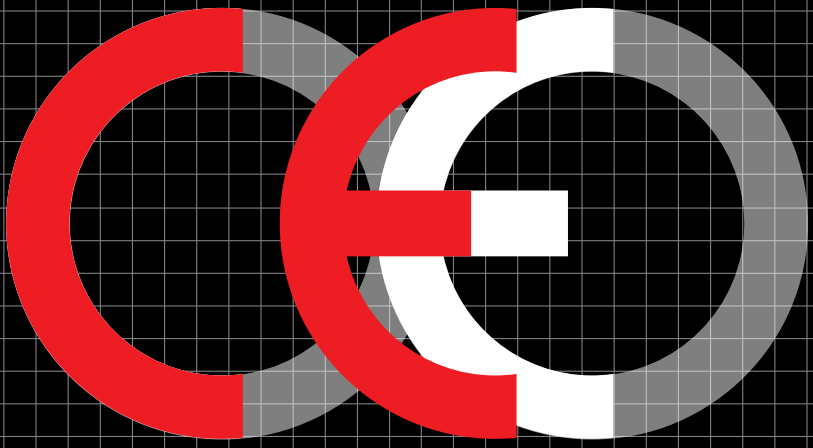


CONFORMITÉ EUROPÉENNE VS CHINA EXPORT.
The Conformité Européenne (CE) mark (white) is a common sight on products in North America and Europe. However the China Export mark (red) and CE mark are easily confused, understandable given they appear almost identical. The China Export Mark means the product was manufactured in China. No registration, testing, or auditing is required in order to use it. The mark can be used arbitrarily by Chinese manufacturers.

PRODUCING STANDARDIZATION: CHINESE BLOCKS IN NETWORKS

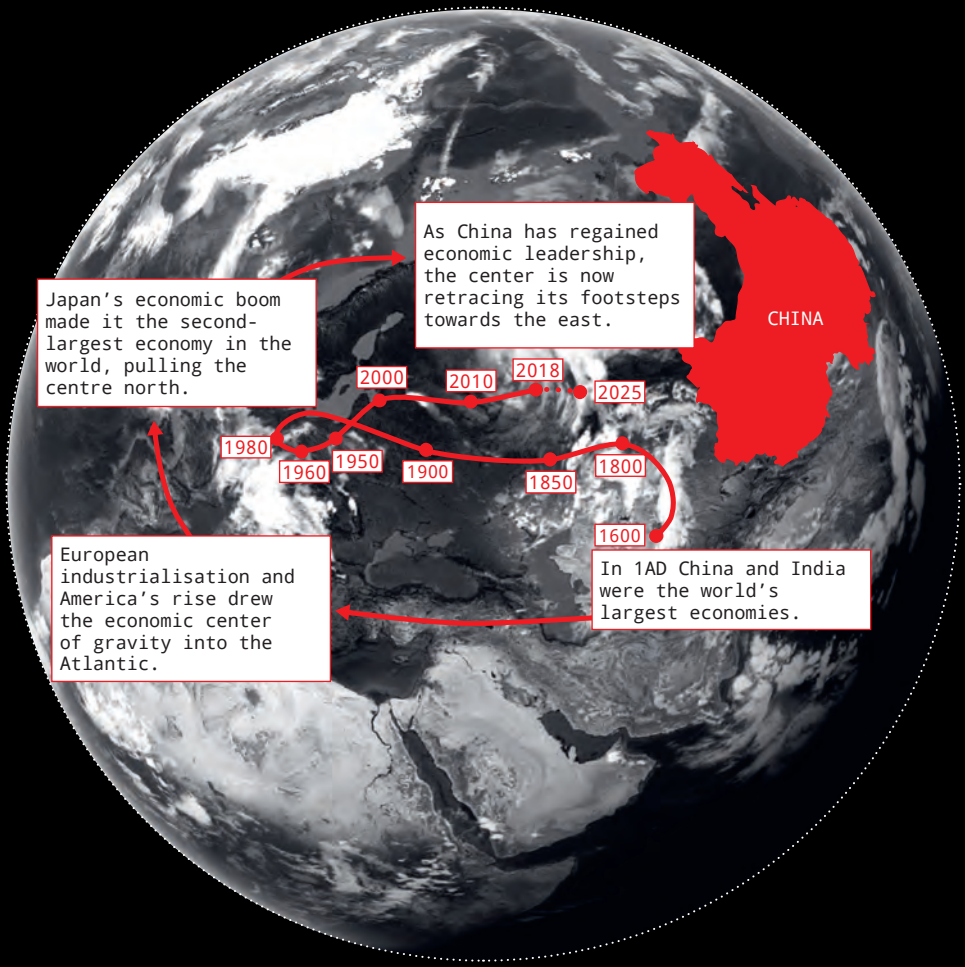
如何创造标准化 ：国际网络中的中国版块 | Marc Laperrouza

The gravity center of the global economy is tilting back towards Asia. Central to this shift are regional and global production networks to which Chinese companies increasingly add value, relying less and less on exports of semi–manufactured and finished goods. In parallel, deployment of large scale infrastructure and service provision at the domestic and international level comprises both physical and digital components with massive amounts of data flowing along telecommunication networks, electric grids, shipping lines and railway routes. This chapter discusses how standardization has enabled the participation of Chinese companies in global value chains (GVCs) and how the production of standards is now used as a strategy to drive them. It argues that the Belt and Road Initiative (BRI) can serve as a vehicle to deploy Chinese standards across borders, raising important questions related to economic and technological sovereignty and security.

1. RE–EMERGENCE OF ASIA/CHINA AS CENTERPIECE IN THE GLOBAL ECONOMY

CHINA IN GLOBAL ECONOMIC HISTORY: RE–EMERGENCE RATHER THAN EMERGENCE

For almost as long as history books can recall, China has enjoyed economic prominence on at least a regional level, with innovation capacity and regional dominance. However, the weight of China (and India) in the world economy changed drastically during the second half of the 19th century. Between 1840 and 1950, the country's GDP dropped from a third to a twentieth of the world's total, and per capita income fell while rising three–fold in Japan, four–fold in Europe and eight–fold in the United States (Maddison 2007). It would take some radical domestic economic reforms for the Chinese economy to put an end to this 150–year period, during which the country stood at the margins of the world economy, and to feature again prominently in GDP tables.



THE WORLD'S ECONOMIC CENTER OF GRAVITY.
Often dominant at home, Chinese manufacturers seldom maintain the lead in host markets. The economic center of the globe is calculated using an average of countries' locations weighted by their GDP.

Ushered in by Deng Xiaoping, the open door policy reconnected the country with the global economy, initially with lightweight industries, later with heavy industries and electronics, and now increasingly with critical infrastructures and services.

The shift of economic gravity back toward the East should not be attributed solely to China. Japan's post–war recovery, followed by the emergence of the four "little dragons",[1] laid the ground for reversing the trend of Western–centric economic powers. These newcomers developed largely thanks to their connection to other economies, at times in the vicinity, at times on the other side of the world. The permanent movement of production means from Japan to other Asian econo–mies created over time a large and intricate regional production network. Such networks proved to be very handy when the Chinese economy opened up again to trade and started to look for ways to participate in global production activities.

Another factor contributing to this shift was the fact that growth rates in Europe and, to a certain extent the United States, started to slow down. Whereas the world economy saw a succession of European empires dominate economic history from the 15th to the early 20th centuries, competition in the first half of the 21st century has taken place between Beijing and Washington. For the past 50 years, the United States, Europe and Japan have dominated exports in information and communication technologies (ICT), embedding many homegrown standards in products and services used throughout the world (e.g., GPS, GSM, VGA, etc.). China's economic development and technological progress in particular fields (telecommunications, machine learning, etc.), coupled with the sheer size of its economy has started to threaten US economic and technological dominance. Whereas some already point to a new Cold (technology) War, one should keep in mind that the level of interconnection between economies is unprecedented in world economic history and that most countries (and consumers) benefit from such interdependency.

A LOT OF PLANNING AND GOOD TIMING

For all its political leadership, planning and implementation capability, the Chinese government also owes its impressive economic turnaround to a number of exogenous factors. The liberal agenda championed by the United States and the United Kingdom during the 1980s paved the way for deregulation across the world. As a result, the flow of goods, capital and technologies increased notably thanks to an international framework conducive to exchange and development. Reduction of tariffs on the trade of IT products[2] in the framework of the Uruguay Round was accompanied by attempts to address the growing service compo–nent through an agreement on basic telecommunications services, introducing among other things the concept of technological neutrality. In effect, govern–ments were recognizing the importance of innovation, intellectual property and

1 South Korea, Singapore, Taiwan and Hong Kong.
2 The Information Technology Agreement (ITA) was concluded by 29 participants at the Singapore Ministerial Conference in December 1996.

SECTORAL MARKET SHARE OF CHINESE AND NON-CHINESE SUPPLIERS/MANUFACTURERS.

the flow of technology for economic growth.[3] Technological developments and trade–related measures significantly lowered transaction costs. This made it even easier to scatter production facilities across the world in search of the lowest production costs (and working standards…). In other words, China's economic re–emergence coincided with, and benefited from, a number of factors that brought economies closer than they had ever been.

FROM SHIPS TO CHIPS?

The phenomenal growth of international trade and sophisticated intrication of suppliers, contract manufacturers and other actors in the supply chain is due in large part to technology and trade agreements. It probably owes as much, if not more, to an innovation in logistics. The fragmentation of production and the ensuing acceleration of trade has indeed been made possible by the stan–dardization of containers initiated in the United States at the end of the 1950s (Levinson 2006). The standardization was actually an attempt to regain compet–itiveness for US ports by simplifying logistics, reducing overall transport time and, in the end, the total cost.

Fast–forward 50 years and one could observe a similar pattern of standardization in the field of telecommunication manufacturing. Companies like MediaTek, a Taiwanese chipset manufacturer in search of competitive advantage, transformed some parts of the handset manufacturing business by offering turnkey solutions. This opened the door to Chinese companies with limited technical know–how but a good understanding of particular markets to match demand and offer, in a cost–effective manner, something that would have been totally impossible without the standardization of components throughout the value chain.

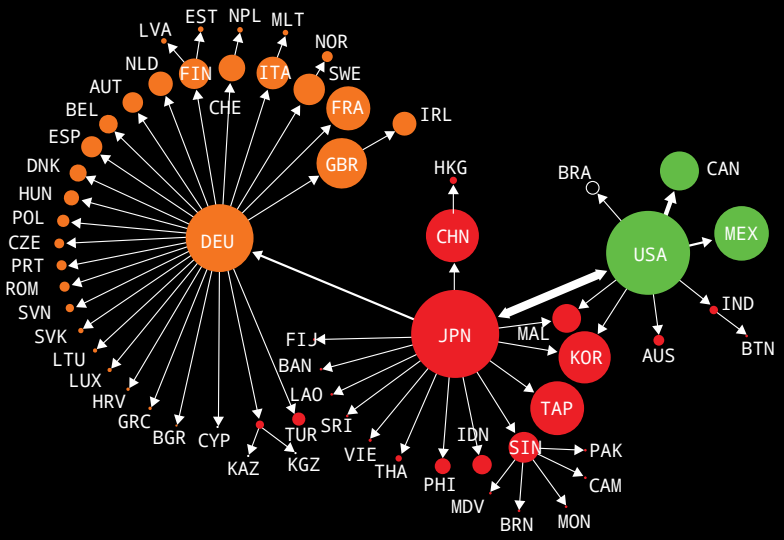
Being able to sell globally operable mobile phones while having limited technical knowledge wasn't a given. In fact, until not so long ago a European traveler crossing the Atlantic would not have been able to use her mobile phone in the United States as manufacturers (and operators) on both sides of the ocean were battling to impose their homegrown telecommunication standards. The telecommunication industry clearly illustrates the importance of standards in economic growth and, to a certain extent, why they have become so central to governments intent on ensuring technological dominance for their domestic industries and companies.

In the field of telecommunications, the Chinese government had been extremely keen at the turn of the century to promote TD–SCDMA, a "homegrown" standard for 3G.[4] Its enthusiasm extended to China Mobile, assigning its deployment as a way to find an alternative to European or American standards.

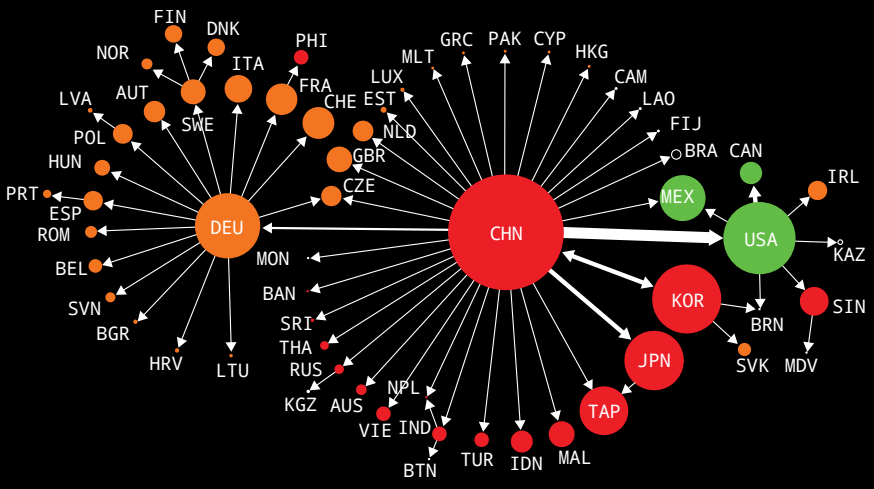
3 The agreement on Trade–Related Aspects of Intellectual Property Rights (TRIPS) enshrined IP into the trading system in 1995.

4 Time Division Synchronous Code Division Multiple Access (TD–SCDMA) was jointly developed by the Chinese Academy of Telecommunications Technology, Datang Telecom and Siemens.

2000



2017



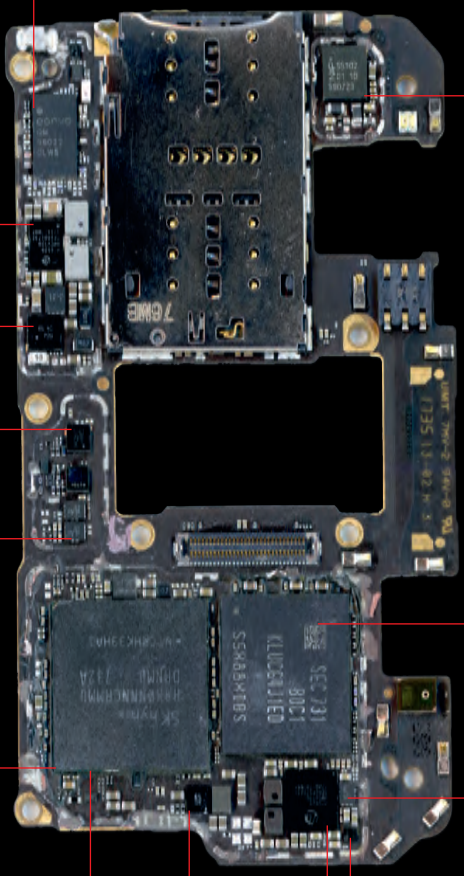
SUPPLY HUBS OF TRADE IN VALUE-ADDED TO VARIOUS NETWORKS IN THE ICT SECTOR (TRADITIONAL TRADE NETWORKS).

In that particular case, the attempt failed both domestically and internationally as the standard did not offer the required technological maturity. As we will see later, it was just a matter of time before a Chinese company would be ready to offer a telecommunication standard with the potential to be deployed globally.

The deployment of standards and, more importantly, the dominance of standards is not an easy feat. One can differentiate *de jure* standards, which are imposed by the government or standardization bodies, and *de facto* standards which are imposed by the market. *De jure* standards can be powerful tools for the implementation of industrial policies orchestrated by the government, and China's *de jure* standardization efforts have been relentless at the domestic level. For the past two decades, few sectors have been spared as an estimated 150,000 standards were adopted in an attempt to regulate economic agents at all levels (national, provincial and local).[5] In 2018, and alongside a swarm of other initiatives aimed at positioning China among the front-runners of innovation such as "Made in China 2025",[6] the government initiated the China Standard 2035 policy. This does not mean that market-driven standards do not exist in China. In fact, similar to what has been witnessed in other areas of economic reforms, the government has often used a dual strategy by letting competition in the market emerge while maintaining an oversight.

Not surprisingly, China's standardization drive does not stop at its borders, nor does it leave rival economies impervious. The propensity of the Chinese government to play the standardization card is increasingly raising concerns abroad. Breznitz and Murphree (2013) have argued that "the main challenge China poses in standardization is in establishing new norms, particularly the advancement of a cheap royalty option to the holders of standards-essential Intellectual Property Rights (IPR)."[7] They also pointed to the increased skill and sophistication in global standards organizations. Chinese companies (e.g., Huawei) understood this early on, and in the late 1990s began to increase their presence and activity (e.g., commission chairing) in different international telecommunication forums such as ITU and 3GPP. Lastly, the authors have highlighted the role of government in the standardization process—as opposed to more voluntary and market-based approaches in the United States. Standards can indeed be used both as a way to ensure easy dissemination and interconnection of technologies and as a tool for protectionism. One needs to look no further than electric plugs in European countries to grasp how standardization can betray inward- rather than outward-looking strategies.

5 One obviously needs to differentiate technological and non-technological standards (e.g., safety standards). In particular since the former usually come with network and lock-in effects.
6 Made in China 2025 is a strategic plan at the national level aimed at turning China into a major manufacturing power over a ten-year period. It epitomizes the Chinese government's ambition to move up the value chain.
7 By creating competing standards for similar technologies, the idea is to push foreign standard alliances to lower their rates.



USA
Power amplifier,
Qorvo

NETHERLANDS
Controller,
NXP
Semiconductor

CHINA
Battery charger,
HiSilicon

TAIWAN
Load switch
battery charger,
Richtek
HiSilicon

USA
USB switch
ON Semiconductor

NETHERLANDS
Audio switch,
NXP
Semiconductor

SOUTH KOREA
Multichip memory
by Samsung

SOUTH KOREA
Multichip
memory,
SK Hynix

NETHERLANDS
Audio switch,
NXP
Semiconductors

CHINA
Processor,
HiSilicon

JAPAN
Regulator,
Renesas

CHINA
Audio CODEC,
HiSilicon

JAPAN
Electronic
Compass,
AKM
Semiconductor

CHINA™ INSIDE
Electronic components originate from multiple countries before being assembled in China.

The jury is still out as to whether China's standardization strategy has really paid off. Whereas Chinese technology firms tend to dominate the Chinese market or act as first–tier suppliers in many industries, their market share in the rest of the world remains below 20% in all but two industries, namely solar panels and cargo ships (Woetzel et al. 2019).

In summary, the Chinese economy has benefited from the alignment of trade opening, standardization and development in ICT to engineer one of the most impressive economic growth periods observed in history. However, its model of economic development, based on technological catch up and low added–value manufacturing activities (the low–hanging fruit of globalization), has reached its limits. In fact, Chinese companies have now understood the need to strengthen their position in global value chains and to capture higher returns from participation in global trade.

2. GLOBAL VALUE CHAINS, STANDARDS AND UPGRADING

One way governments "measure" China's place in today's world economy is through their trade deficit with the factory of the world. Measuring goods at the border actually offers a simplistic view of the reality of international trade and supply chains. Take, for instance, an iPhone entering the United States. While each phone adds USD300–400 to the US trade deficit with China, the actual value–added by firms based in China remains extremely low (e.g., labor costs below USD10 for the assembly of an iPhone 4) and is mostly captured by foreign contract manufacturers like Foxconn (Dedrick et al. 2010). Outsourcing of production has placed the Chinese economy at the center of Asia's regional production network but control still largely rests in other hands.

The trade deficit is in fact a trade deficit with all other countries sending intermediate goods for assembly in China. Crude trade measurement systems like the balance of trade are being replaced by input and output tables which give a much more precise and correct view of the reality of added–value and, in the end, a more nuanced picture of trade deficits.

MOVING UP GLOBAL VALUE CHAINS

A way of looking at how Chinese companies climb up the technology food chain is to look at the type and value of components originating from China found in technological devices and their evolution over the years. In high–end technology products, foreign firms still account for a large part of added–value but in products further away from the technology frontier, Chinese firms tend to capture an increasingly higher value.

The efforts of companies to grab more value is meeting the Chinese government's strong push for indigenous innovation. In other words, top–down innovation policies are meeting enhanced bottom–up innovation capacity. That said, the "ideal" alignment of government and industry interest may not automatically lead to actual upgrading. In a recent study, the IMF found that the relationship between

	AREAS/SECTORS	TECHNO-LOGIES REVIEWED	SHARE USING GLOBAL STANDARD	SHARE THAT HAS LOCAL PROVIDER	SHARE WHERE CHINESE COMPANIES TECHNICALLY PROVIDE BETTER THAN OR ON PAR WITH GLOBAL LEADER
BASIC MATERIALS	■ MINING ■ STEEL	7			
CHEMICALS	■ OIL & GAS ■ COMMODITY & SPECIALTY CHEMICALS ■ TEXTILES	12			
COMPONENTS	■ DISPLAY ■ INTEGRATED CIRCUITS	8			
ELECTRIC VEHICLES	■ BATTERY ELECTRIC VEHICLES ■ PLUG-IN HYBRID ELECTRIC VEHICLES (PHEVS)	7			
TRANSPORTATION	■ HIGH-SPEED RAIL ■ MARINES	10			
CONSUMER ELECTRONICS AND INTERNET	■ CONSUMER ELECTRONICS ■ DIGITAL PAYMENTS ■ DRONES	11			
EQUIPMENT	■ SURGICAL ROBOTS ■ INDUSTRIAL ROBOTS	4			
PHARMACEUTICALS AND BIOTECH	■ SMALL-MOLECULE DRUGS ■ BIOMOLECULE DRUGS	6			
ARTIFICIAL INTELLIGENCE	■ SPEECH RECOGNITION ■ FACIAL RECOGNITION ■ AUTONOMOUS DRIVING	5			
NEXT-GENERATION TECHNOLOGIES	■ QUANTUM TECHNOLOGY ■ 5G ■ SPACE	8			
GENOMICS	■ GENOTYPING ■ GENE SEQUENCING ■ GENE EDITING	3			
TOTAL		81	>90%	60-80%	40-60%

CHINA™ INSIDE
When it comes to standardization, the number of sectors in which Chinese companies lead remains small.

upstreamness in GVCs and economic development is not straightforward. While financial and business services tend to be upstream and high in added–value, the link is less clear in manufacturing (IMF 2019). In other words, economic and political actors alike will need to keep experimenting as economic structure and production networks evolve. One cannot fail to notice how China's position in global production networks has changed since the turn of the century, both from a supply and demand perspective and in both simple and complex networks.

TECHNOLOGY, GLOBAL VALUE CHAINS AND STANDARDIZATION

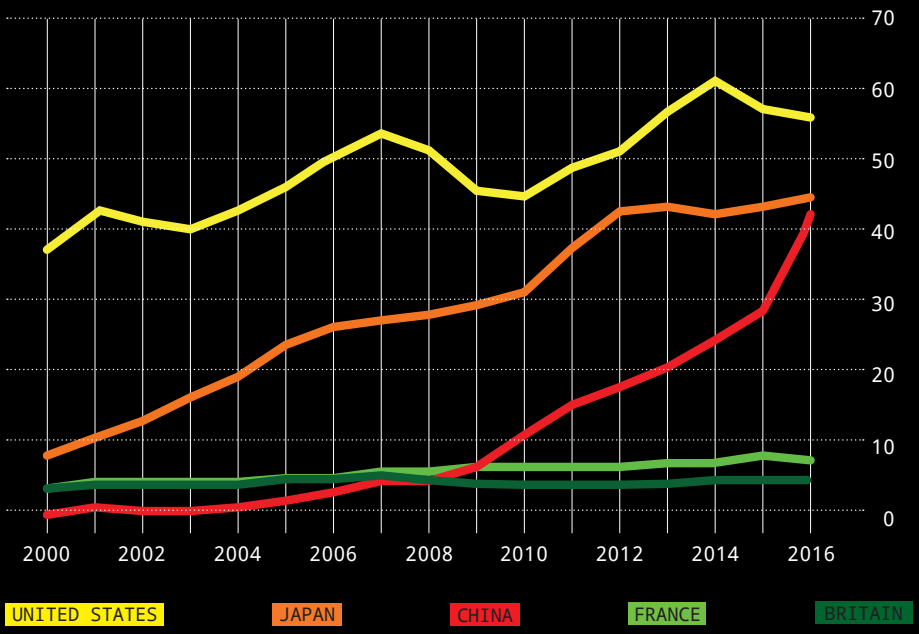
Woetzel et al. (2019) have looked at the extent to which China's technology value chains are integrated globally. They found that in 81 technologies in 11 categories more than 90% of technologies used in China follow global standards. In a further analysis of comparable standards, they found that "Chinese suppliers may be able to achieve performance on a par with, or better than, global suppliers in 40 to 60 percent of the technologies studied." In addition, in emerging technologies (e.g., 5G and artificial intelligence) "where a global standard may not yet have been defined, China has begun to make headway."

Standardization may again serve as a guiding hand to ensure participation in the global economy. Nadvi (2008) has argued that compliance with international standards is now a *sine qua non* for entry into globalized production networks. Similarly, Inomata and Taglioni (2019) found that "standardization through breaking production into modules with a high degree of functional autonomy (limited mutual interference between modules) can dramatically reduce the amount of research and development (R&D), learning by doing, and the number of complementary skills needed to produce a good. This greatly increases opportunities for developing country firms to participate in formerly capital–intensive industries through reducing entry costs into global value chains."

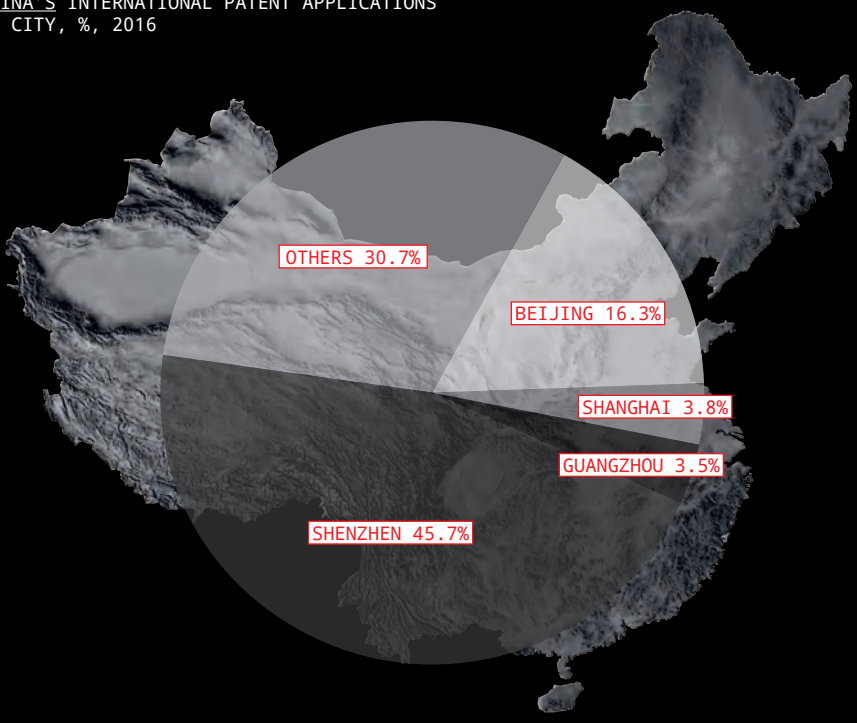
Such eased access to technology can also flood the market with similar products. In addition, the "protectionism" that comes with standardization can also act as a disincentive to innovate, delaying the reality of market competition. In other words, the Chinese government and companies will need to find an equilibrium between rule–maker and rule–taker. There is little doubt that the "assembly economy" model of development based on cheap labor and low productivity has run its course. Pressured by rising labor costs, manufacturing companies are already turning to automation, shedding in the process millions of jobs. Some of the more sophisticated companies are already investing massively in research and development (R&D) to (finally) capture the fruits of globalization. As we will see with the case of Huawei and 5G, such a journey is by no means easy as more and more governments seem to have re–discovered the strategic and geopolitical importance of deploying homegrown standards across the world.

The Chinese government and companies have notably upped their game in the fields of telecommunications. They are already setting their sights on the next technology frontier. How countries and companies regulate AI may offer the next data point as to whether and to what extent the Chinese government and

INTERNATIONAL PATENT APPLICATIONS
PCT ’000



CHINA’S INTERNATIONAL PATENT APPLICATIONS
BY CITY, %, 2016



ICT WEIGHS HEAVILY IN CHINA’S INTERNATIONAL PATENTING ACTIVITY.

companies orchestrate their transition from standard taker to standard maker. In fact, a similar technology catch–up strategy deployed in other industries (car, rail, air, etc) can be witnessed in the field of AI. One could nonetheless argue that thanks to access to talent, state–sponsored funding, droves of data and unseen adoption, some (Chinese) companies are much closer to the technology frontier than in any other sector previously. An increase in quality and a decrease in cost seems the most potent way to further export Chinese AI–related technologies.

This leaves us with a tryptic. One can find both an exponential growth of standards limited to the domestic market, sectors in which China still rests on international standards and a number of sectors in which Chinese companies are starting to be in a position to impose or, at the very least, lead standardization.

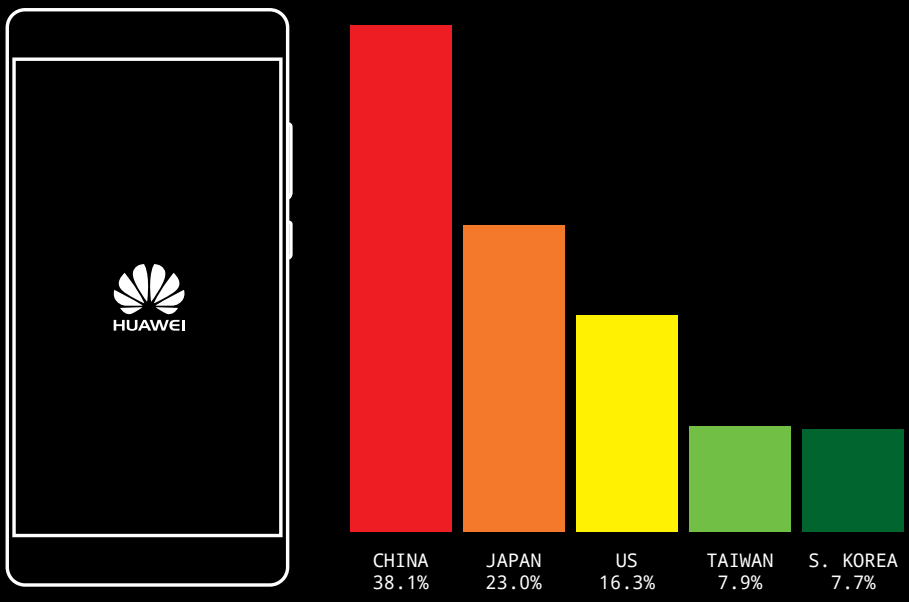
3. FROM MATERIAL TO IMMATERIAL

As economies develop, they tend to abandon the manufacturing of goods to concentrate on more profitable sectors with a higher intensity of services. The telecommunication sector provides a good example of how some Chinese companies have, over a rather short period of time, moved from exporting first goods, then infrastructure and finally services. For instance, Huawei began at the end of the 1980s as a manufacturer of telecommunication switches. It moved later to building network infrastructure, providing enterprise services and lately to selling mobile phones. To strengthen its competitive edge, the company has invested heavily in R&D, both at home and abroad, often locating its research centers in the vicinity of telecommunication clusters (e.g., Sweden, Germany). In fact, the Shenzhen–based company has occupied the first or second rank of companies with the highest number of patent applications worldwide, accounting in part for the recent rise of China in global patent applications.

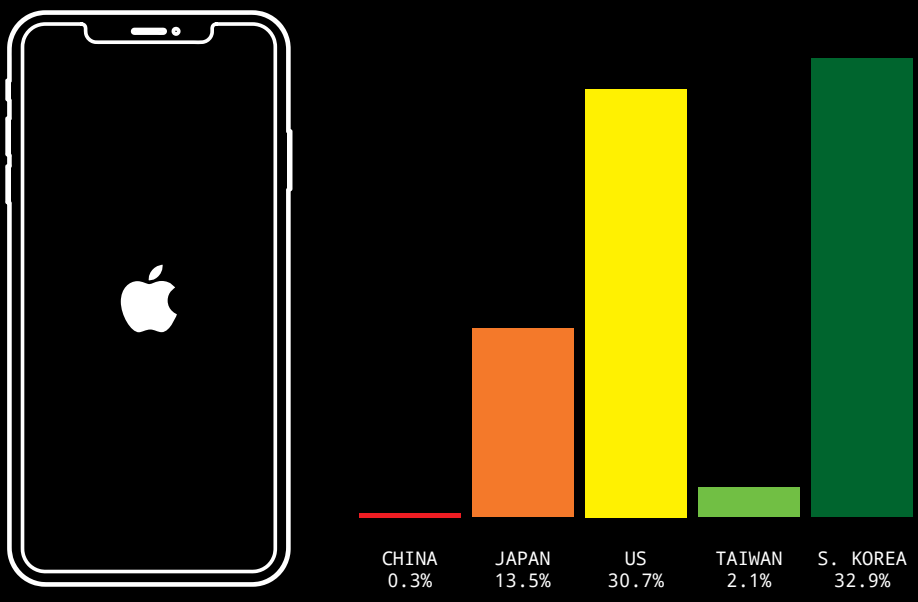
Since telecommunications is a standard–intensive industry and two of the global players are headquartered in Shenzhen (the other being Zhongxing Telecommunications Equipment or ZTE), it is not surprising that the city's share in China is so high.[8] As to the usual question regarding the quality of patents, the PCT[9] patenting activity of both companies over the last five years provides an interesting indication. The continuous increase (+500% in ten years) is testi–mony to the global ambition of some Chinese companies and to their intellectual property (IP) strategies. It nonetheless remains interesting to see that the ratio of domestic to international patent applications in China has remained relatively stable over the years. Moreover, whereas domestic applicants represented only 50% of granted patents in 2009, this figure is close to 80% in 2017. A final figure can help shed light on patenting activity: the ratio of domestically granted patents (over applications) hovers around 25% for residents and 66% for non–residents, indicating that a gap remains between both groups when it comes to quality.

8 Other companies like BYD in the fast–growing electric vehicle industry further account for the city's heavy investment in R&D.
9 The Patent Cooperation Treaty (PCT) can be seen as a one–stop "shop" for patenting worldwide.

HUAWEI P30 PRO
$363.83
(COST OF 1,631 PARTS)



APPLE IPHONE XS MAX
$438.2
(COST OF 1,756 PARTS)



WHERE HUAWEI AND APPLE GET THEIR SMARTPHONE PARTS.
Dependency on region/territory (percent of total cost). Chinese companies are increasingly able to source their components from domestic providers.

Patents aside, the path to technological leadership is full of pitfalls, including for well–established Chinese companies. ZTE's seven–year component ban from US suppliers in 2018 has shown that different exogenous factors can seriously indent the growth (and even endanger the existence) of a company.[10] Developing "homegrown" technologies and capturing markets abroad still goes hand in hand with ensuring access to chips supplied by US and European companies.

The blacklisting of Huawei by the US in 2019 on grounds of national security has similarly led the company to close some of its research centers in the United States and, according to certain estimates, cost up to USD 10 billion in lost revenues. Both examples point to the importance of integration in GVCs at the research and business level and to the fact that this integration can be derailed rather easily.[11]

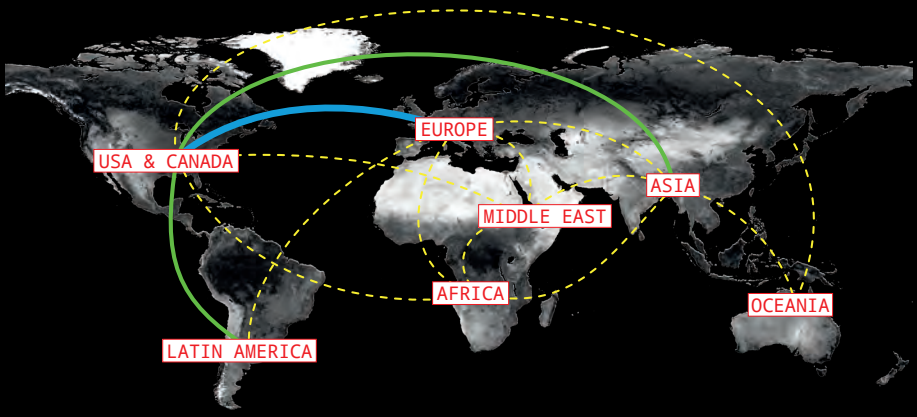
The emergence of ambitious, powerful and sophisticated technological companies like Huawei can sow the seeds for an economic war. The 5G saga offers a good case in point. The next generation telecommunication standard is particularly significant as it brings to the forefront the progress achieved by Chinese companies in technology over the last decade. It probably marks a (symbolic) turning point since it is, by–and–large, the first time in recent history that a standard with global reach will come out of China. Its significance goes beyond the immediate economic advantages that standards procure for their owners. It marks the entry of Chinese companies in the business of the immaterial economy. One that scales infinitely. Invisible but central to the functioning of infrastructures is the laying down of tracks for technological trajectories. And of course, the opening of crucial questions relative to the security of critical infrastructures as well as further questions related to issues of privacy and commercial dominance.

FROM "MADE IN CHINA" TO "CHINA INSIDE"?

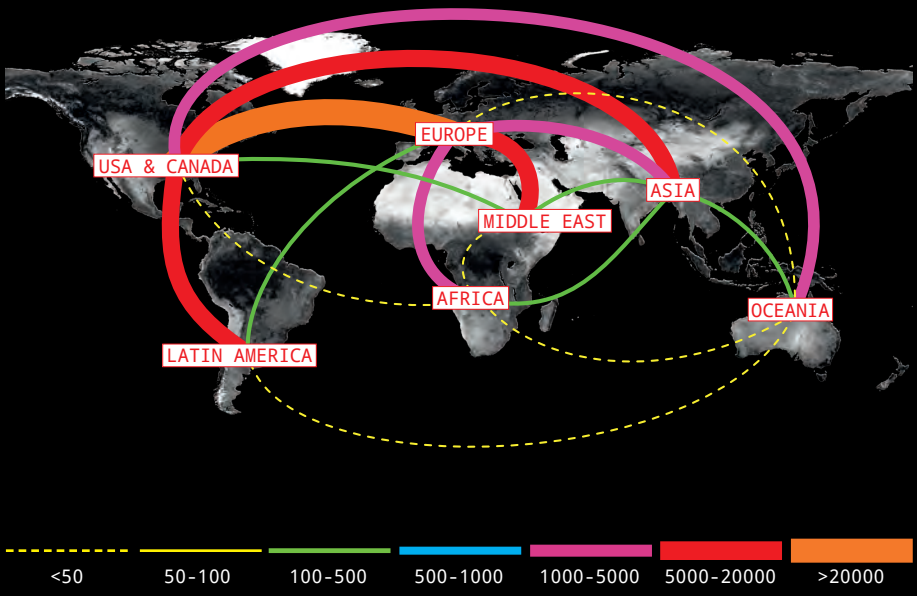
The roadblocks thrown onto the deployment of 5G give an indication of the seriousness with which Western governments and companies treat Huawei's new position in the telecommunication industry. One can wonder whether the most unsettling aspect for Western policy–makers and governments alike is the slow disappearance of easily identifiable goods labeled "Made in China" and their associated trade deficit, replaced instead by a service deficit. At times, one needs to be reminded that, whereas Western economies are net importers of Chinese goods, they are net exporters of services to China. In other words, while importing low to medium added–value goods from China, Western economies have been exporting high added–value (and environmentally friendly) services to China,[12] benefiting from cheap labor, "business–friendly" labor protection and,

10 Both Huawei and ZTE have been accused by the US Government of breaching the embargo on Iran.
11 Thucydides' trap, so often called upon to highlight the dangers of China's rise, could also be applied to the business world.
12 According to USTR, in 2018 the United States had a service trade surplus of USD 41 billion with China (and a goods trade deficit of USD 419 billion). Sales of services in China by US firms was USD 55 billion in 2016 and USD 8 billion for Chinese firms in the United States.

2005
100% = 4.7 TERABITS PER SECOND (TBPS)



2014
100% = 211.3 TERABITS PER SECOND (TBPS)
45X LARGER



LAYING DOWN THE CIRCUITS.
Cross-border data flow bandwidth, gigabits per second.

in the end, cheap products in stores. It seems politically much easier to point to millions of containers of goods crossing the ocean on vessels rather than bits and bites and know–how embedded in hardware going the other way.

For all the political pandering and economic sanctions surrounding the 5G saga, the fact remains that the most advanced Chinese companies are now entering new and immature industries. The economic and technological catching up achieved by Chinese firms was precisely that: catching up. Learning from, imitating, copying from, innovating on top of, was possible because the gap was large and all sides seemed to be winning in the short–term. Now that some Chinese firms are getting closer to the technological frontier, reverse engineering is no longer an option for them. This implies that hitherto successful companies will need to make investments in unproven technologies with much higher risks of hitting dead–ends.

A DIGITAL SILK ROAD

While EU and US policy–makers try to protect their markets (at great cost to their consumers), Chinese companies have been steaming ahead with the deployment of homegrown technologies in emerging markets. Huawei is said to have installed 70% of African 4G networks (Bayes 2019). Thanks to the Belt and Road Initiative (BRI) launched in 2013 by Xi Jinping, Chinese companies can count on one of the most ambitious infrastructure development plans of the 21st century to export their know–how.

A seemingly infinite list of services can be deployed along BRI. Indeed, its infrastructure is not limited to rails, docks and electricity pylons— e–commerce and smart cities (for example, Kuala Lumpur's City Brain), undersea cables[13] (linking Asia and Africa), data centers, customs automation (Digital Free Trade Zone in Malaysia), Silk Road e–Merchants, even the Digital Belt and Road Program (DBAR) for sustainable development, initiated in 2016 by Chinese scien–tists to improve environmental monitoring, promote data sharing and support policymaking using big data on Earth observations. BRI could become the most formidable vehicle for the exporting of goods and services, and for importing data related to the activities enumerated above.

BRI and domestic markets aside, if China was to play an even more important role (e.g., weighing in on global data or AI standards) it would need to become a net importer of data from the West, something that the United States excels at with the GAFAs.[14] In what appears to be a preemptive strike, the Trump administration has already warned consumers and governments about the risks of DJI drones sending information to servers in China (a rather ironic posture since the rest of the world sends large chunks of their data to servers in the United States).

13 Historical parallel with Britain cutting Germany from its telegraph cables during World War I but also cables as a conduit for the spread of ideas.
14 One can wonder what role European companies intend to play.

FREIGHT TRANSPORT OF CHINESE ELECTRONICS (HUAQIANGBEI, SHENZHEN).

Data flows have notably expanded over the past decade and this growth continues at a brisk pace. International organizations have already started to measure the world economy through data flows (Caslini and Lopez 2019). It may not be long before countries complain about a data balance deficit.

In other words, and if techno–nationalism does not prevail, the Chinese government's Belt and Road Initiative (BRI) could serve as a formidable spring–board for placing Chinese blocks of standardization in upcoming growth industries and markets. Visiting the showrooms of the leading Chinese social media companies, one can easily envisage how exporting an ecosystem inte–grating infrastructure, services and the organization of society could be next. Such export–driven development strategies nonetheless remain dependent on the openness of other economies. The current trade war between the United States and China serves as a powerful reminder of how quickly and strongly trade relations can deteriorate, and to a certain extent, of how dependent the Chinese companies are on foreign technologies.

4. CONCLUSION: BLOCKS AND ROADBLOCKS...

Over the past three decades, the Chinese economy has played very different roles in the global economy. It started by exporting (cheap) labor at a high social and environmental cost. Through BRI, it is currently exporting its surplus infra–structure building capacity. Thanks to notable advances in some technological fields (e.g., mobile telephony and facial recognition) it already exports know–how and intellectual property at very low marginal cost. By outsourcing low–end textile manufacturing to South–East Asia and East Africa, China is already importing (cheaper) labor, hence coming full circle.

Before closing this chapter, one can wonder what role Shenzhen plays in producing standards and standardization? For now, the role of the city in terms of standards is mainly linked to the telecommunication industry. There is no reason to expect the city will develop another industrial cluster with the same scale as telecommunications any time soon. Political support in the form of policies incentivizing innovation up to fully–fledged industrial policies can go a long way towards creating national champions. It is not always easy to sustain exports without strength "at home." At the same time, a strong presence at the domestic level does not guarantee success abroad. Going the extra mile may require a different ingredient, namely soft power. So far, the Chinese govern–ment and companies have seemed to fall short of this resource. Soft power can come in handy when money or superior technology does not suffice to win over international organizations, governments and companies.

Positioning Shenzhen as the Silicon Valley for hardware further indicates the role the city intends to play. Whether the city can ever assume the same real and imaginary function is another question. In the past, Silicon Valley has managed to integrate the flow of money, technology and talent like few others. To rival the success of Silicon Valley, the Shenzhen Valley will need to emulate its attractiveness.

FREIGHT TRANSPORT OF CHINESE ELECTRONICS (TRANSIT).

At the same time, Shenzhen is part of the ambitious Greater Bay Area (GBA) initiative.[15] One can imagine it playing (once again) the role of a pilot in this massive con–urbanization project. In fact, the GBA is at the forefront of an in–depth transformation of the Chinese economic development model. To strive or simply to survive, companies have launched into massive automation projects, shedding in passing thousands of jobs. Paradoxically, automation makes China a less interesting place for production, unless Chinese factories can find ways to achieve similar productivity gains as factories in the West in addition to the proximity of a large market. Year after year, during the visit to a medium–sized PCB factory on the outskirts of Shenzhen, one could notice how machines have (already) replaced operators at certain stages of the production process.

Cities like Shenzhen and companies like Huawei and Tencent already act as key blocks in the circulation of goods and services domestically. If the ambition of the Chinese government and economic actors does not fall short, the next iteration will be to play a similar role beyond the Chinese borders and further than emerging markets. But while technology plays a central role in the rela–tionship between China and the world, China remains by–and–large dependent on foreign technology flows to innovate and increase productivity.

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15 GBA refers to the Chinese government’s project to link the cities of Hong Kong, Macau, Guangzhou, Shenzhen, Zhuhai, Foshan, Zhongshan, Dongguan, Huizhou, Jiangmen and Zhaoqing into an integrated economic and business hub.

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