EdUHK Corpus-based ELT Lesson Design Competition

From a Topic to an Essay

-How to develop a topic

Bio Data

- **Competition No.: CH17**
- **Author: Chen Cong**
- **Affiliation: Information Engineering University**

Lesson Introduction

- **Target Students: 1st-year postgraduates majoring in science**
- **Corpus Used: AntConc (3.5.7Version)，WordItOut**
- **Lesson Duration: 90minutes**
- **Lesson Material: The Race for 5G: Why China Wants to Lead Next Generation Wireless Internet (Material attached)**

Learning Objectives

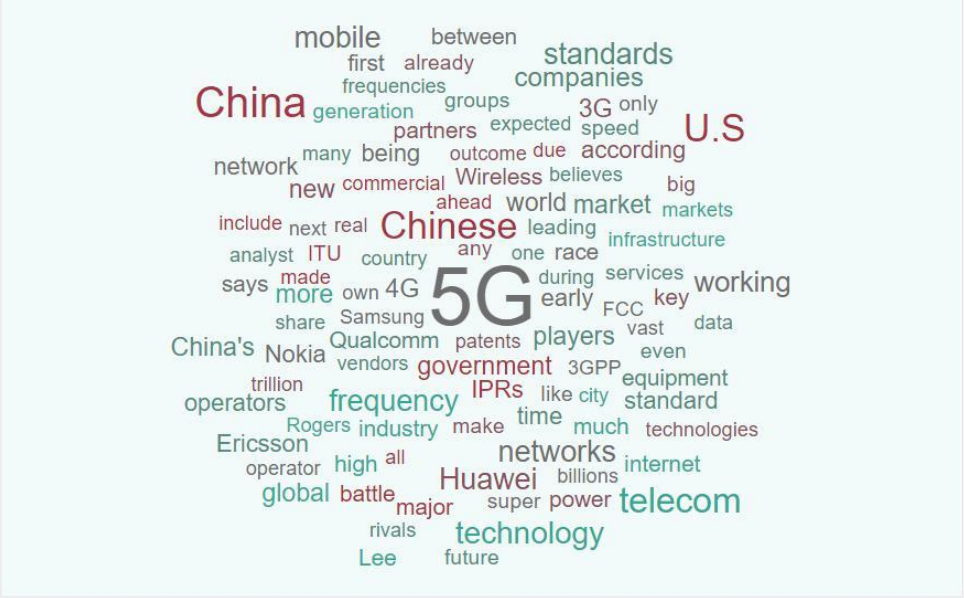
- **To extend a topic into a thesis statement**
- **To start an essay by providing familiar information and arguing about the topic's prominence**
- **To use "division & classification" to develop a topic**
- **To apply the recommended nine topic development strategies into text analysis**

Lesson Procedure

Step1: Start from a topic and extend it into a thesis statement (10mins)

- Pose one question: Could you figure out the topic from the title "*The Race for 5G: Why China Wants to Lead Next Generation Wireless Internet"*

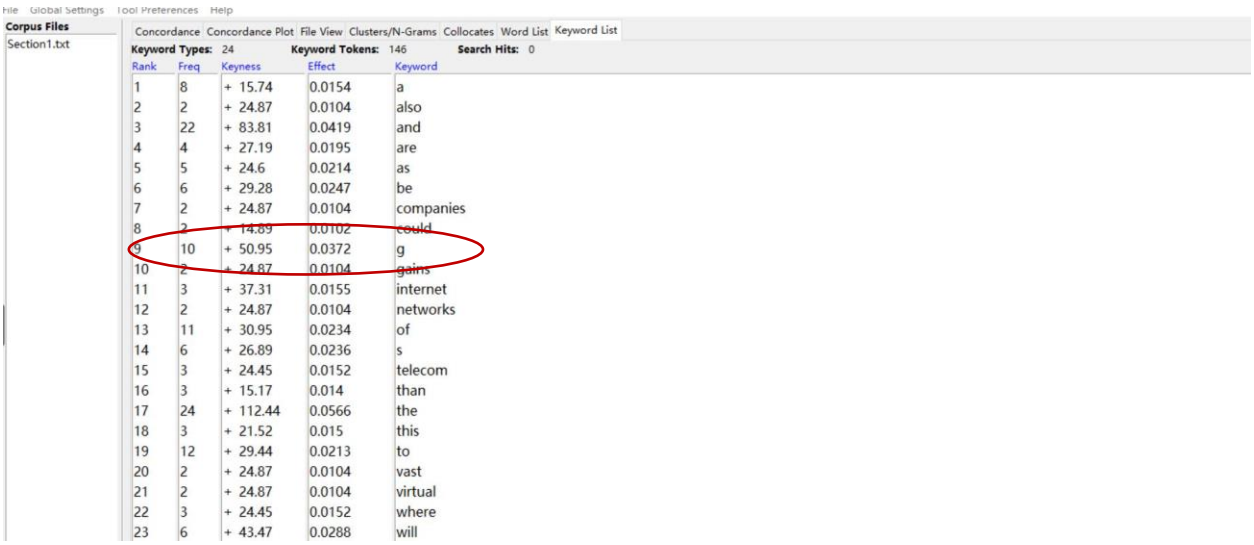
  (Answer: the Race for 5G)
- Check students' answer by showing the picture generated by the software WordItOut



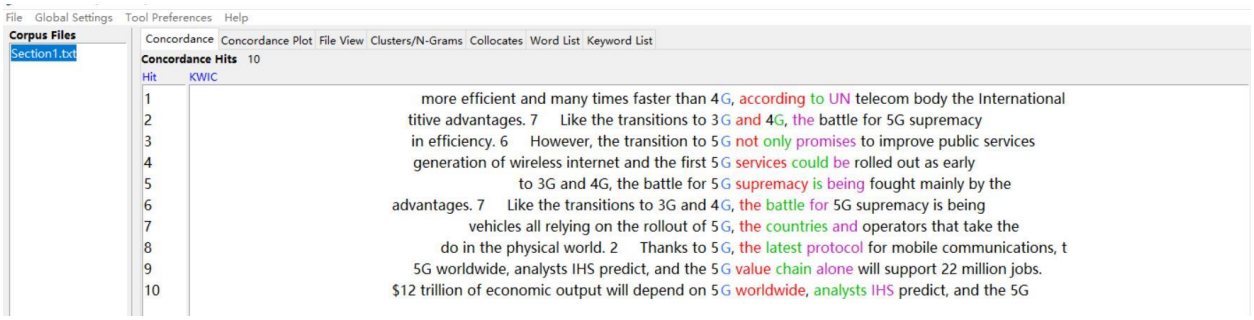
- Guide students to find out the most frequently used words: 5G, China/Chinese and U.S, which testifies the previous assumption based on the title
- Instruct students to observe the title once again and find out the author's argument
  (Answer: Why China Wants to Lead Next Generation Wireless Internet)
- Clarify two terms: topic and thesis statement
  Topic: a neutral word or a phrase (e.g. *The Race for 5G*)
  Thesis statement: a sentence that can best represent authors' opinions or attitude (e.g. The author's opinion: China wants to lead next generation wireless internet for a lot of reasons narrated by a question "*Why China Wants to Lead Next Generation Wireless Internet"*)
  Take-home Message No. 1: Establish the thesis statement of an essay by extending a topic into an opinion-laden sentence

Step 2: kick start an essay by providing familiar information and arguing about the topic's prominence (25min)

- Pose one question: if you are given a prompt "*The Race for 5G: Why China Wants to Lead Next Generation Wireless Internet"*, how will you start your essay?
- Ask for students' answers and compare different versions
- Observe the keyword list generated by AntConc
  (Note: Target Corpus-the 1st 7 paragraphs of the essay; Reference Corpus- BrownCorpus)

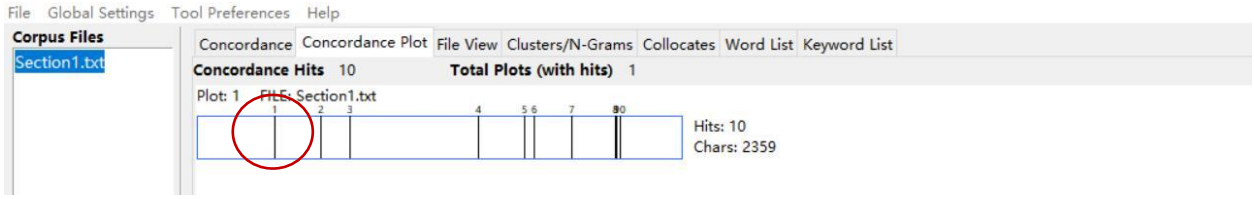


- Click the 9th term "g", and show students the concordance and concordance plot results.



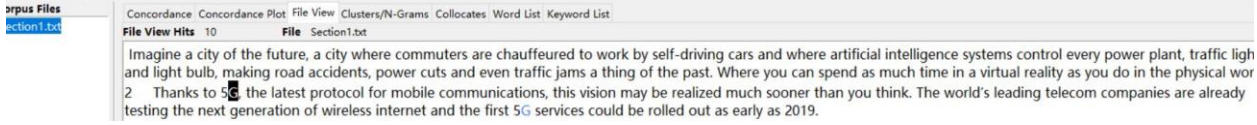
(Click the "Concordance" button)

- Explain to students the "Concordance Plot" means the positions the letter "G" appears in the first section and results demonstrate that the 1st appearance of G-related words does not show in the very beginning. Rather it appears late (Shown in the following picture)



(Click "Concordance Plot" button)

- Pose one question: what does the author do before introducing the keyword "5G"?
- Put the pointer in the first bar (shown in the red circle of the above picture) and get the following result.

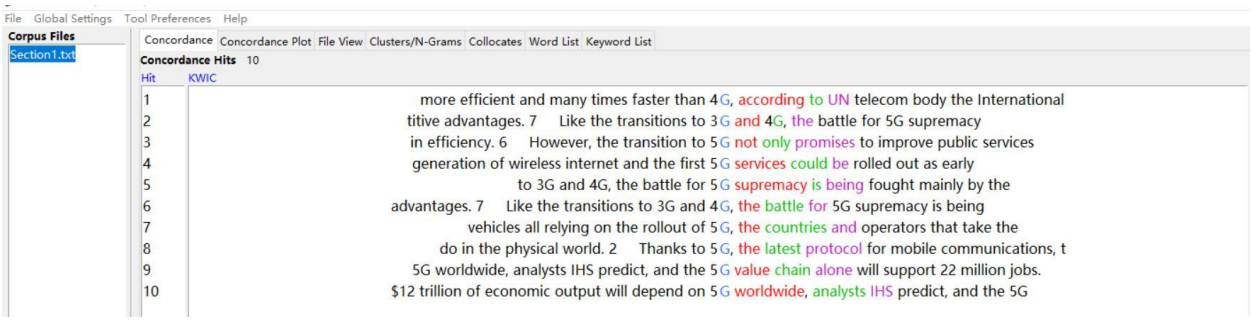


- Read the sentence before the first "5G" and analyze what preparation work the author did.

(Answer: the author pictures the future city with details like commuters, power plant, traffic lights and light bulbs)

- **Take-home Message No.2**: To entice readers, introduce specific and familiar information before the topic instead of referring to it head on.
- Ask students to analyze sentences containing "G" in the following picture and find out what aspects of 5G are elaborated.

  (Answer: 5G services, comparison with 3G and 4G, benefits of 5G)



- Pose two questions**:** Why does the author compare 3G, 4G with 5G and why does the author talk about the benefits of 5G?

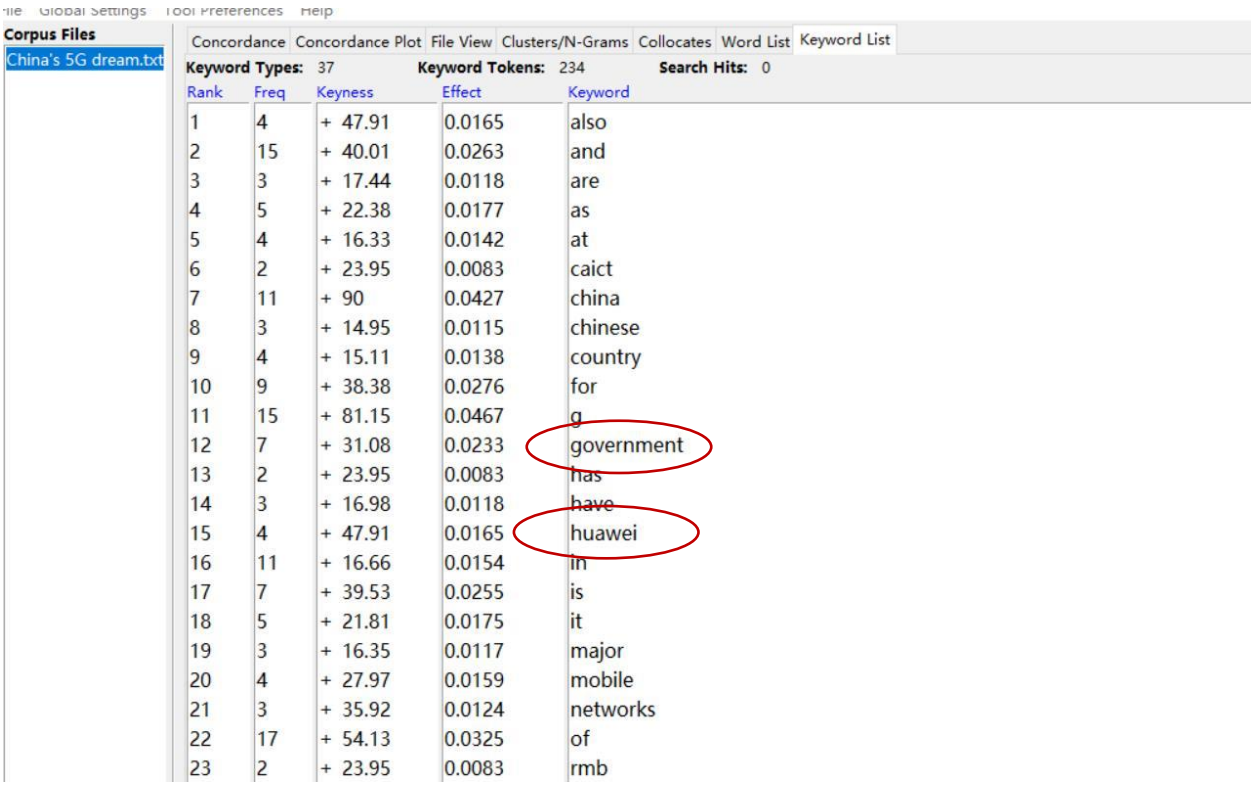
  (Answer: To show 5G is a valuable topic and worth a discussion)
- **Take-home Message No.3:** Emphasize the prominence of a topic before showing stances

Step 3: Introduce one topic development technique: division and classification （25min）

- Divide students into 4 groups and ask them to discuss the following question:

  How to develop the body part of an essay based on the prompt "how does China achieve its 5G dream?"

  (Note: each group provides one strategy and writes down three subpoints)
- Show the key word list in Section 2 (seen in the following picture)



Corpus Files: China's 5G dream.txt

Concordance | Concordance Plot | File View | Clusters/N-Grams | Collocates | Word List | Keyword List

Keyword Types: 37 **Keyword Tokens:** 234 **Search Hits:** 0

Rank	Freq	Keyness	Effect	Keyword
1	4	+ 47.91	0.0165	also
2	15	+ 40.01	0.0263	and
3	3	+ 17.44	0.0118	are
4	5	+ 22.38	0.0177	as
5	4	+ 16.33	0.0142	at
6	2	+ 23.95	0.0083	caict
7	11	+ 90	0.0427	china
8	3	+ 14.95	0.0115	chinese
9	4	+ 15.11	0.0138	country
10	9	+ 38.38	0.0276	for
11	15	+ 81.15	0.0467	g
12	7	+ 31.08	0.0233	government
13	2	+ 23.95	0.0083	has
14	3	+ 16.98	0.0118	have
15	4	+ 47.91	0.0165	huawei
16	11	+ 16.66	0.0154	in
17	7	+ 39.53	0.0255	is
18	5	+ 21.81	0.0175	it
19	3	+ 16.35	0.0117	major
20	4	+ 27.97	0.0159	mobile
21	3	+ 35.92	0.0124	networks
22	17	+ 54.13	0.0325	of
23	2	+ 23.95	0.0083	rmb

- Observe the picture and ask students the following questions:

  Question 1: Why do the two specific words "government" and "Huawei" carry a lot of weight?

  Question 2: How may the author amplify the two words?

  (Answer: "government" and "Huawei" are two important parts of China. If we argue that each of them has played their parts in the realization of China's 5G dream, then we can convince readers that China has made great efforts.)

- Show students details containing the word "government" and let them find out words that can represent Chinese government's attitude towards 5G development.

File Global Settings Tool Preferences Help

Corpus Files: China's 5G dream.txt

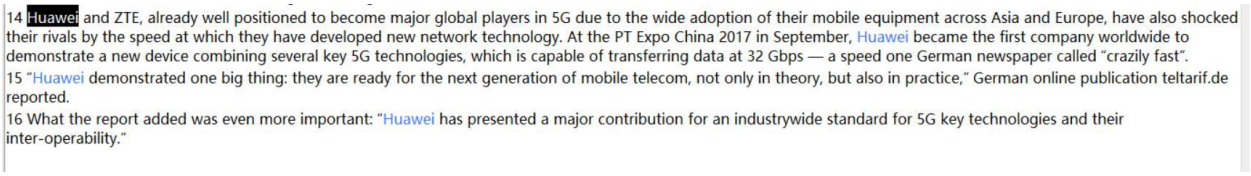
Concordance | Concordance Plot | File View | Clusters/N-Grams | Collocates | Word List | Keyword List

Concordance Hits 7

Hit	KWIC
1	vernment body is responsible for coordinating the government agencies, operators, vendors, universities and re
2	for it. Both they and the Chinese government appear determined not to let that happen
3	-2020 (5G) Promotion Group as early as 2013. This government body is responsible for coordinating the governme
4	tious industrial strategy launched by the Chinese government in 2015 that aims to make the country
5	to let that happen this time. 9 The government is keenly aware of the potential opportunities
6	depend on 5G connections to function, the government knows that leading and shaping this technology
7	the entire U.S. population. 13 The Chinese government's planning is starting to pay off,

(Answer: determined, be responsible for, aim to, be keenly aware, leading and shaping this technology)

- Show students details containing the word "Huawei" and let them summarize Huawei's contribution.



- Read Section 2 and find out the topic sentence for each of the two terms "government" and "Huawei".

  Answer:

  Topic sentence for "government": The government is keenly aware of the potential opportunities offered by the transfer to 5G and has been preparing for it for years. (Para. 9)

  Topic sentence for "Huawei": Huawei and ZTE, already well positioned to become major global players in 5G due to the wide adoption of their mobile equipment across Asia and Europe, have also shocked their rivals by the speed at which they have developed new network technology. (Para. 14)

- **Take-home Message No.4:** Divide a big term into smaller elements and argue for your point element by element

Step 4: Group work (20mins)

- Introduce 9 commonly used writing strategies to students
  1. division & classification,
  2. exemplification
  3. cause & effect
  4. comparison & contrast
  5. process
  6. narration

7. description
8. definition
9. argumentation

- Four groups fill up the following table by working on four different sections and find out the topic sentence and development strategy for each section using AntConc as supporting evidence.

Section Headings	Topic sentences	Development Strategies	Supporting Evidence
Setting New Standards			
Fifth Time Lucky			
What's the frequency			
Western Headwinds			

Step 5: Recap & Assignment

- Recap (10mins)

  Theme: From a Topic to an Essay

  -Move1: extend a topic into a thesis statement

  -Move2: start an essay by providing familiar and specific information and arguing about a topic's prominence

  -Move3: develop a thesis statement into paragraphs by means of various topic development strategies

- Assignment

  Write an essay based on the topic "Chinese dream".

  Requirement: extend the topic into a thesis statement and develop an essay by using one or several topic development strategies introduced above.

Reading Material

The Race for 5G:
Why China Wants to Lead Next Generation Wireless Internet

Jens Kastner

1 Imagine a city of the future, a city where commuters are chauffeured to work by self-driving cars and where artificial intelligence systems control every power plant, traffic light and light bulb, making road accidents, power cuts and even traffic jams a thing of the past. Where you can spend as much time in a virtual reality as you do in the physical world.

2 Thanks to 5G, the latest protocol for mobile communications, this vision may be realized much sooner than you think. The world's leading telecom companies are already testing the next generation of wireless internet

and the first 5G services could be rolled out as early as 2019.

3 The new networks are expected to be 100 times more efficient and many times faster than 4G, according to UN telecom body the International Telecommunication Union (ITU). This will open a vista of new technological possibilities.

4 The gains in network speed and reliability will enable billions of internet-enabled devices to connect and coordinate themselves seamlessly in real time. On the roads, self-driving cars will be able to sense each other's movements and adjust their speed and direction to avoid collisions.

5 Beneath the asphalt a vast network of smart sensors will control cities' water, power, waste and transport systems, unlocking vast gains in efficiency.

6 However, the transition to 5G not only promises to improve public services and people's quality of life; it could also be a game-changer for businesses and governments across the world. By 2035, more than $12 trillion of economic output will depend on 5G worldwide, analysts IHS predict, and the 5G value chain alone will support 22 million jobs. With key emerging industries like the Internet of Things (IoT), virtual reality and autonomous vehicles all relying on the rollout of 5G, the countries and operators that take the lead in mastering and deploying these next-generation networks are likely to gain significant financial and competitive advantages.

7 Like the transitions to 3G and 4G, the battle for 5G supremacy is being fought mainly by the leading telecom players including European companies Ericsson and Nokia, Samsung of South Korea and the U.S.'s Qualcomm. But this time, China's Huawei and ZTE have also emerged as forces to be reckoned with. And they may have a decisive impact on the outcome.

China's 5G Dream

8 China's telecom firms were little more than also-rans during the transitions to 3G and 4G — and paid the price for it. Both they and the Chinese government appear determined not to let that happen this time.

9 The government is keenly aware of the potential opportunities offered by the transfer to 5G and has been preparing for it for years. It founded the IMT-2020 (5G) Promotion Group as early as 2013. This government body is responsible for coordinating the government agencies, operators, vendors, universities and research institutes working on new wireless internet technology.

10 Making China the global leader in 5G is also one of the cornerstones of "Made in China 2025", the ambitious industrial strategy launched by the Chinese government in 2015 that aims to make the country the world's leading high-tech manufacturing power. As the factories of the future are sure to depend on 5G connections to function, the government knows that leading and shaping this technology will bring enormous benefits.

11 A recent report by the China Academy of Information and Communication Technology (CAICT) made clear what is at stake for China. It predicted that the rollout of 5G infrastructure would drive RMB 6.3 trillion ($947 billion) of economic output in the country by 2030.

12 The country's telecom groups have answered the call and are expected to spend a combined RMB 2.8 trillion ($420 billion) on building out 5G mobile networks between 2020 and 2030, according to a study from the CAICT published in June. Such vast investment is understandable given the scale of China's internal market — the Asian superpower had 950 million 4G network users as of the end of September, almost triple the entire U.S. population.

13 The Chinese government's planning is starting to pay off, as China nudges ahead of the pack make the 5G world a reality. In November, the Ministry of Industry and Information Technology announced it had officially launched the third stage of trials for 5G networks and that the country's three major wireless carriers — China Mobile, China Unicom and China Telecom — would begin installing an initial commercial version of 5G networks in 2018.

14 Huawei and ZTE, already well positioned to become major global players in 5G due to the wide adoption of their mobile equipment across Asia and Europe, have also shocked their rivals by the speed at which they have developed new network technology. At the PT Expo China 2017 in September, Huawei became the first company worldwide to demonstrate a new device combining several key 5G technologies, which is capable of transferring data at 32 Gbps — a speed one German newspaper called "crazily fast".

15 "Huawei demonstrated one big thing: they are ready for the next generation of mobile telecom, not only in theory, but also in practice," German online publication teltarif.de reported.

16 What the report added was even more important: “Huawei has presented a major contribution for an industrywide standard for 5G key technologies and their inter-operability.”

Setting New Standards

17 It is crucial that Chinese companies leverage China’s pole position in the 5G race to shape the global standards. If they fail to do so and the standards stray too far from what they have been working on, there is a real risk that large chunks of the massive investment — in the billions of dollars — Chinese companies have already spent on R&D for pre-commercial 5G products could be lost.

18 “It will be strategically important for all equipment vendors, Chinese and otherwise, to get ahead of 5G standardization because 5G will require a more complex ecosystem of partners to enable services than previous generations of mobile networks,” says Malcom Rogers, a telecom market analyst at UK-based market intelligence provider GlobalData.

19 “Working early to shape 5G standards will cut down on future R&D costs, establish valuable partnerships with operator customers and reduce time to market once 5G is ready for commercialization.”

20 According to Rogers, equipment vendors, by working with partners can ensure that their early investments in trial 5G equipment will be able to be deployed without any major overhaul once 5G has been fully standardized. Such partners include mobile network operators, handset chipset manufacturers, cloud integrators and IoT platform providers, as well as standardization and regulatory bodies. Their early investments include antennas, base stations, core networks, backhaul and data centers.

21 Shobhit Srivastava, an analyst with India-based technology market researcher Counterpoint Research, points out another key reason why China is so committed to shaping the development of 5G. Intellectual property rights (IPRs) related to 3G and 4G, Srivastava says, are mostly owned by Ericsson, Nokia and Qualcomm.

22 The result of this is that Chinese companies pay huge amounts to the foreign players in royalties. Exactly how much this amounts to is difficult to estimate due to the complex cross-licensing deals between the companies, but is almost certainly in the billions of dollars.

23 “So, they are in a real rush to get many IPRs that are going to be essential for the future 5G standards. This is not only to save on 5G-related royalties but also to cross-license their 5G IPRs against IPRs in the conventional telecom technologies,” he says.

Fifth Time Lucky

24 When it comes to the importance of setting global standards, the Chinese players have learned from bitter experience. China played virtually no role in the development of 1G and 2G networks in the 1980s and 1990s, with the technology being dominated by Ericsson, Nokia and Qualcomm.

25 In the 2000s, when the rest of the world started to move onto 3G, which allowed mobile users access to the internet, China decided that it would shun dependence on Western technology. Instead, it developed its own 3G standard, TD-SCDMA, rather than adopting the standards — CDMA2000 and WCDMA — being used elsewhere. But TD-SCDMA was not adopted by any telecom operator other than China Mobile even though it was recognized by ITU as a 3G standard.

26 Qualcomm managed to stay ahead of the pack during the migration from 3G to 4G, but when in 2012 the ITU started thinking about 5G, all the nations, including China, realized that 5G is going to be a single global standard that will no longer be built on legacy technology. This gave China a big, brand new opportunity to own a certain share of crucial IPRs.

27 The Chinese players are doing everything they can to seize this opportunity. At the Mobile World Congress 2017 last February, Huawei, Intel and their telecom operator partners announced they would work together to drive globally-unified 5G standards. They also said they would create a unified 5G industry chain, from chips and terminals to network infrastructure and test equipment.

28 But before Huawei has any chance of doing this, the Chinese will first need to win a much bigger battle against their U.S. rivals.

What’s the Frequency?

29 Edison Lee, an equity research analyst at Jefferies Hong Kong Limited, notes that besides the race for 5G IPRs, there’s also fierce competition between Chinese and U.S. interests in terms of what frequencies the eventual global 5G networks will be working on. Whereas China is enthusiastic about the medium frequency,

which offers wide coverage, the U.S. supports the super high frequency. This makes it easier for operators to find big chunks of unused spectrum, but offers shorter transmission distances and is more vulnerable to blockage by objects such as trees or houses.

30 "U.S. academia believes they have achieved a breakthrough to overcome this, so that they can use super high frequency instead of the lower frequencies that are heavily contested in the U.S. by both commercial and military uses," Lee explains.

31 The Chinese, in turn, try to push for 5G at medium frequency and scale up the industry in order to reduce the cost.

32 So serious are the struggles taking place behind the scenes, it is expected that the first 5G networks will go live in 2019 without any agreement on standards being reached. The battlefield on which this regulatory fight will play out is a task force under the ITU called the third Generation Partnership Project (3GPP), which is meant to broker agreements on what performance requirements 5G will have to achieve.

33 The 3GPP breaks the project down into working groups. Each working group will come up with engineering solutions for each component backed up with trial data in order to reach consensus as to which proposal is the best. These will ultimately be combined into a standard.

34 China scored an early victory in the working groups in November 2016 when the 3GPP decided to make China's Polar Code error correction technology part of a 5G global standard. The decision was hailed throughout China as proof that the country is a contender in the race to define and develop 5G, but set teeth gnashing in the U.S.

35 The U.S. Federal Communications Commission (FCC), which can barely hide its deep dissatisfaction with the 3GPP's standard-setting process, put out a terse statement in the wake of the decision.

Western Headwinds

36 The battle over standards is not the only area where the Chinese players are encountering strong opposition from the U.S. . Huawei and ZTE have been banned from America's telecom infrastructure market since 2012 on U.S.'s alleged national security grounds.

37 The companies have responded by focusing on other key markets such as Australia, India, Japan, Latin America and the EU. There they are giving Ericsson and Nokia a run for their money on their home turf, according to Neil Wang, Greater China president of researchers Frost & Sullivan. However, even in these markets the Chinese groups risk being shut out due to their lack of close partners within the industry.

38 "The challenge remains that the major rivals like Ericsson, Nokia, Qualcomm, Samsung and Verizon own many more patents than Huawei and that market and technical alliances are made between those competitors. Examples are Verizon's association with Samsung and Ericsson, and AT&T's partnership with Nokia," says Wang. "Chinese players still have a certain distance from them in the eyes of the outside."

39 Huawei is working closely with 5G consortiums that include U.S. companies like AT&T and Verizon. But, according to Rogers from GlobalData, this pales into insignificance compared to the massive amount of collaboration occurring between Japan, Korea and the U.S. as these markets aim to be the first to launch commercial 5G services.

Unclear Signals

40 With the race for 5G entering the final furlong, the eventual outcome still looks far from clear. According to Lee, there is a high likelihood the fight over patents will eventually end up in the courts. However, Lee believes it is a safe bet that China's initial share of 5G patents will be somewhere around the 10% mark.

41 "While I think they are targeting a 20 – 25% share, 15% is certainly achievable in the intermediate term, which would put them in a much stronger position in the competitive landscape than during 4G," he says.

42 The outcome of the battle over frequencies looks equally uncertain. The U.S. government currently appears to be digging its heels in, as the FCC has already allocated super high frequency for 5G. But U.S. industry does not appear totally confident that the U.S. will win this battle. In June, Fierce Wireless reported that U.S. telecom operators have been pressing the FCC to revisit medium-band frequency to make sure U.S. technology can be aligned with the frequency range if necessary.

43 Given that the availability of free spectrum is a very big factor for telecom operators, Lee believes that a compromise may be reached, in which the world settles for medium-to-low frequency with super high frequency being used as a supplement in densely-populated city centers.

44 The 5G world may not run on Chinese rules, but there is no doubt that the balance of power is tilting

eastward.