5G. IoT, in brief, is a system that connects computing devices embedded in everyday objects that send back data instantaneously. We will see a significant change in our lives – more than 75 billion devices connected wirelessly before 2025. Take the self-driving car as an example. Multiple sensors installed on the car, around the city, and on your phone will be able to form an invisible, sensitive, and self-operational system that makes features such as automatic parking and wireless charging (for electric cars) come true. To enable the operation of such large-scale systems, the transmission of data takes up energy as well as time. By providing higher speed connectivity, however, 5G resolves this problem. It becomes possible for these intelligent cars to constantly collect multiple types of data. Therefore, the algorithms that operate autonomously keep track of the car's traits and provide suggestions to future designs.

> If we compare our mobile phones to cars driving on an increasingly crammed highway, then 5G technology is the newest solution to the traffic jam.

Though Augmented Reality (AR) is already a prominent part of today's society, its future development relies heavily on the capacity of data transformation. Do not confuse AR with VR. Virtual Reality (VR) seeks to create a new digital world within our current reality, while AR aims to embed virtual components in the real world. However, in order to knit the real world tightly with the internet, data must be transferred between both sides instantaneously. This restrainment "spell" is broken by 5G. According to ABI research, 5G has "10X increase in throughput, 10X decrease in latency, and 100X increase in traffic capacity." AR will become more accessible to the public. For instance, smart cities is one of the novel ideas that might be applied to real life via 5G. The mechanism behind smart cities is to synthesize large amounts of data collected by sensors in city infrastructures, then stream them to multiple intelligent systems. These systems are able to "talk" to each other, therefore enabling instant, effective response to the management of traffic systems, water supplies, libraries, schools, and other services.

The birth of 5G technology brings a promising future, however, there are three major limitations that should be taken into consideration. Firstly, the cost makes it less practical. Due to the signal's frequency, wavelength, and latency, a 2G cellular base station has a coverage of seven kilometers, a 4G base station covers one kilometer, and a 5G station's range is only 300 meters. Therefore, if countries and companies desire to make 5G more accessible by constructing more base stations, the expenditure will escalate. Another concern is that the power consumption of a 5G base station is "Three times that of its 4G LTE predecessor," according to Zhengmao Li, the Employee Value Proposition at China Mobile. Moreover, for the applicability of 5G, there is still room for improvement. Before IoT and AR are popularized, the influence of 5G on the individual customer is limited.

5G is not merely a technological advancement. Its economical and political influence on countries and private firms should not be overlooked. Most of the developed and developing countries' growth is heavily reliant on technology. However, 5G can be a double-edged sword. Like all the other innovations, it is a key factor that triggers new businesses and promotes international trade. The country or company that leads the world in the adoption of 5G technology will have a distinct technological, economic, and security advantage. According to the United Nations' report on "Leveraging Technology and Trade for Economic Development", Netflix is "reported to be one of the most valuable media companies in the world, with a market value of $152.6 billion on 24 May 2018, and the company revealed that its current membership level was 125 million subscribers at the end of first quarter of 2018." On the other hand, the gap between leading countries and the rest might be widened. Therefore, it will be even more challenging for some countries to achieve economic growth. For them, foreign technology might mean not being provided with complete information or up-to-date technology. Therefore, a country's capability to innovate independently is crucial to its leadership in international technology.

As more people are connected to each other through the Internet, our world has become more globalized than ever before. Inevitably, countries will have to become allies with each other in order to sustain a positive and mutually beneficial relationship. In my opinion, instead of turning the research of 5G into an invisible war, both countries and their people might be better off if they are open to sharing. • • •