CKGSB KNOWLEDGE

CHEUNG KONG GRADUATE SCHOOL OF BUSINESS

Volume No. 44

JUNE 2022

$12.00

DATA RULES

The abundance of data in China has led to new levels of innovation, but sovereignty considerations are coming to the fore

- Globalization as we know it appears to be ending even though the world is increasingly connected
- China's agricultural sector is embracing digitalization, but there is still some way to go
- Chinese brands are finding increasing success in international markets

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Vol. No. 44

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ISSN 2312-9905

Publisher
CKGSB GLOBAL LIMITED
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Business Trends

Companies

Downtime

Global Give-and-Take

Business is always a complex and nuanced process of give-and-take, especially when it is conducted across different countries and cultures. Transactions can be affected by a variety of factors including interpersonal relationships and market conditions, as well as national and international policy changes. Since World War II, the world has witnessed dramatic changes and expanded multilateralism and, by extension, globalization, supported by parallel policy changes in each country. But in recent years, a rise in international tensions and trade disputes has led to many countries, China in particular, looking increasingly to self-sufficiency in order to ensure future growth. These issues, highlighted recently by the situation in Ukraine, are also the cause of the rising prioritization of national security over economic development in most countries.

While some experts have suggested that all this signals the end of globalization, it seems more reasonable to assume that we are simply heading into a new phase. What this could mean for different market sectors and the businesses that function within them is a question covered in this issue's commentary, "**Globalization in a Divided Yet Connected World**" (page 6).

Within the debate around national security, a topic which has found itself at center stage for businesses and governments alike, is the ownership and usage of data. The value of the digital commodity, financial or otherwise, has become more pronounced in recent years and as such, there has been fast implementation of regulations governing data across the world. China is no exception and its new data regulations, which are similar in purpose to the EU's GDPR, mean that business now has more issues to consider when expanding into the digital world. We discuss this further in our cover story "**The Reign of Data**" on page 9.

Continuing on the digital track, China's agriculture industry, which has to feed 20% of the world's population with only 7% of the world's arable land, is making progress along the road to digitalization. E-commerce has been a particular hit, allowing farmers to connect directly with urban customers for the first time, but the adoption of farming technologies is hindered primarily by a lack of understanding among the country's aging rural population. In the fourth article in our series on digitalization, we look at "**The Dawn of AI-griculture**" on page 28.

We are also lucky to be joined in this issue by Scott Kennedy, senior advisor and trustee chair in Chinese business and economics at the Center for Strategic and International Studies, who provides valuable insights into the current US-China relationship and the implications for businesses on both sides (page 25).

Elsewhere in the issue, we look at the progress made by China's space program over the past 20 years (page 17). We also look at China's increased presence on the international stage in the biotech industry (page 41), the growing visibility of Chinese brands in non-domestic markets (page 33) and the changes to tourism within the country since the start of the COVID-19 pandemic and the ensuing border restrictions (page 61). For our company profile this issue, we feature Pony.ai, the US and China-based robotaxi company that is one of the global trailblazers of autonomous driving technology (page 54).

We hope you find the topics addressed in this issue to be exciting and illuminating at this time of great change. As always, if you have any comments or opinions to contribute, please feel free to contact us at (lzhou@ckgsb.edu.cn or ckgsb.knowledge@ckgsb.edu.cn).

Yours Sincerely,

Zhou Li
Assistant Dean, CKGSB
Editor-in-Chief, *CKGSB Knowledge*

For more insights on the Chinese economy and business, please visit the CKGSB Knowledge *site: http://knowledge.ckgsb.edu.cn/*

COMMENTARY

Globalization in a Divided Yet Connected World

Globalization in its current form appears to be ending. As we enter its next stage, it's important to keep some key lessons in mind

Zhou Li, Assistant Dean of the Cheung Kong Graduate School of Business, Editor-in-Chief of CKGSB Knowledge

All commentaries reflect the personal opinion of the author and are not necessarily the official position of the school and the magazine

The end of the Cold War in 1991 resulted in the development of a new geopolitical and global economic landscape, offering crucial lessons that if heeded might have helped the world stay on a peaceful course. But instead, the last three decades have seen an increasing disregard for various aspects of the international rule of law by the great powers of the world, and if those at the top break away from agreed norms, then others may follow.

The war in Ukraine is a symptom of growing fractures in the international fabric, and, worryingly, the conflict signals the risk for an even larger war, the prospect of a digital conflict, the exacerbation of global food and energy crises, and a continuation of a political race to the bottom. All of this could have been avoided if we had learnt lessons from the past: similar to how the Congress of Vienna after the Napoleonic Wars helped prevent another widespread European war for nearly 100 years, despite there being legitimate criticisms of the structure of the agreement.

The prioritization of national security is now at the forefront of thinking for many countries and with it accelerates the rise in economic nationalism and protectionism that started about a decade ago, which in turn enhances an "us against them" mentality that permeates all levels of politics.

Of course, it would be naive to say that there will not be disagreements and points of tension between the world's major countries. Different viewpoints mean these are inevitable. But maintaining an automatic baseline of confrontation on any subject simply out of political principle or domestic political agenda, can only damage the world's already strained economies and escalate political or even military tensions. All countries, large and small, have legitimate national security concerns that need to be respected and addressed, and constantly crossing lines drawn in the sand can only push the world towards another major international crisis.

Back to cooperation

Although it is by no means the only such fractured global relationship, the US-China connection is an obvious example of a shift from partnership, to co-operation, and now to a state of competition, at a time when collective leadership is urgently needed. Putting an end to the war in Ukraine and preventing any subsequent conflicts which have the potential to cause so much human suffering, rebooting the world economy after the pandemic, and the fight against climate change and global warming are among the many challenges that require cohesion from the world's largest economies.

US politicians are unusually unified in their approach to China, viewing the country as a largely negative force in the world and one that, if unrestrained, will inevitably overtake them. On the other side of the divide, meanwhile, there is a belief that the US acts only from self-interest and a desire to defend its position as the world's number one economy.

A hardening of positions seemingly simply for domestic political gains, leaves little room for nuance and has already led to the stifling of business and the ratcheting-up of political tensions around the world. There is a great need for reflection on all sides, especially for those who seek to exacerbate existing issues, concentrating on the true motivations behind perceived adversarial stances and their possible future cost, both to themselves and to the world as a whole.

This relationship trajectory is not simply limited to the US and China. All countries have a responsibility to acknowledge the rights, interests and concerns of their international counterparts. There is a need for all sides to respect each other more, and people at the policy level need to understand the importance of taking into account the national concerns of other countries, not just their own.

The next stage

While everything that is happening now may add up to the end of globalization as we have known it over the past 20 or 30 years, it surely does not mean the end of globalization as a whole. Rather, we expect that the process will move forward but with a shifting of priorities and changes in the roles of multilateral institutions, major economies, governments, companies and individuals. For most of the modern era, economics has been the driving force behind international cooperation and global development, but given current events and the geopolitical uncertainties that the world faces, national security issues, perceived or real, are becoming a top priority in many countries.

So while inevitably, globalization will continue in some form or another, it is very likely that we will see fundamental splits, with decoupling now being almost unavoidable. In such a scenario, the economic spoils are going to go to those economies and companies that can succeed in multiple markets. Countries like India, Singapore and many others that have not excluded themselves from any particular market are far better positioned than those which abstain from one or another. Examples of companies could be Apple, whose sales of computers and iPhones in the Chinese market are still strong, ByteDance with its sister apps Douyin and TikTok, and Tencent, which is seeing international success through behind-the-scenes ownership of major gaming companies in the West. Companies which are stuck in one market or the other are likely to lose out.

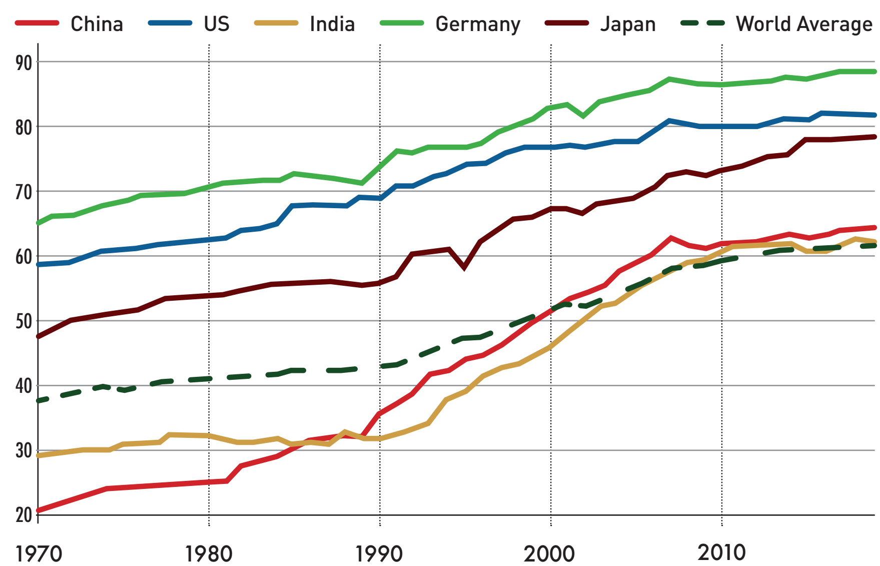
Fractured globalization

The fractured nature of the next stage of globalization that we foresee will lead to different sectors being globalized to varying extents. The sourcing of parts for mass-manufactured products will continue to be mostly decided on the basis of cost, and they will continue to be fully-globalized commodities. There are few national security concerns with regard to cheap, basic electronics, for example.

There will be a geographical global split between high-value commodities and common, low-cost products. Again, a company that can straddle each of these market sectors will have a higher chance of business. But the higher up the value chain you go, the closer you get to something that might have an effect on national security, thus you will see a lower level of globalization. The clear lack of cooperation between the world's major nations on space technology provides a good illustration of this.

During this round of globalization that is coming to a close, China became the unquestioned leader in low-cost production and has developed one of the world's most comprehensive domestic supply chains, but the country is now

TAPERING OFF | After steady gains over the past five decades, gloablization index* growth is starting to slow



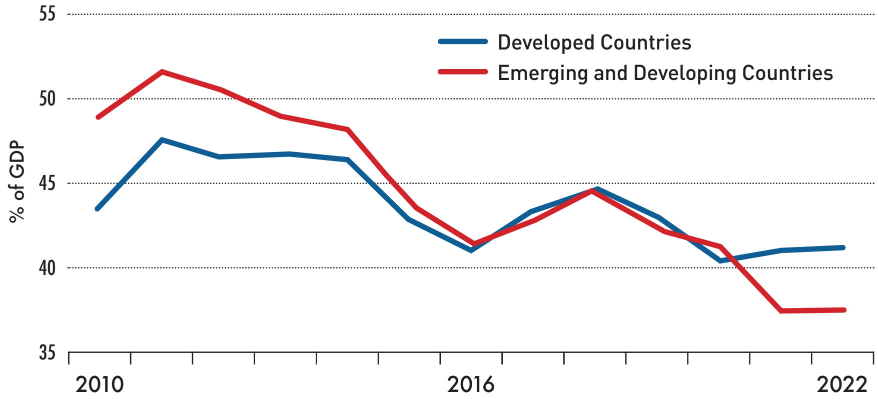
* A rating given to countries based on changes in various economic, social and political dimensions

Source: KOF Swiss Economic Institute

CLOSE TO HOME

International trade as a percentage of GDP has been dropping in recent years, signifying a shift in many countries to greater self-reliance

International Trade as % of GDP 2010-2022



Sources: Euromonitor International; OECD; IMF

also home to world-leading innovation in many areas and in general, aims at developing into a producer of high-value technologies. The country's views on its competitors, in particular the US after the situation with Huawei, has also shifted, and many in China seem certain that future development has to be achieved independently. China has introduced the "Dual Circulation" policy to encourage domestic production to cover the dangers of an increasingly unstable international market. This means that in the near future, China will be looking to increasingly turn to emerging markets for the bulk of its trade. But it is likely to retain a significant role in the US market if for no other reason than its lower cost of production and logistics efficiency, for without a drop in production costs, the US faces a serious risk of increased inflation.

It is in the emerging economies, mostly in Asia and Africa, that the next promising markets can be found, and it is already clear that companies that have seen success in China have a higher chance of doing well in emerging markets, due to the similarities in the level of economic development. Many successful international companies in Southeast Asian markets are Chinese and there are very few US companies with a solid presence in that region. In Africa, which has been largely an open playing field for business over the past 20 years, Chinese companies are clearly winning. All this also highlights the ongoing importance of China as a market.

Public and private

But, as we have mentioned in our Spring 2020 and Winter 2016 commentaries, the private sector will still need to play a major role in the new phase of globalization. The fact that there is a growing adversarial aspect to international relations is another good reason to place greater emphasis on cooperation between private business people, who tend to have more autonomy and often are more pragmatic and innovative. Many top business leaders still see immense value in global markets that their governments may see as dangerous competitors, and believe that rhetoric-driven policies and sanctions ultimately hobble the competitiveness of their domestic private companies.

Elon Musk, for example, is well-known for being outspoken on issues, with opinions that may go against the current political tide, and for good reason. Tesla has seen great benefits from its Shanghai manufacturing facility, with its China revenue more than doubling two years in a row, and SpaceX has demonstrated a great deal more efficiency than NASA, given similar levels of funding.

China has got to where it is today by creating a balance between SOEs and the private sector, and giving full reign to the positive energy of private enterprise is important in making sure that China has the capability to compete effectively in the new phase of globalization, and in particular the digital economy, where entrepreneurship and innovation will be more critical to its global competitiveness than ever before.

Actions by China's government can be extremely effective in terms of boosting economic growth and offsetting threats to economic development, but at the same time an overly heavy hand can have negative effects. Something we saw 40 years ago, before the "Reform and Opening Up" policies were introduced.

Apart from the role of the private sector, there is also an important trend in the growth of a public desire for business to take on more social responsibilities. While China can, again, learn from other parts of the world and develop its own model in this regard, all countries need to be careful that their ESG initiatives do not act as greenwashing.

Globalization, again?

While globalization as we have come to know it over recent decades may be coming to the end of the road, the next stage of globalization will similarly involve both opportunities as well as risks, and the private sector is going to be key for all countries in navigating through this transition successfully.

The increasingly adversarial nature of political discourse between the world's great powers is a worrying trend, and could quite easily lead to an expansion of the various global crises that we are already facing. There is a sense that politics wants to keep the world divided, but people today are inexorably connected through technology, culture and, importantly, business. It is vitally important that these connections are well-maintained and promoted through dialogue at all levels, from thought leaders to businesses people and regular citizens, because while the new era of globalization will be more fragmented, it is critical that it does not lead to complete separation of the parts that make up the whole.

The Reign of Data

China's new data regulations pose challenges for business, but they also provide an increased level of data security for the country and its citizens

By Matthew Fulco

Image by Jason Wong

Data security and data sovereignty are becoming increasingly important factors in global governance

Didi Chuxing's $4.4 billion IPO on the New York Stock Exchange (NYSE) went south fast. Within days of the June 2021 listing, the Cybersecurity Administration of China (CAC) launched an investigation into the company and banned new downloads of its app from local app stores. Its share price plummeted. By December, regulators ordered Didi to delist from the NYSE.

Like other governments around the world, the Chinese government is paying ever greater attention to data security, the process of protecting data from unauthorized access and data corruption throughout its lifecycle, and privacy concerns and is placing ever greater restrictions on companies with regard to the data they collect via their business. And Didi's information was particularly broad and sensitive in its nature because it has information on where just about everybody is going in China, all of the time.

"'Data security' is a good way for regulators and other government stakeholders to package what transpired with Didi Chuxing," says Ross Darrell Feingold, senior advisor at DC International Advisory, a global political risk consultancy.

Didi's travails are not only its own; they are representative of the problems of a sector which has long seen data as a golden egg. It and other tech giants rely on insights they glean from user data to customize products and services for customers, but for years, the collection and use of this data went largely unchecked. "Having control of data is so important today because people's daily activities are highly dependent on digital tools," says Lee Cheng-hwa, an industry analyst at the Market Intelligence & Consulting Institute. "Their digital trajectory becomes the key to quickly understanding, identifying and monetizing consumer preferences."

Yet with the regulatory winds changing, the country's tech giants face choppy waters ahead. In March 2021 during a meeting of China's top financial supervisory committee, Chinese leader Xi Jinping ordered regulators to tighten oversight of internet companies and crack down on monopolies.

Since then, Beijing has moved steadily to create a policy framework that requires full oversight of user data held by private sector companies—primarily China's own tech giants. In late 2021, both the Data Security Law and the Personal Information Protection Law came into force. Together with 2017's Cybersecurity Law, they give the state a stronger role in the protection of user data and also greater oversight of the potential flow of China data beyond the country's borders.

Chinese tech firms that once may have sought to list in New York will now have to think twice. The operations of multinational firms in China are also being affected, and in order to comply with the regulations they have all set up local data storage operations.

China's new regulatory controls over data are not unique and also not necessarily more stringent than other jurisdictions in the West. Similar new data regulations have been promulgated in the United States and Europe, in Washington's case the Clarifying Lawful Overseas Use of Data Act (CLOUD Act) and Brussels' General Data Protection Regulation (GDPR).

And while the regulations will certainly lead to changes in the way that companies operate, the recognition by both the state and private enterprise of the value of data, especially over the past five years, has resulted in high levels of innovation and technological development.

"The Chinese government considers data an indispensable asset and resource for driving AI-based algorithms, and asserting economic strength and national power in an increasingly digital world," says Daniel Tu, founder and managing director of Hong Kong-based Active Creation Capital and former chief innovation officer of Ping An Group.

Given the importance of data to innovation and development, the firms which come out on top will be those that are best able to adapt to China's fast-changing data regulations. "For China's technology firms, the era of free data collection and usage in China [in terms of consent, liability and cost], is over," says Winston

Ma, author of *The Digital War: How China's Tech Power Shapes the Future of AI, Blockchain and Cyberspace*.

Evolving regulations

The first draft of the Personal Information Protection Law (PIPL) came into effect in November 2021. It laid out for the first time, a comprehensive set of rules governing data collection and protection in China's digital economy. Previously, various pieces of legislation governing data such as the 2019 E-commerce Law and new Civil Code, introduced in January 2021, "covered data protection in a piecemeal fashion," says Ma. "Together with the new Data Security Law and Civil Code, China has developed a complete data regulation framework to cover the complex relationships between individual users, tech corporations and the government," he adds.

The Data Security Law (DSL) is the country's first law designed to limit the ways companies can process and use data, says Active Creation Capital's Tu. The law lays down the rules for the use, resale and movement of data, including across borders. The law also prevents companies from providing any data stored in China, regardless of sensitivity or whether it was initially collected in the country, to any foreign judicial or law enforcement agency without first gaining prior approval from the relevant Chinese authorities. Fines for violating the law can reach RMB 10 million and violators may also face potential criminal liability.

"Equally important is that the DSL expands the scope of regulation to cover not just the initial collectors of data, but also downstream "intermediary services" that use data for commercial and marketing purposes," Tu says. "These downstream data handlers are required to ask their data providers to explain their data sources."

As for the PIPL, like the EU's GDPR, it lays out a set of consumer privacy rights in three categories: informative, corrective and restrictive. These rights allow individuals to receive a copy of their data, to correct or delete it if necessary, and to control its use—such as in decision-making that relies on AI technology. "For example, a bank would have to demonstrate it can reach the same result through a manual process rather than just running the request through an AI decision engine," Nader Henein, privacy research VP at Gartner, said in a November 2021 *Fortune* commentary.

COMPARING STANDARDS

The new Chinese data laws offer some similar protections to Europe's GDPR and the US CLOUD Act

Key data protection standards:

● Absent ● Partially addressed ● Addressed

Strength of the general legal framework for personal data protection

	China	European Union	United States
Privacy protected by constitution	○ ○ ●	○ ○ ●	○ ○ ●
Definition of personal data	○ ○ ●	○ ○ ●	○ ○ ●
Legal framework for personal data protection and coherence	○ ● ○	○ ○ ●	○ ● ○
Independent data protection agency	● ○ ○	○ ○ ●	○ ● ○
Civil society participation in regulations and oversight	● ○ ○	○ ○ ●	○ ○ ●
Possibility of consumer lawsuits	○ ○ ●	○ ○ ●	○ ○ ●

Source: Mercator Institute for China Studies

However, the EU GDPR also differs from China's data laws in important ways. "The former is focused on protecting EU residents' personal information collected by individual enterprises," says MIC's Lee. In contrast, China's data laws are more expansive in their coverage, while penalties for violating them go beyond monetary fines. "For China, it is all about national security," he says.

Under the PIPL, "there are very serious administrative and criminal punishments for the violators who intentionally or unintentionally process personal information in breach of China's national security requirement," China-based lawyers Ken Dai and Jet Deng said in an article comparing the GDPR and PIPL.

A key message Beijing intends to convey with its new data legislation is that "cyberspace is not beyond the law," says Tom Nunlist, a senior tech and data policy analyst at research firm Trivium China.

Yet security issues are not Beijing's sole consideration. "It's 50/50, security and economics. It's about keeping these two things in balance with each other, and fostering data as a national resource: recognizing it, protecting it and facilitating its use," he adds.

> **It's 50/50, security and economics. It's about keeping these two things in balance with each other, and fostering data as a national resource**
>
> Tom Nunlist
> Senior Tech and Data Policy Analyst
> Trivium China

DATA RULES | China is using multiple measures to regulate data, some published and some still in draft form. Each measure covers one or a number of different topics

Government measure	Total number of each type of measure and their status	Number of measures addressing each topic						
		Digital Economy	Security	Data Flows	Encryption	Online Content Management	Securing Critical Infrastructure	Security Review
Standards	Finalized - 7*	7	7	1	0	0	7	4
Regulations	Finalized - 8	7	7	0	0	7	0	1
	Draft - 3	3	3	1	0	0	2	2
Laws	Finalized - 3**	3	3	1	2	1	1	2
	Draft - 1	1	1	0	1	0	0	0
Strategies	Finalized - 6	6	6	0	0	0	0	0

* The seven measures mentioned here are only a fraction of the standards relating to the topic
** The Cybersecurity Law (2017) is the only measure covering all seven topics
Source: CSIS

To that end, China's tightening data oversight also can be seen as a response to consumer needs. "After years of Chinese internet companies building business models around Chinese people's lack of awareness about privacy, users are becoming more knowledgeable, and they are becoming angry with companies abusing their personal information," says Winston Ma.

Compliance burden

China's tightening data regulations affect both domestic and multinational firms, with local tech giants likely to take the biggest hit in the short run. For instance, in the 12 months after the nixing of the IPO planned by Ant Financial, a major fintech company controlled by Jack Ma, the market capitalization of Alibaba, which is also controlled by Ma, fell more than 50%. Investors are reacting to the company's regulatory travails, including an obligatory restructuring. It will have to relinquish some control over consumer data that has been integral to its competitive advantage in digital financial services, likely by setting up a personal credit reporting company.

Big platform companies are being singled out by regulators because "they collect personal information on a massive scale," says Trivium's Nunlist. Compared to companies without such vast troves of user data, "they get the scrutiny from regulators. The compliance burden is pretty significant."

The new regulatory framework likely means changes are in store for how China's internet giants operate. "Companies like Alibaba, Tencent and ByteDance will have to rethink their business models and how they collect data," says Winston Ma.

> The Chinese government considers data an indispensable asset and resource
>
> Daniel Tu
> Founder and Managing Director
> Active Creation Capital

Multinationals operating in China, meanwhile, face a different set of challenges. Cross-border data transfer will get more complicated for them. In the PIPL's case, there is a requirement for individual user consent for data to be transferred out of China. "Consent makes cross-border transfers impractical, because even if a minority of individuals object to the transfer of their data, it would require the establishment of local store-and-compute capabilities," Gartner's Henein noted in the *Fortune* commentary.

Some multinationals with large China businesses chose to develop greater local data storage capabilities ahead of the two new laws. State-owned Guizhou Cloud took over as operator of Apple's Chinese iCloud service in 2018 while the US tech giant launched its first China data center in Guizhou Province last May. Apple also plans to establish a data center in Inner Mongolia. That same month, electric carmaker Tesla said it had established a data center in China for the purposes of "localization of data storage" and that it would add more domestic data storage facilities in the future. China is Tesla's second-largest market after the US.

One area to watch is what the new laws

mean for multinational companies in terms of complying with foreign government sanctions. This is especially important given the increased frequency with which other governments are placing sanctions on various Chinese entities, even if they do not necessarily have assets outside China, says political risk analyst Feingold. “Multinational companies might have some challenging data requests from foreign governments to deal with.”

Data as the new oil

In 2013, shortly after beginning his first term, Chinese leader Xi Jinping said, “The vast ocean of data, just like oil resources during industrialization, contains immense productive power and opportunities. Whoever controls Big Data technologies will control the resources for development and have the upper hand.”

Broadly speaking, Xi was underscoring the importance of China as a country taking a leading role in the cultivation of Big Data technologies. The 13th Five-Year Plan vowed “to implement the national big data strategy” while at the 19th National Congress in 2017 Xi emphasized the need to “promote the deepened integration of Internet, Big Data and artificial intelligence with the real economy.”

The trifecta of legislation that has accompanied these broad policy objectives—the Cybersecurity Law, Data Security Law and Personal Information Protection Law—has been aimed at cementing China’s data governance model. “The overarching motivation is exercising cyber sovereignty,” says Active Creation Capital’s Tu. “Beijing also regards data and the digital economy as a major opportunity to overtake the US and the West.”

Winston Ma notes that China is the largest data market in the world. And he expects that China will continue to develop its data rules to cover more aspects of the new digital economy. “China’s data rules will become an important reference case for the world, especially the emerging markets, as more and more countries are starting to develop their own data regulations,” he says.

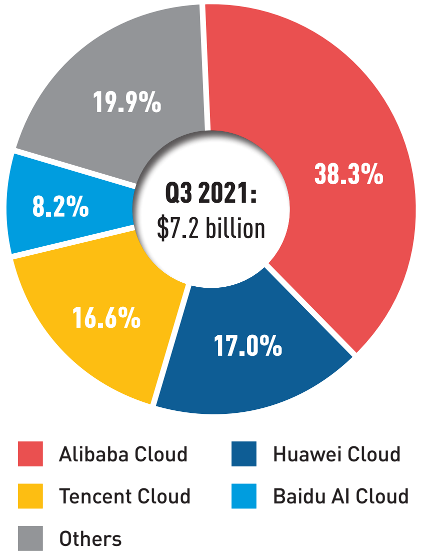
One risk for China is that the state’s increasing attempts to control data use and flows in the private sector could blunt the edge of its top internet companies. While there is broad consensus that more comprehensive regulation of their data practices is needed, there are some concerns that regulators may go too far.

> **Companies like Alibaba, Tencent and ByteDance will have to rethink their business models and how they collect data**
>
> Winston Ma
> Author
> *The Digital War*

However, Herbert Yum, a research manager at Euromonitor International in Hong Kong, expects that China’s tech giants will be hardy enough to withstand the changes. “Since they are not fixed-asset intensive, they are more resilient [than firms which are] to adverse events in the economic cycle,” he says.

WHOSE CLOUD?

Spending on cloud infrastructure services by China tech firms



Source: Canalys

In some respects, the new regulations appear to put multinationals at a disadvantage vis-à-vis local firms. “Some of these measures have a protectionist result, because in the space of the largest data collectors, Chinese companies will have a better ability to quickly implement (at least in the short term) sufficient compliance measures,” political risk analyst Feingold says. He expects that all multinationals need to reconsider their China mainland operations in light of the new rules, obtain outside legal advice, possibly procure new information technology hardware and software, and enhance firewalls to ring-fence China’s data. Such measures may require internal approval at the regional or global level.

At the same time, larger multinationals tend to already have in place governance structures that see company-wide adherence to the strictest set of regulations of any jurisdiction they operate in. So for many companies, the China rules are merely requiring the same level of data compliance they already have in place.

Whatever the case, multinationals will have little choice but to comply with the tougher data laws. “In the near future, the business environment [in China] will be less and less free, but the market remains a huge opportunity,” says Euromonitor’s Yum. “So, businesses that don’t want to give up this market will need to learn how to operate safely there.”

China Has a Strong Role to Play in International Trade

Petros C. Mavroidis, professor of foreign and comparative law at Columbia Law School, laments the current state of the WTO, but suggests that there is hope for the ailing organization

China has now been a member of the World Trade Organization (WTO) for more than 20 years, and those two decades have seen a remarkable growth in global trade and multilateralism in general. But over the past few years, many members of the WTO have criticized the body for being inefficient and not functioning in the way that it perhaps should.

In this interview Petros C. Mavroidis, professor of foreign and comparative law at Columbia Law School and previously a member of the WTO legal affairs division and a legal advisor to the organization since 1996, discusses the general state of the WTO, China's role within the organization and the future of multilateralism in an increasingly bilateral world.

Q. How would you characterize the current state of the WTO?

A. My response is really one word: moribund. The judicial function is in abeyance. If you look at the numbers, the average number of disputes per year between 1995 and 2019 is a little over 24. But in the last two years, it's below five, because why go to a panel if it isn't functioning properly, if at all.

In terms of the legislative function, it's very difficult to negotiate free trade agreements in the WTO across the heterogenous members. This is precisely why we are seeing the increase in the number of free trade agreements (FTAs) around the world, because they provide a homogenous setting. For example, the UK cannot sit down and negotiate with Senegal over environmental protection, Senegal has other problems to solve before discussing the environment.

Q. How effective has the WTO been in terms of regulating trade and resolving disputes between the trading countries of the world?

A. This is a much more difficult question than many people think it is, because we need to have an understanding of compliance. A very simple example is this: Assume the UK brings a case against Europe. If the UK wins, and Europe implements whatever they are told to as an outcome of the case, it is not abundantly clear whether that is solely because of the WTO. Europe could choose to implement either because the WTO obliges them to, or because the UK promises a vote for Germany, for example, for a seat on the Security Council of the UN. Now, this is private information, and something we're unlikely to ever know. So it's hard to tell whether it was the WTO's doing or if there was something else in play.

If we don't care about the rationale for implementation, then the WTO has an impressive compliance rate of over 85%. But if compliance stems from ulterior motives, then it's not necessarily because of the WTO, it is more because these countries interact with each other at different levels.

Q. As part of China's accession to the WTO in 2001, it agreed to a series of measures aimed at bringing its economy more into line with WTO norms. To what extent has China done what it said it would do and how have other nations responded?

A. There are so many misconceptions about what China agreed to as part of its accession to the WTO and the WTO itself. The WTO is the outcome of a negotiation between the Europe and the US after the GATT (General Agreement on Tariffs and Trade), and during these negotiations they took it for granted that we're all liberal countries and we all have liberal economies. So instead of regulating internal markets, they looked at regulating "excessive exports" and "dump exports," among other things. But the issue with China is not its exports, because there is already a panoply of measures to deal with that: anti-dumping, countervailing, safeguards, special safeguards, you name it. The problem with China is the Chinese domestic market, and this is not something that the WTO regulates nor has the mandate to regulate.

The fact that China's internal market is not to the liking of some WTO members is something they should have thought about back in 1999, not now. And at this point, if China is violating anything, it is the spirit of the "liberal understanding" of the WTO, and not the letter of the law. For example, there is only one dispute case that China lost and the complainant still maintains that China has not implemented the decision, which was the case over China's bank card monopoly.

There should have been a better discussion of subsidies and the role of state-owned enterprises (SOEs) within China, because now, 20 years later, people are still complaining about the role of SOEs—the word is even missing from the WTO subsidies agreement. Also, many of the issues are around transfer of technology, which is private behavior, so there's not much we can do about it anyway due to it being outside the WTO mandate.

Q. The WTO is weighed down by a variety of disagreements and accusations on specific trade issues by various member states. In your view, what is the right solution?

A. I make a distinction between the claims concerning the judicial function and the claims concerning the legislative function, because they are two different things. I am not on the same page as the US regarding what went wrong with the judicial function—the appellate body. I'm not saying that it is perfect, in fact, if you look at my papers, I'm very critical of the quality of the cases. But I wouldn't say that disabling the whole thing was the right solution.

When it comes to the legislative function, the WTO has two roads to take because it is impossible to continue negotiating across 164 different members. It's one thing to negotiate tariffs, it's a different thing to negotiate on the environment, public health, competition policies, fiscal policies, and compare innovation markets. These are difficult issues that few countries truly have the ability to care about. So either the WTO opens up to plurilateral agreements, allowing subsets [of countries] to go negotiate a deal which can be joined by other countries at a later date. Or we take the 15 to 20 most representative Free Trade Agreements (FTAs) that currently exist and see how many of them overlap with each other, and how much of that overlap can be brought into the WTO's remit.

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Q. What's your view on the situation and prospects of FTAs such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the Regional Comprehensive Economic Partnership (RCEP) and how they relate to the WTO? To what extent is the WTO in danger of being overtaken by bilateral or regional trade pacts?

A. I think that FTAs are inevitable. If you look at the content of FTAs, and the content of WTO negotiations, it is two ships passing in the night. There's no overlap. Business communities nowadays care much more about FTAs than about the WTO as this is where global value chains, among other things, can find their way. FTAs have already overtaken the WTO, the question now is, what can the WTO do about it in light of what has happened? And that relates back to how many of these FTAs can be absorbed into the WTO.

Q. To what extent do you think the content of these FTAs could be absorbed into the WTO and how would that affect China?

A. One of the points we made in our book was that the international community got it wrong on SOEs in the WTO negotiations and that they should check the CPTPP for how to do it properly. There was a difference between the WTO and CPTPP negotiations in that the CPTPP was negotiated with China in mind but without China's participation, so it was the first-best solution for the US to corner China. And we suggested that if this is what is required, the CPTPP agreements could be replicated inside the WTO.

Now, China has said it wants to be part of CPTPP, which means they're prepared to accept disciplines on SOEs that the US designed for China, without China's participation in that negotiation. It's impossible to predict how the negotiations will go, because China could request exemptions. But, what we do know is that they are ready to negotiate on the basis of the CPTPP agreement originally hashed out by others.

You would expect the US to be happy with this outcome, as these are the restrictions they wanted to impose. But what did the US do? They said to Canada and Mexico, "If you agree to China joining the CPTPP, I might leave the North American Free Trade Agreement (NAFTA)." It's strange.

Q. Do you think China's "Dual Circulation" policy and stressing of domestic production is a barrier to engagement?

A. This is what a lot of countries have done, not just China. Germany was accused of doing exactly the same thing, export-led growth, Singapore as well. China is not the first, and will not be the last. So yes, it is a problem, and a big one at that. But it will only change if we manage to find a solution regarding the openness of the Chinese market. This is where the Comprehensive Agreement on Investment (CAI) between Europe and China comes in. There has been negative feedback around it, and I understand why the US is upset that it wasn't involved in negotiations, but it is the first agreement which looks into opening up the Chinese market for one big player, and hopefully more than that.

Q. The WTO was set up on the basis of shared values and principles by the major member states at the time. But it is argued by some that China has a different perspective. To what extent do you think that is true? And to what extent can explicit wording in agreements offset fundamental differences in perspective?

A. The 1995 WTO agreement was, to a large extent, negotiated between the US and Europe and in a particular historical context. It took place after the Berlin Wall fell and around the time that Fukuyama proclaimed the end of history. Now we know history continues forever, but the agreement took place when almost everybody believed we had turned the page, and moved into a liberal world. This has proven to be wrong and a very shaky basis for an understanding.

> There are so many misconceptions about what China agreed to as part of its accession to the WTO and the WTO itself

China was never part of this liberal world. China never promised it would become a market economy. China consistently said that it was a socialist market economy, and the socialist part was forgotten for our convenience. So the main problem was the difference in perspective between the West and China.

China has a very strong role to play in international trade, much stronger than the British government or the American government, and in today's world, this matters a lot, because what segments international trade is regulation. If you're liberal, you regulate one way and if you're illiberal, you regulate in a different way. That is the challenge for the world community: How do you rationalize your policies? We need to be pragmatic and de-ideologize the regulation of the market.

Q. So what do you see as China's attitude towards the WTO today?

A. What bothers me about China most is its unwillingness to be one of the leaders in the WTO. They don't have skin in the game, and you cannot do that forever. I mean, if you want to be a major player, you have to behave like one. China is playing a waiting game of sorts still, because when you become a leader and you want to impose on the organization, there is a cost associated with this. Currently, China is just watching and profiting through trading without leading any of the discussions about the future of the WTO. And when they do talk, say about the appellate body, they need to do so more forcefully.

Q. How would you see the next five or 10 years shaping up in terms of China's relationship with the WTO?

A. We have imperfect information about the future, but if I were to make a wild guess, I would say a lot depends on how the transatlantic allies behave. I think they will influence China's policies quite a lot. If the US continues the way it is now, where I don't see much change from the previous regime on trade specifically, then it is functionally in abeyance in the WTO. For Europe, it's a group that speaks with 25 different voices if we want to be intellectually honest, and ever since the UK left, the liberal voices in Europe have been reduced to redundancy. So Europe has no political voice, the US is in abeyance to a large extent, and China refuses to lead. That's where we are.

I'm not very optimistic in the short run. We need a major shake up. People need to be sensitized about the cost of there being no WTO and realize that they have to come back and take it a little bit more seriously.

Interview by Patrick Body

OUT OF THIS WORLD

China's space program has been stunningly successful over the past two decades, a feat that has been achieved largely independently

By Patrick Body

The dramatic progress of China's space program has played a part in raising the stakes in extra-planetary governance

Taking her first step outside of the airlock on China's new Tianhe space station, on December 27, 2021 Wang Yaping made history by becoming the first Chinese woman to conduct a spacewalk. Her achievement marked yet another milestone for the country's space program, which has been hitting target after target in its pursuit of extraterrestrial excellence.

Her spacewalk and the *Tiangong*—meaning *Heavenly Palace*—space station, are not China's only recent achievements in space. There was the *Chang'e 4* lunar module landing on the far side of the moon, making China the first nation to achieve such a feat, the *Zhurong* Mars rover, which landed in May 2021, and the *Chang'e 5* lunar mission that made China only the third nation to ever return lunar rocks from the moon. All of these indicate clearly that the country is well on the way to achieving its goal of becoming a world-leading space power by 2045.

The various implications of China's recent space-related successes are huge, and not just for China. But they have been years in the making.

"In many aspects of life, the Chinese play a long game, and their plans for space have been around for quite some time," says Quentin Parker, Director of the Laboratory for Space Research at the University of Hong Kong. "What we're seeing now is the actual manifestation of what they've been planning for the last 20 years. Not only is it astounding, it is set to continue and they're going to be playing an increasingly major role in the space ecosystem."

Stuttering start

China's space program started in earnest in 1956 when the US vs. USSR space race was already well underway and the country's hopes of competing in any serious way seemed slim. It has been said that China's most advanced technology at the time was the diesel engine.

A year after the US put astronauts on the moon in 1969, China made its first major space breakthrough, successfully launching the *Dongfanghong 1—The East is Red 1*—satellite into orbit.

Over the next 15 years, political priorities saw the space program take a back seat. And the next major landmark was the development of the *Long March* series of rockets, which are still in use, that allowed China to initiate a commercial launch program in 1985. It has since launched over 50 satellites for foreign clients—for reference, China itself currently owns or operates 363 satellites.

Experimentation on such a grand scale is not immune to problems, even with strong systems of quality control in place. "China's space program has not always been successful," says Brian Harvey, author of *China in Space: The Great Leap Forward*. "In the 1990s, for example, there was a series of setbacks with launch failures and more recently, a *Long March CZ-5* rocket failed. Even [in 2021], there were four launch failures, mainly new rockets. But this is not unusual, we must remember that rocket science is unforgiving of even the slightest error."

But despite the slow start, the last 20 years have seen China's space aspirations really take hold, with the country consistently setting and reaching ambitious targets. Today, China is at the leading edge of space exploration and development, whether that be manned, exploratory, commercial or military. As well as returning rocks from the moon, in May 2021, it successfully landed a rover on Mars, which then sent back reams of data and performed well beyond its expected three-month lifespan, continuing to send data until November.

"The early part of the 21st Century was ramping up, but in the past few years they've achieved a lot," says Jonathan McDowell, an astrophysicist at Harvard University's Center for Astrophysics. "The plans that they've had for the longest time are now becoming reality."

For Brian Harvey, meeting these targets demonstrates China's space prowess. "China has demonstrated the ability to undertake the most complex and challenging missions—and to be successful first time out," he says. "Historically, this is something new and speaks to its technological sophistication."

Home alone

China's position today is the result of Beijing's commitment to achieving China's space dream of becoming a major space power by 2045. The strong, centralized system of governance that allows the country to decide on a target and reach it, has played a key part in the space program's recent success.

"For the 100th anniversary of the CCP they're planning on launching a probe out to 100 astronomical units from Earth, probably powered by a nuclear reactor," says Quentin Parker. "It's going to have all kinds of interesting scientific payloads on board, but it's also a very strong statement about nation-building."

China has historically worked alone on developing its space infrastructure, a situation that basically stemmed from concerns on both sides. "China has been under sanctions from the United States since 1949—which make it difficult to import technology—and these were reinforced in 1999," says Brian Harvey. "As a result, China had to develop its space program largely on its own, through its own resources and ingenuity."

Security concerns about China's involvement in space projects led to the US's outright ban on space-related collaboration with China in 2011. Ronnie Xiao, a Chinese space industry veteran with over 30 years of experience, says that it is a pipe dream for China and the US to work together. "I don't think there will be any cooperation in the short-term, at least within the next five years or even 10 years," says Xiao. "In the space industry, we call it the new Cold War."

China was involved in the early stages of the European Space Agency's (ESA) Galileo Project—a global GPS satellite system—but didn't play a long-term role. "There were Chinese investors involved at the start but, and I guess it was for political reasons, over time they were phased out of the project," adds Xiao.

Although the scientific ideal would be for full cooperation between all global space programs, developmental isolation has had some positive outcomes for China. "The result of China's isolation is that development is slower and more expensive," adds Harvey. "But it ultimately made the country more independent and self-reliant."

It is worth adding that China is not entirely "alone." The country hosts the Asia Pacific Space Cooperation Organization (APSCO) and has bilateral cooperation agreements with a number of other countries. Including a two-satellite cooperation project with France and technical exchanges with Russia, with which there is a proposed scientific collaboration on a moon base.

Starship private enterprise

Historically around the world, state-controlled enterprises have been at the forefront of space exploration and development—the US space program was guided by NASA, the entire Soviet space effort was state-sponsored and of course, there is the China system. But the big game changer today, is that in the West the super-rich, including Elon Musk and Jeff Bezos, have leaped into the space race. While some have started with tourism, that is not the final aim. The goal is to expand the reach of humanity beyond planet Earth, and the advantage private enterprise has is that it is relatively free of bureaucracy and has seemingly unlimited funds.

Elon Musk's SpaceX conducts launches on behalf of NASA—sending astronauts and supplies to the International Space Station (ISS)—and has long-term, high-value contracts with the US military and the newly formed US Space Force. The company is also leading the way in the commercialization of space—its reusable rockets are world-leading, as is its Starlink satellite network—designed to provide internet coverage worldwide—which is the largest constellation ever launched.

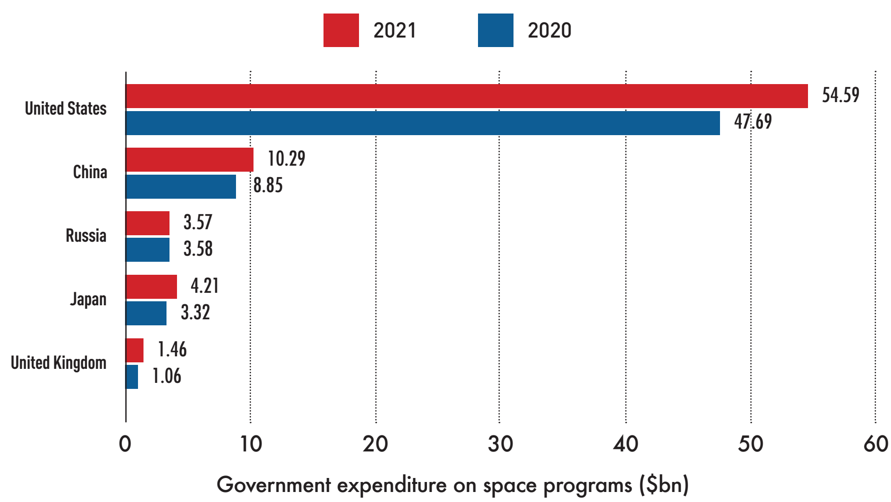
The past few years have also seen an increase in private sector involvement in the Chinese space program, albeit at a lower level of independent operations than in the West. "China wants a thriving commercial space industry because it will mean more capacity and more development," says Gidon Gautel, Associate at LSE IDEAS. "It can also fill a lot of the gaps where the state-owned firms aren't operating."

"The Chinese government started encouraging private equity and venture capital into the space industry around 2005," says Ronnie Xiao. "It has resulted in 100-200 different companies working across the entire space chain, from small satellites to commercial rockets."

But state-owned enterprises (SOEs) still dominate the landscape and many of these commercial companies aren't yet

SPACE SPENDING

Despite its fast growth, China's space program is still significantly smaller than the US in terms of funding



Sources: China Ministry of Finance; Yuekai Securities

SPACE PRESENCE | Use of satellites varies depending on ownership and country of origin

Commercial
Military
Government

1 Communications
2 Earth Science
3 Technology Demonstration
4 Earth Observation
5 Space Science
6 Navigation/Global Positioning
7 Space Observation
8 Technology Development
9 Unknown

Country	Operator owner		
US	SpaceX	1,655	1
UK	OneWeb Satellites	288	1
US	Planet Labs Inc.	188	4
China	Chinese Government	129	4 6
Russia	Russian Government	125	1 8 4 7 6 2
US	Spire Global Inc.	121	8 4
US	Swarm Technologies	120	1
US	US Air Force	87	4 1 8 6 9
US	Iridium Communications Inc.	75	1
US	National Reconnaissance office (NRO)	63	4 8 1 9
US	National Aeronautics and Space Administration (NASA)	60	2 5 4 8 1
Multinational	SES S.A.	51	1
Multinational	European Space Agency (ESA)	51	5 4 6 8 3
India	India Space Research organization (ISRO)	47	4 5 8 1 6
US	Intelsat S.A.	46	1
US	US Government	45	4 6 1
China	China Academy of Space Technology (CAST)	39	4 5 8
US	ORBCOMM Inc.	35	1
US	Globalstar	32	1
Multinational	EUTELSAT S.A.	30	1

Source: Dewesoft

profitable. "State-owned companies or organizations are still the main operator," adds Xiao. "Most of the commercial businesses are relatively small as it takes a long time for them to develop, but profitability is proving to be a big headache for them. Most of my colleagues in the industry foresee a lot of M&A over the next five years."

These private enterprises also need to focus on where SOEs leave gaps in the space ecosystem, rather than trying to compete, as state-control is always likely to win out where there is competition. "There's a bit of a conflict between what the state-owned firms are doing, and what's happening in the commercial market," says Gautel. "Consider the broadband mega-constellations—you have a couple of Chinese commercial players but you also have the state doing it. And it doesn't make sense to have more than one. So likely, in this area, and some others, high state involvement will also mean the squeezing out of commercial players."

But based on China's current progress in space, and the increasing interest of private enterprise in the space sector, the lack of opportunity on offer in China, as compared to in the US, seems to not be a major concern.

Beyond infinity?

China has steadily developed itself into a leading player in the modern-day space race but the country's ambitions remain grand and it is clear that it has no plans to slow down. "We can expect the current rapid pace of launches to continue," says Brian Harvey. "Between the state and the private sector, China is launching a rocket every week."

This year will see the completion of the *Tiangong* space station, the flagship of China's space presence. Beyond 2022, lunar launches are set to continue, with the end goal of landing humans on the surface of the moon and constructing a permanent lunar base—with mission durations in the weeks, rather than the days achieved in the *Apollo* missions. The mid-2020s will see an attempt to land on a passing asteroid and a mission to return the first samples from Mars. The completion of China's first satellite mega-constellation is also on the horizon, too.

The implications of all this space progress impacts everyone given how ubiquitous space-related technology is in 21st century society, providing things like GPS capabilities and facilitating fast communication. "Our whole society is dependent on space now," says Jonathan McDowell. "If you want to be a superpower on Earth, you better have a strong space program. I think it's as simple as that."

As China is becoming an increasingly important producer of technological advancements in fields such as AI, robotics and quantum computing, the space program can be expected to take on an even greater role—and a valuable one at that. "By 2030, the space economy is going to be worth over $1 trillion, and a lot of that will be in data," says Quentin Parker.

"These technological advancements all require data and the ability to both learn from and communicate through space infrastructure will be invaluable."

Advanced technology can also provide nation-building bragging rights. "Space technology is useful for iconography," says McDowell. "Having something you can point to and say 'look, we can put a rover on Mars, we must be pretty capable,' can be really important."

But the benefits of China's space progress are not just limited to China—those countries that do not have the ability or infrastructure in place to access the benefits of space, now have another option. "The implications for third party nations could be quite positive," says Gidon Gautel. "Whenever China builds or develops something new, whether that's in exploration or in telecommunications, other countries now have more choices in terms of accessing space infrastructure."

But Gautel does see a potential caveat to this choice. "Depending on how the geopolitical situation with the US develops, it could have some negative implications if it means that countries are forced to choose who they're going to side with," he adds.

> **The problem is that the mechanisms of international space governance need revamping**
>
> Jonathan McDowell
> Astrophysicist
> Harvard University's Center for Astrophysics

Rules of the game

The general consensus, from those within the industry on both the Chinese and Western sides, is that more space development is generally a good thing—no matter who is doing it. The main concern for many involved is the governance that guides that development, and perhaps that is where China could contribute further.

There have been recent problems with various spacecraft creating debris in areas that could threaten other craft in similar orbits, including satellites and even the ISS. And also multiple cases of uncontrolled rocket re-entry into the Earth's atmosphere—with a possibility of landing in populated areas.

"Cascading debris could knock out the satellite habitability of the entire low earth orbit zone," says Quentin Parker. "Meaning the technology supporting mobile phones, the internet, everything would collapse. If we don't regulate the way that the debris is monitored, created and dispatched into the Earth's atmosphere or further out, we could face serious repercussions in the future."

Space law is not a new field, and there are five international treaties and five sets of principles that govern outer space which were set up under the auspices of the United Nations between 1967 and 1979. But, given the age of these agreements, the way that the area is governed needs updating to reflect the rapid technological development of the past few decades, and China can engage more in this respect. "The problem is that the mechanisms of international space governance need revamping," says Jonathan McDowell.

Escaping the atmosphere

Despite the fundamental difference between the involvement of private enterprise and the state in China as opposed to the US, progress for both remains strong.

Geopolitical divisions on Earth are starting to impact on space, and memories of the motivations behind the previous space race between the US and the USSR are starting to surface. "Some western leaders see Chinese advances in spaceflight as a great, but non-specific, threat," says Brian Harvey. "It reminds me of the 1950s and 1960s, when Russian advances in spaceflight were seen as somehow threatening, although ordinary people celebrated them and everyone benefited."

Despite the concerns of some Western leaders, there can be no doubt that China's space program is one of the country's most impressive achievements over the last few decades. It is also clear that a healthy competition between the China space program and the space programs of the US and other countries is, at a fundamental level, a good thing for scientific and technological development.

But at the same time, increasing the levels of collaboration between space agencies, researchers and private enterprise should be a priority. "I'm a great fan of the Chinese space program because it is just so impressive and ambitious and they just do what they set out to do," says Quentin Parker. "I think there are a lot of opportunities to work together, with major benefits for so many people. I want to see cooperation. I want to see collaboration. I want to see partnership."

Brain Harvey agrees. "One of the main purposes of spaceflight is science and this always develops faster internationally when countries can share scientific projects and results, more collaboration would lead to more progress—for everyone."

Diversified Thinking

Given the unique challenges presented by the China market to foreign businesses, the importance of strategic thinking cannot be understated

By Edward Tse, professor of Managerial Practice at CKGSB

China is still a target for the business portfolios of many major global companies, despite a myriad negative factors such as the pandemic, geopolitical tensions and supply chain disruptions. Foreign direct investment (FDI) remains an important part of China's overall economic landscape, and the country's leaders remain eager to encourage foreign investment in spite of the headwinds.

China's role in the world is evolving, with rapid and complex changes also taking place within the country itself. The evolving governance system comprising both top-down state planning and a vibrant business sector often bridged by resourceful local governments, has created a unique governance approach. Developed against the backdrop of an ancient civilization and culture, this approach has created a context that very few MNCs have been able to understand and appreciate. China's governance approach is changing to advance its own definition of modernity while dynamically striking the right balance across multiple national priorities.

The evolving China context

When MNCs first entered China, they thought they could simply "plug and play" what they did in other parts of the world, and in a small number of cases this worked, for a while. However, they soon began to realize the need to adjust to business dimensions as manifested in China.

The China context is characterized by changes to policies, technology and demand patterns, in ways that are often complex and discontinuous. Beijing's policies often lead to new directions and priorities for the country, creating new opportunities for businesses and investors alike. Technology plays a major role in China these days and is an enabler for businesses and entrepreneurs to innovate and develop new business models. These factors, as well as shifting demographics, lifestyle pursuits and brand preferences, mean that demand patterns in China are changing rapidly.

As the market has expanded, Chinese competitors have emerged across the board and in many cases, have become serious competitors to foreign MNCs. In some sectors such as e-commerce, online payments and logistics, Chinese players have taken dominant positions.

In the past, Chinese companies, many of them state-owned enterprises enjoying preferential conditions, had strong positions only in a few sectors. But Chinese companies are now exhibiting strengths and outmatching marquee Western MNCs in many more areas of the economy. One critical reason is that Chinese companies are usually better able to anticipate changes

> China's governance approach is changing to advance its own definition of modernity

and disruptions brought about by shifts to the key drivers of business here well before the MNCs do.

The third way

The entire China context needs to be considered when companies think about their strategies.

Decades ago, Western corporate strategists only thought about business strategies in two ways: "diversification"—building conglomerates with portfolios of vast and often unrelated businesses—or "focus"—building solely on the company's own "core competences." Since then, these two concepts have both shaped strategic decision-making and how the capital market evaluates companies.

But, neither of these two concepts can fully explain the corporate growth phenomenon in China—and of some tech companies on the West Coast of the US. In 2014, I proposed an alternative way of strategy formulation in which companies go through "multiple jumps" from an existing scenario to a new opportunity even without having the necessary experience and capabilities. Under this approach, corporate leaders taking this approach constantly evaluate new opportunities versus the extent to which they can build capabilities in the new area, either by themselves or through partnership "ecosystems." This is what I call the "Third Way of Strategy" which bridges the theoretical gap between the first two concepts by explicitly considering both market opportunities and internal capabilities. The Third Way has become prevalent as new opportunities emerge rapidly in China as policies, technology and demand patterns evolve.

By using the "multiple jump" strategy, many local companies have crossed over from one sector to another to seize new opportunities by leveraging underlying technologies such as the internet, and now increasingly, artificial intelligence, the internet-of-things, 5G, blockchain and cloud computing. They may lack many of the capabilities needed in the new space but they will try to meet these requirements, either internally or through partnerships.

Local companies were the first to grasp opportunities in this way, but foreign companies too are beginning to follow the same approach, most notably in internalizing the fact that market development in China is often non-linear, discontinuous and multidimensional.

The organizational manifestation of the "Third Way" of business strategy is, therefore, business ecosystems, which are developed in order for companies to close these capability gaps as they "jump" from sector to sector.

What localization?

Foreign MNCs have been aware of the need for localization for a long time. Their initial version of localization, however, was simply to hire some local people, while non-locals still controlled major decision-making, including strategy.

But this has been evolving. Many MNCs now hire a "Head of China," usually a Chinese person with a sales or marketing background, and their priority is to meet sales targets usually set by global headquarters. Some multi-business unit companies designate someone as a "China CEO" or "Chairman" whose focus is largely to build and maintain government relationships, both local and central, and with Chinese joint venture partners where applicable, besides being the public face of the company in China.

Neither of these leadership strategies is ideal for the China market. The operations-focused leadership concentrates on achieving financial targets for the company's business based on "what was defined and agreed upon." These managers are typically heads-down, linear, incremental and KPI (key performance indicators)-driven. The ceremonial leadership structure focuses on relationships, events and ceremonies. They may be involved in business peripherally, certainly not at the core. The headquarters of such companies are typically handicapped as they are at a distance from China, and lack adequate understanding or even familiarity with China's context.

Numerous MNCs have hired many Chinese locals, while also transferring in people from overseas, but capability gaps still exist, especially in interpreting the evolving China context. Many struggle to realize their full potential here, not only in terms of revenue and supply chain efficiency, but also increasingly from the knowledge and expertise to be derived from China's innovative business environment. Some have been taken by surprise by new policies, new innovations and the emergence of new competitors, and a simplistic approach to localization and assignment of some expatriates to China is not sufficient to ensure that MNCs can adequately achieve their purpose.

Common pitfalls

While the ability to think strategically is a key requirement for MNC managers in China, not many MNCs have been able to effectively develop these kinds of skills among their managers on the ground.

> **While the ability to think strategically is a key requirement for MNC managers in China, not many MNCs have been able to effectively develop these kinds of skills among their managers on the ground**

> By using the "multiple jump" strategy, many local companies have crossed over from one sector to another to seize new opportunities

Without a basic level of strategic thinking ability, companies face a number of common pitfalls.

1. Missing out on discontinuous opportunities (or threats)
As opportunities (and threats) often arise unexpectedly in China, an operations-focused, linear approach isn't ideal. While being operations-focused is critical in achieving short-term results, the ability to strategically anticipate how and when the next discontinuity would manifest itself is crucial to avoid missing new opportunities or threats.

2. Inadequate peripheral vision
A corollary to Point 1 is why and how operations-focused managers often miss situations that may be emerging at the fringe of the company's business as they focus only on its core strategies. For example, many MNCs tend to focus on the premium segments in China, but often a "mid-market" segment will emerge. MNC managers are often slow to respond to mid-market opportunities, which are often served better by quickly emerging local competitors.

3. Missing out on new competitors
Initially, MNC managers focused upon operations typically ran into local competitors within the same industry and already known to the MNCs. However, as the China context evolves, new local competitors now often emerge "from nowhere in particular." These may be smaller local companies who were able to see the emerging market opportunities, or they could be local players who are already successful in adjacent sectors. Often these competitors bring with them ecosystems and capabilities that the incumbent players may not have and as such can rewrite the rules of the game.

4. Needing a better understanding of how to build capabilities
MNCs tend to regard capabilities as things they internally develop and possess—sometimes gained through mergers and acquisitions or joint ventures. Nonetheless, MNCs generally believe capabilities should be internally owned. This is a heritage derived from the "core competence or capabilities-driven strategy" concept. As mentioned above, a "multiple jump" strategic approach in a dynamic market like China often requires companies to form collaborative partnerships to fill the capability gaps as they jump from one opportunity to another. Commonly called "ecosystems," formation and maintenance of these collaborative partnerships is increasingly a key part of corporate strategies in China and for China in the global context also. Operations-focused MNC managers often lack a prospective and proactive view and fail to build the right ecosystems for their companies.

Key ideas

The role of a leader of China operations of an MNC varies depending on how it is defined by the MNC itself, the most primitive of which is simply a ceremonial facilitator. But the role of the China head evolves as the MNC internalizes the strategic importance of that position. As a full-fledged business leader of the company, the China head has to fulfill a range of responsibilities, not only for the P&L but also for thought leadership.

Given the quickly evolving China context which itself governs how and in what ways MNCs should act in China, it's critical that MNC executives in China possess a certain level of "thought leadership" capability.

Shane Tedjarati, the recently retired President of Global High Growth Regions for Honeywell, a large US industrial conglomerate, and the architect of its China strategy, stresses the importance of viewing and treating the China team as a brains trust. By that, he means that his China managers cannot simply assume "business as usual" and just execute orders. The local team has to be able to fully understand and appreciate the strategic dynamics of the market and be able to propose viable solutions to the global headquarters and business units.

Strategic thinking ability enables local managers to better communicate the conditions in China to the relevant people at global headquarters. More often than not, seniors at global headquarters do not have the time or access to fully understand the situation on the ground. Therefore, accurate and complete input from local managers is critical. More often than not, there is a breakdown and a certain degree of inadequacy in such communications, leading to many of the common pitfalls mentioned above.

Needless to say, operational responsibilities are also very important for the China heads of MNCs. However, downplaying strategic thinking and simply being operations-focused will not suffice for any MNC to become sustainably competitive in China. Both are required. More MNCs have now come to realize this and are willing to make the right investment to build this capability. Given the importance of China and availability of homegrown talents on the ground, in due course we expect a consequent shift in the landscape.

Competition at the Top

Scott Kennedy, senior advisor and trustee chair in Chinese business and economics at the Center for Strategic and International Studies, looks at the fundamentals of the US and China systems and how they interact

The differences between the governance systems of the US and China have sometimes created disconnects, yet in terms of overall economic development the two countries are growing ever closer.

In this interview, Scott Kennedy, senior advisor and trustee chair in Chinese business and economics at the Center for Strategic and International Studies (CSIS), looks at how the China system is developing, the US regulatory approach to China in response to the greater role that China is playing internationally and China's status as an innovation hub.

Q. The US-China relationship is currently fraught with a multiplicity of tensions. How do you see each of them charting a path around decoupling or is decoupling inevitable?

A. If you had asked me three years ago, I would have said that the chance of US-China decoupling in any area would have been highly unlikely. Then along came the sanctions on Huawei, more tariffs as a part of the trade war and the limitations brought about by the pandemic. And now there is Ukraine, which has had a fundamental effect on how Washington looks not just at Europe, but also at China.

The chances of the US and China substantially reducing connectivity today is a lot higher than I would have imagined even a couple of months ago. That said, I don't think it's guaranteed. We already have such a large relationship that is hard to displace and, in addition, there are benefits to both sides to staying together. Our survival as a planet depends on the US and China working together to address climate change and global health. There are fundamental reasons that would justify having a relationship.

It's possible that politicians in both Washington and Beijing will not only realize that, but also take action to make the relationship continue in a more stable way. But currently that's not the case, and companies are not speaking up significantly, either Chinese or American companies. So, I'm more concerned than I've ever been that we may decouple unnecessarily because there's not enough effort taken by either side to maintain the relationship.

Q. CSIS has said that the recent US Innovation and Competition Act is arguably the most comprehensive infrastructure investment action by Congress on China ever. What impact do you think that will have on US-China relations and business partnerships?

A. The Senate passed the US Innovation Competition Act and the US House of Representatives passed the America COMPETES Act of 2022. They're working on a joint bill now. There are important differences in those two versions of the law, but they do a few things. Both try to expand investment in American infrastructure and advanced technologies, encouraging an amount of re-shoring or diversification of supply chains and also creating a higher threshold of compliance on commercial and national security grounds for some elements of the US-China relationship. I don't think the law in and of itself will fundamentally change the nature of the relationship, but it is a good measure of where we are in a

Scott Kennedy is senior advisor and trustee chair in Chinese Business and Economics at the Center for Strategic and International Studies (CSIS). A leading authority on Chinese economic policy, Kennedy has been traveling to China for over 30 years. His specific areas of expertise include industrial policy, technology innovation, business lobbying, US-China commercial relations and global governance.

relationship that is primarily viewed in competitive terms, where China's win is our loss.

Also, we must understand the United States as a democracy. Congress represents diverse interests around the United States and the China issue is unique in the level of consensus there is on it. On almost every other issue, Congress is deeply divided, more than ever before. So that they see eye-to-eye on China should tell us something. In their view, China in the last few years has changed significantly in worrying ways, so American policy needs to change as a result. I think that's the lesson people ought to take from this bill, as opposed to seeing it as simply a knee-jerk American reaction to the rise of another country.

Q. How is China's system, which is often described as a state capitalist system, changing?

A. In the 1990s, 2000s, and even in the early 2010s, the Chinese would describe their economic system as a system in transition. They would say we're going from a planned to a socialist market economy. In addition, we are fundamentally changing the nature of governance and the bureaucratic mechanisms. We're creating new types of regulatory tools. We used to have a mono-banking system, now we're going to have stock market, bond market, futures market. We're going to have private companies, corporation laws. But we're now no longer seeing this framing. China is implementing a lot of changes and reforms, but it's not going from one system to another, rather they are trying to improve the existing system.

In addition, China is changing the way it interacts with the rest of the world. China spent a long time trying to learn the rules of the game in the international system, but I think the Chinese have grown tired of that learning process, even though they learned a lot and they are quite good players in that system. I think they've decided they want to ensure that the international system, and the country's interactions with others, are in the interests of China, and in the interests of the Chinese system, a state capitalist, non-democratic system.

China has translated to a much greater state-intervention economy, with many interferences in investment choices, financial system operations, etc. And that looks like state capitalism rather than a free market economy. But I believe that we shouldn't whine about whether China's system is fair, we should just compete head head-to-head and see what happens.

Q. But how easy is it for the US to compete head-to-head with China?

It's very difficult to compete head-to-head with a system that is deeply intertwined with our own. China uses a lot of that intertwinement as leverage to make it difficult for us to compete effectively. One of the answers that the United States is coming up with is, if you can't beat them, join them. If you're facing a country that's as large as China which makes such massive use of policy to oversee industry, then we need an industrial policy of our own. That's one of the ways to explain some legislation that Congress is working on.

We are still very early in the debate of how the US will adapt to China's economic challenge at the end of the day. Because in the US, we've had our approach to the global economy for a long

Grinding gears: The US-China relationship is increasingly being viewed as adversarial

time and changing it is very hard, particularly in a democracy. We don't know exactly where we'll end up. Right now, what we have is a better sense of what the questions and challenges are as opposed to the answers.

Q. How do you see the prospects for foreign businesses in China, considering these recent trends?

A. Surveys from AmCham show that the majority of foreign companies in China have a mixed outlook. Yes, they can still make money in China, but it is a very difficult place to be. As a result, China will go down the ranks of foreign companies' investment priorities for the future. Part of that is realism, it's much more difficult to do business in this state capitalist system than it has been before.

China itself is reevaluating its relationship with the global economy and self-reliance. The "Dual Circulation" economy is an explicit goal of the Chinese system. China wants to reduce its dependence on foreign countries for semiconductors, airplanes, seeds, for many different things. And if they do reduce that dependence, then they're going to buy less foreign products and are going to be less open to foreign investment. China is signaling to the rest of the world that an opportunity window is closing, and that has dampened companies' enthusiasm. Given the fact that China is the world's largest economy in purchasing power, the largest trading country, with a growing consumer class, there should be more than enough opportunities for everyone. So it's disheartening to see the current level of pessimism that exists about the China market.

Q. There's a growing trend of Chinese companies delisting from the US and then relisting on China exchanges. How do you see this impacting China's financial markets and what are the implications for the US markets?

A. The financial impact for China is going to be a lot bigger than it is for the United States. China originally encouraged state-owned enterprises to list abroad, but eventually private companies listed as well. Aside from the new investment sources available to businesses, there was also a knock-on effect on corporate governance in China. Chinese companies that listed abroad in these mature systems faced a whole bunch of more strenuous reporting requirements. When China created its own stock markets and regulatory structure, this provided an outside pressure to improve regulatory standards, which in turn, pushed domestically listed companies to improve their corporate governance.

The big downside of the shift away from US listings is the corporate governance quality erosion in China, not a direct loss of money. As long as China allows it, those institutional investors that bought Alibaba shares on the New York Stock Exchange can do the same thing on the Shanghai Stock Exchange or in Hong Kong.

I don't think it's going to have a big effect on the American economy, either the financial community or mainstream investors. Chinese companies listed on our markets represent a small fraction of the overall market cap for the US markets.

The big downside of the shift away from US listings is the corporate governance quality erosion in China, not a direct loss of money

Q. In terms of tech, what are the prospects for China versus Silicon Valley?

A. China has many innovative companies and innovative people and on the Global Innovation Index China is now in the top 12, separating itself from other developing countries. That said, China still has a long way to go to be an efficient high-tech power. There's still a great deal of money wasted through projects done either for political reasons or short-term financial benefits.

It will be hard for China to break through to the top five innovators of the world and be in a dominant position in any technological sector. At the moment, China's power comes from having a huge capacity to scale up good technologies, and they have a very large market to buy them. But that's not the necessary strategy for it to be the primary innovator or stand at the top of these technology ecosystems.

There is a huge improvement over previous generations, but China still has a way to go. The most important lesson is that no country can be an innovation island all to itself. Marketization at home and globalization abroad has fostered domestic innovation, and has made up for deficiencies in China's own innovation system. If China leans too heavily on state-owned companies and self-reliance, it's not going to maintain the level of innovation it has had.

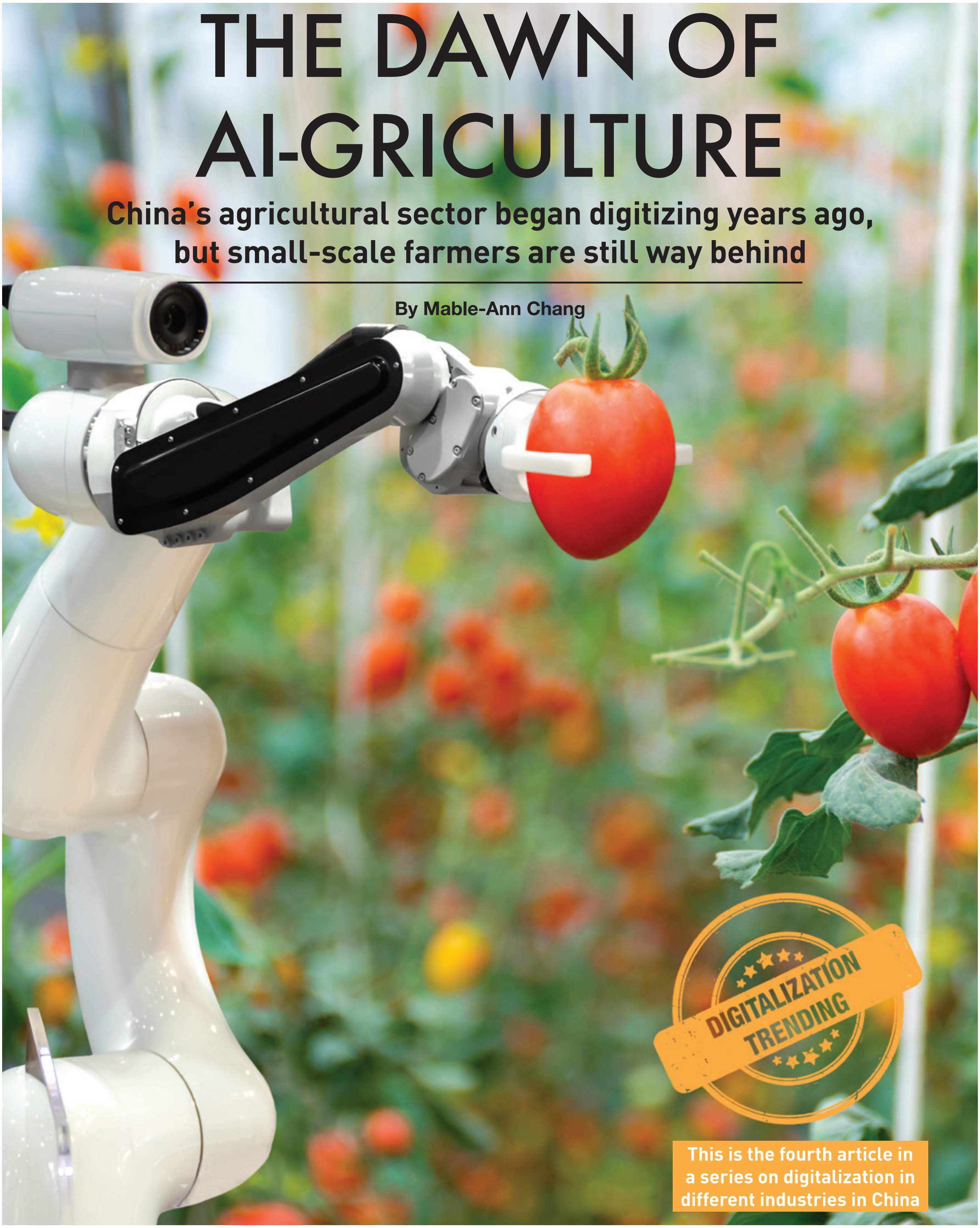
China's size doesn't guarantee that it's going to be an innovative power. It's about how people in China are trained and incentivized and held accountable. Being in a globalized market economy is, so far, the best system we have found on the planet to encourage constructive long-term innovation. China is facing a choice about what type of system it's going to adopt. And that will have huge consequences for China's innovation trajectory.

Interview by Patrick Body

THE DAWN OF AI-GRICULTURE

China's agricultural sector began digitizing years ago, but small-scale farmers are still way behind

By Mable-Ann Chang



This is the fourth article in a series on digitalization in different industries in China

Agriculture is a fundamentally important part of China's economy, but attracting the best and brightest to the industry is an issue

In early 2020, an unusual competition in the western Chinese province of Yunnan pitted e-commerce giant Pinduoduo and the China Agricultural University against strawberry farmers to see whether humans or technology were better at growing the vitamin C-rich fruit. The result was unequivocal—tech beats humans.

The digital experts used artificial intelligence (AI), image recognition and machine-learning algorithms to improve on the traditional approach to raising strawberries by quantifying crop parameters such as ripeness indicators, measuring the need for nitrogen-based fertilizers or looking for bruising not visible to the human eye. At the end of the four-month competition, they had produced a whopping 196% more strawberries by weight compared with the farmers. Before the contest had even ended, the leading tech team was already receiving inquiries from farmers keen to deploy the obviously more successful technology.

Chinese agriculture had to a large extent been left behind in the process of modernization that has completely transformed the rest of the economy since the early 1980s, but in the last few years it has been catching up rapidly. Digitalization in particular offers hope in the form of more efficient production, higher margins and a reduced need for labor.

"The future management of a farm will be like the management of a battlefield," says Anthony Ang, General Manager of the Weifang Qiaoxin Group, a Singapore-headquartered agricultural services company which operates a hog farm in the eastern Shandong Province. "A data terminal in a central control room will receive a variety of signals transmitted signals by IoT devices. Combined, this data can be used to manipulate irrigation systems, greenhouse temperatures, humidity controls, monitor seedling conditions and orchestrate robot weeding, harvesting and other work."

Lettuce eat!

Home to 1.4 billion people, China has 20% of the world's population to feed but only 7% of the world's arable land to do it with. Agriculture plays a much more important role in China's economy than in the developed western economies such as the US and the UK, contributing 7.7% of China's gross domestic product (GDP) in 2020, compared to 1% in the US and UK. It is also a major employment provider, accounting for approximately 315 million jobs across 200 million farms.

Due to increasing urbanization, development and desertification, China has lost around one-fifth of its arable land since 1949, and today only 15% of land in China can be used for farming—in comparison with India where around 50% of land is arable. Over 90% of farms in China are less than 2.5 acres in size, which is one of the smallest ratios in the world.

"China is a large agricultural country," says Ang. "With most of China's land in the hands of small and medium-sized farmers, encountering problems of standardization in the process of modernization is inevitable."

Despite the challenges that China's agricultural sector may face, it is still one of the largest producers of agricultural commodities globally, producing around 29% of the world's rice, as well as 23% of cotton, 22% of corn and 18% of wheat.

But despite high production levels of key commodities, China has also been the world's largest importer of agricultural products since 2012. Between 2020 and 2021, China's food imports as a percentage of total merchandise imports grew by around 1%, taking them to just over 8% in total. It is now also the world's largest consumer of meat and grain.

But China topping the world's agricultural import table is not the ideal for China's leader, Xi Jinping, who has said that the country must prioritize establishing a "strategic baseline" to ensure self-sufficiency for key commodities, including soybeans. Experts, however, generally see it as highly unlikely that China will ever be able to wean itself off agricultural imports in order to satisfy demand. While the country sits 34th overall on the *Economist's* Global Food Security Index and ranks 2nd in food availability, the country is a lowly 64th when it comes to its national resources and resilience rating.

"China's policy goal is not complete self-sufficiency in agricultural products," says Lin Xie, a professor at the South China Agricultural University. "Of course, for the sake of national food security, the Chinese government emphasizes self-sufficiency in the three major staples of rice, wheat and corn, but China's oversized population and the transformation of its food structure make it difficult to achieve self-sufficiency in the short-term."

But the goal, however difficult to reach, remains an important one. Especially with recent geopolitical issues driving up prices of basic commodities such as wheat, which, by the end of 2021, had reached a price of $317 per ton—a level not seen since 2012 and only beaten during the 2008 financial crisis. The price rise even led India, the world's second-largest producer of wheat, to ban its export entirely in May 2022. This ban will have a negligible effect on China's well-stocked wheat reserves, but it is indicative of the growing need to expand domestic production.

Digital transformation

In 2020, China declared that it had achieved its goal of eradicating extreme poverty, with its focus now shifting to, among other things, modernizing the country's rural economy. In order to do so, emphasis is now being placed on the development of agricultural technology, or agri-tech.

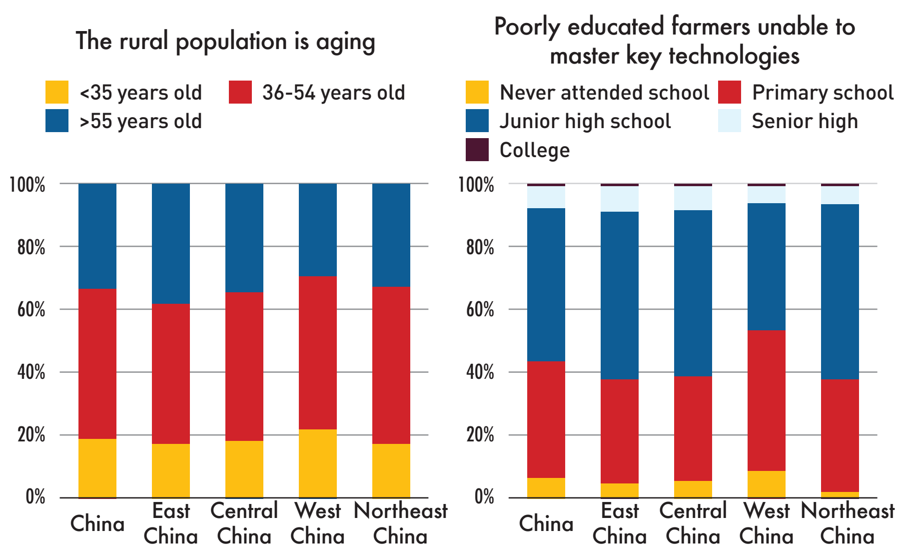
Chinese agriculture has historically been, and remains today, to a very large extent built upon smaller family plots, with the average farm size being dramatically smaller than those seen in other parts of the world and particularly the West, emphasizing the need for technological efficiency.

But in terms of production, intelligent agricultural machinery with AI integration can be seen across farmlands in China, making work more efficient and effective. For example, unmanned tractors are used to level massive cornfields, as well as for harvesting and transportation. Equipped with super-accurate global positioning systems linked to China's own BeiDou Navigation Satellite System, the machines work in coordination with each other after technicians set routes and instructions.

Drone technology is also being adopted across the sector for crop protection, spraying, monitoring and risk mitigation. Agriculture-specific drones are developed by a number of companies, including XAG, a Guangzhou-based company that specializes in working with small-scale farmers, who are deploying them on a day-to-day basis.

Adoption isn't easy, though, as farmers are somewhat reluctant to take on new technology and the cost of the drones and their maintenance is a factor. To address the latter, the drone rollout has been staggered throughout the country, with the first drone purchase subsidy program launched in the eastern province of Henan in October 2014, following this a nationwide pilot subsidies program for agricultural drones was launched in September 2017. Aside from cost issues, the drones also represent a new, disruptive technology that is still unfamiliar to most of China's small and medium-sized farmers, who often lack basic know-how on how to use them. The onus is on both the government and manufacturers to offer education and licensing courses to ensure the effective use of the technology by the farmers.

FARMERS' BLOCK | An older and less-educated rural population limits adoption of new technologies



Source: China National Bureau of Statistics

While the digitalization of tech for agricultural production has its barriers, e-commerce is where real breakthroughs have been made. Farmers across China today are now also able to market and sell their products directly to consumers on e-commerce platforms, boosting sales and reducing costs as they cut out the middlemen wholesalers who they had been forced to sell to before. The internet giants Alibaba, JD.com and Pinduoduo have put significant effort into training farmers to sell via their online platforms.

The platforms have created links between suppliers and consumers that previously couldn't exist, and offer a wide range of benefits. "The producers and farmers are getting time and cost savings as well as clear real time insights into how their business is performing," says Katherine Smyth, CEO of China Jingpinou, a strategic advisory firm which focuses on China's farming industry. "Benefits to society and to the consumer are even more abundant: digital agriculture allows us to assess the nutritional quality of farm products, reduce waste, improve food safety, increase sustainability, prevent food fraud and prove authenticity."

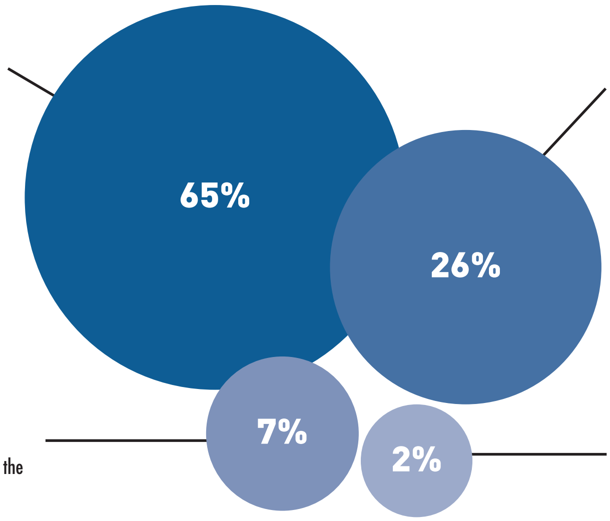
The data collected by these massive marketing platforms also plays a key role in assisting farmers by providing insights into consumer spending patterns and demographic information so that they

SMART FARMING | There are are four major technologies/services in the production chain of smart agriculture

Contribution in China, 2021 (%)

Data platform services
Using data on various indicators collected through satellite remote sensing technology and aerial photography by drones, to establish a data service platform that provides visual management services for agricultural enterprises.

Intelligent breeding
Monitoring the growth of livestock animals and carrying out real-time tracking, body type recognition through ear tags, cameras, etc., and processing and analyzing the collected data such as graphics, to achieve the refined management of breeding.



Plant protection drones
Equipped with advanced sensor equipment, they carry out accurate and efficient spraying operations on crops, conserving water through the co-working of man, machine and chemicals.

Automatic driving of agricultural machinery
Using computer and sensor technology, it realizes accurate positioning of farm machinery based on GPS and machine vision technology, and monitors farm machinery information, operation status and operation speed in real time.

Source: Forward-looking Industry Research Institute

can plan out their inventory and logistics, resulting in cost savings through targeted sales and reduction in wastage. This makes it easier for the many small farmers to deliver on demand, and makes it cheaper for the consumer to buy.

Blockchain, a decentralized and secure data storage technology, is becoming another valuable innovation being embraced by agriculture in China. It can be used to discern the origin, safety and authenticity of food, providing real-time tracking across the entire supply chain, giving a significant upgrade to food safety.

"What's happening today is that produce changes hands multiple times before getting to the consumer, so there has been no traceability," says Xavier Naville, author of *The Lettuce Diaries: How A Frenchman Found Gold Growing Vegetables in China*. "Blockchain and data collection could significantly improve accountability in this regard."

GoGo Chicken is a poultry monitoring technology based on blockchain, developed by a subsidiary of the Chinese online insurer ZhongAn. According to the company, each chicken wears a tracking device, which automatically uploads its real-time progress through the supply chain to the blockchain database. Sensors monitor temperature, humidity and other aspects of the chicken's environment, while algorithms evaluate the bird's health using video analysis.

Many of these developments for rural farmers wouldn't have been possible without advances that have been made in financial technology—China today is almost entirely cashless, with virtually everybody using digital payment systems that are efficient and instantaneous. Also, China's new fintech services offer loans to farmers and small rural enterprises which have been fundamental to the remaking of the sector.

China is also investing heavily in vertical farming systems—the practice of growing crops indoors in vertically stacked layers—and aims to become a world leader in industrial scale applications of these systems in the near future.

A vertical farm in Shaanxi province which started operations in 2021, is entirely run by robots and features planting on 10 layers one above the other, covering an area of 2,400m^2. The facility grows vegetables under highly-controlled conditions and solid yields can be maintained throughout all seasons.

When it comes to the main players involved in this trend of digitalization, it is mainly the state, internet giants and logistics companies that are taking center stage. The internet giants especially are facilitating sales, incentivizing and co-opting research and innovation via universities, and upgrading supply chains via capital investments.

"There is a combination of players involved in this at the moment," says Lynn Frewer, Professor of Food and Society at the School of Natural and Environmental Sciences at Newcastle University. "But it all aligns with current Chinese government policy to reduce the negative impacts of agriculture and increase efficiency."

Global comparison

China has been making major inroads in the adoption of digital technology in agriculture and the development of new technologies overall.

"China is ahead of the field with its digital marketplaces, whether B2B or B2C," says Smyth. "Selling directly to the catering sector like Meicai or to community groups like Nice Tuan is a significantly better deal for producers. This 'farm to fork' direct selling doesn't really exist, at any significant scale, in Europe or in the United States."

But, although the country is leading the way in some fields, in areas such as uniform adoption and application, it still has room to grow. "The reason for this is partly due to the relatively low level of technology," says

Xie. "But more importantly, small-scale farms are hindering the adoption of digital farming technologies."

And China is also lagging behind in compliance with some international expectations. "A big weakness of China's agricultural sector is that it's relatively new to international standards in terms of food safety, which has a huge impact on exports," says Frewer. "It's a problem that technology can help solve in the form of digital records, but it requires farmers to be honest about what they are putting into the system in the first place."

Seeds of doubt

Despite the obvious breakthroughs within the sector, there are several barriers to the further digitalization of China's farms. "It's really hard to create economies of scale when you have a lot of farmers on small plots of land," says Naville. "Economies of scale are increasing, particularly in animal husbandry because they can leverage capital and technology to increase productivity. But when it comes to produce—fruits and vegetables—it's still very fragmented. You can't resolve all of these problems with capital and technology."

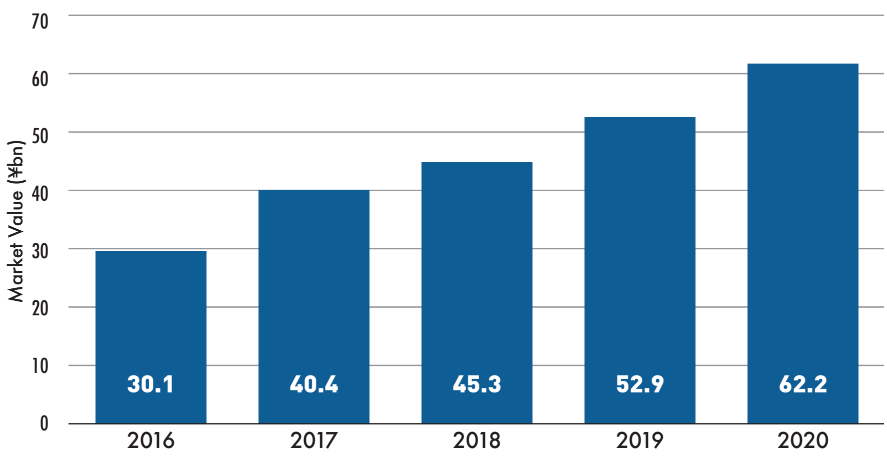
Less than 30% of farmers in China are involved in new businesses like agricultural e-commerce and organic farming, demonstrating an unwillingness to change for some. "Many farmers generally prefer to carry on doing things the way they've always been done because it really is quite a big investment to relearn skills, particularly in an aging workforce," says Frewer. "To assist in widespread adoption, there need to be training programs, extension studies and demonstrations. A lot of farmers adopt new technologies because of peer influence, so spreading it through those social networks is really important, rather than just focusing on the top-down approach."

Financial constraints also affect the enthusiasm of developing new agricultural business, around 56% of smallholders and 52% of large-scale farmers lack the required capital. But even if there was sufficient money to go around, attracting enough big-name tech companies into the agricultural space to produce technology has proved difficult.

"The government has been nudging tech leaders into the agriculture space for almost a decade now, but the space is still not 'cool'," says Smyth. "Some of the stigma has gone, but is still not a space that easily attracts top talent and capital."

Urbanization and an aging demographic in the agriculture sector has also proved to be a challenge, with many young people flocking to cities in search of a better lifestyle. Other macro factors include climate change, a lack of fresh water and issues with soil remediation after the go-go years of the 1980s during which farms were slathered in pesticides and fertilizers.

FARMER'S MARKET | The market value of smart farming in China grew consistently between 2016 and 2020



Source: China National Bureau of Statistics

Laying the foundation

The development of e-commerce has obliterated the distance between farmers and consumers, robot fruit pickers are already replacing human laborers on some farms and data-driven insights are impacting business decisions. But widespread adoption of agri-tech is still several years away with plenty of opportunity for businesses to get involved in the transformation.

"There is scope for far more startups, rather than very big companies, to drive this trend," says Frewer. "It's certainly possible to develop blockchain applications in a very small company, so there is a great opportunity for smaller startups to move into that space."

The government will have to ensure there are training programs and funding in place, especially for small-scale farmers who are at risk of being left behind when it comes to the implementation of this technology.

"China has been popularizing the application of agricultural science and technology for decades," says Ang. "Ordinary farmers are also applying some agricultural science and technology knowledge to their production operations. However, because of the intensification and scale of Chinese agriculture, some of the leading international technology applications, such as AI, still have a way to go."

The success of agri-tech will ultimately be determined by whether or not these technologies can actually improve the bottom-line for small-scale farmers, whose fate depends on them being able to use the new digital tools. Because if they don't, there is a chance that in the longer-term, they will be replaced wholesale by large industrial agricultural operations.

"The jury is still out," says Naville. "If farmers can't earn a better living through these models and they aren't as profitable as originally perceived, then it's not going to work. The mandate, of any official in the countryside is to make sure that whatever business model you bring to the village helps farmers increase their living standards."

GOING GLOBAL

Chinese brands have historically been seen as producing cheap, low-quality products, but both quality and global perceptions are changing

By Faye Bradley

Image by Yuyu Zhou

With a shift from 'Made in China' to 'Created in China,' Chinese brands are finding increasing success in non-domestic markets

When the OnePlus 6T smartphone was launched in mid-2019, it sent out waves of excitement among fans of the brand. Long queues stretched outside the T-Mobile store in New York's Times Square, even during peak working hours. OnePlus, a Chinese brand, has gathered an almost cult-like following in the West due to its innovative and high-quality hardware, a sentiment almost unheard of for Chinese technology not too long ago.

While OnePlus only represented 0.5% of the smartphone market in the US at the start of 2021, the company experienced 286% growth there over the year, and it has gone from strength to strength globally. The company experienced 388% year-on-year sales growth in Europe in the first quarter of 2021 alone, and it now constitutes 34% of the Indian premium smartphone market.

OnePlus is just one of a number of Chinese brands that have emerged as significant players on the global scene in the past few years. Together they are changing global perceptions of Chinese products from being cheap and low-quality to cutting-edge and aspirational.

Other Chinese companies making waves internationally include ByteDance with its app TikTok, Huawei, Oppo and Xiaomi, and also brands that many people would not necessarily recognize as Chinese, such as Lenovo. For Chinese brands, it is all part of a major shift upmarket resulting from an improvement in quality due to China's ultracompetitive domestic market and Chinese brands' increasing standards of competition in foreign markets.

"As competition grows domestically, more brands are looking to expand internationally to elevate their image and diversify sales channels," says Charlie (Xiaofeng) Gu, founder of Kollective Influence, a cross-border marketing consultancy. "And markets are increasingly accepting their products as good quality and desirable."

Outward bound

In terms of global brand power, Chinese companies now have a strong presence on the list of the world's most valuable brands. According to the 2021 Global BrandZ survey produced by Kantar, a data analytics and brand consulting company and part of the WPP group, 17 of the top 100 global brands are Chinese, with Tencent and Alibaba ranking in the top 10.

The survey includes data from seven developed markets—the US, the UK, France, Germany, Spain, Australia and Japan—and since 2021 also four emerging markets—India, Indonesia, Mexico and Brazil—where Chinese brands are pushing to find opportunities and expand market interest with some success.

Technology and internet companies make up the bulk of China's top brand exports, followed by banking and insurance companies. But there are some outliers, such as alcohol brand Moutai, which ranked eleventh in the list, while online real estate platform KE Holdings just made it into the top 100 at 96.

According to the BrandZ Brand Builders survey, Chinese brands that are doing well in developed markets include online fashion brand SHEIN, game creators Lilith and im30 and electronics companies Anker and TCL. Other successful brands include ByteDance, developer of social media app TikTok, which has overtaken Facebook as the world's most downloaded app, and Chinese home appliances and consumer electronics brand Haier, which has a considerable presence in over 100 countries.

Created in China

For decades, China built its manufacturing capability on the back of the original equipment manufacturing (OEM) business—whereby local manufacturers make branded goods for other companies. That is still a major part of China's export industries but these manufacturing companies now have the technology and skills to make products to an international standard and many have started to produce goods under their own brands that are at least as good as those that they have produced as OEMs.

Historically, Chinese brands offered lower quality products and sold primarily on the basis of lower price compared to their Western counterparts. Brands like Huawei and Xiaomi used to be widely regarded as a good option only for cheap, basic phones but would not be considered by buyers seeking top-level performance. But that mindset is changing. "Huawei and Xiaomi are no longer considered low-quality, but rather, on the contrary, a serious competitor to Apple and Samsung," says Gu.

In order to eliminate preconceptions arising from decades of low-cost manufacturing, the Chinese government is pushing manufacturers to transition faster to high-quality goods and leadership in robotics, information technology and clean energy. Another important factor is that China's manufacturers across the board are realizing that they need to move upmarket to survive. And that means producing the kind of quality products which are needed to create the aura of acceptability and coolness for a brand in a non-domestic market.

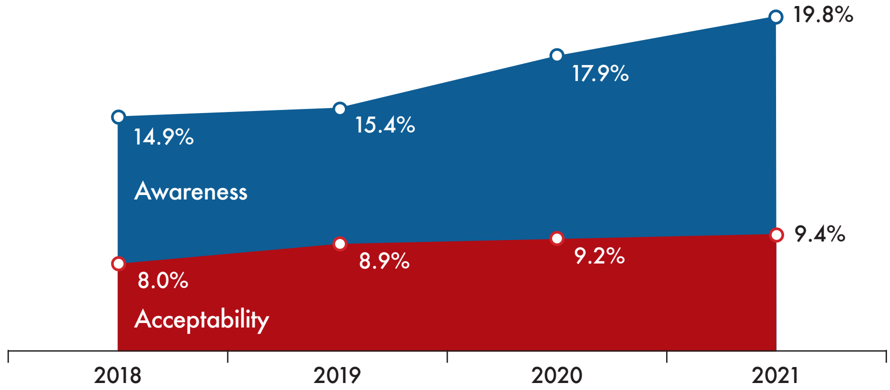
"The quality perception is changing just as it did for Japanese, Korean and Taiwanese products in the past. In the UK in the 1970s, people used to refer to Japanese products negatively," says Joe Studwell, author of *The China Dream*. "They don't do that anymore."

According to the BrandZ survey, growth for the top Chinese brands has been driven in part by the increasing emphasis on factors other than price, including superior quality and the exclusivity of the products they sell, which they are able to do at very competitive prices because of the efficiency of the manufacturing ecosystems in South and East China. "Chinese manufacturers have gotten rid of the stereotype of poor-quality products and earned trust," says Sofya Bakhta, China Market Analyst at Daxue Consulting. "Now, they reflect rapid growth, technology, affordable prices and prospects."

The opportunities provided by the shift in perception of Chinese brands offer a springboard for continued expansion of brand power. "Chinese brands continue to push into fast-growing emerging markets,

BRAND RECOGNITION

Chinese brands are experiencing higher levels of awareness and acceptability by consumers in developed markets



Sources: Google; Brandz Chinese Global Brand Builders/Kantar

bringing to them the same level of insight and innovation that they have [brought] to the developed world," says Doreen Wang, CEO of Kantar China and Global Head of BrandZ.

The Belt and Road fast track

China has also worked to create a new perception of itself as an international power in terms of Belt and Road Initiative (BRI), the China-funded infrastructure development program. Chinese companies are faring particularly well in countries linked to the BRI, with Hisense now the number one TV brand in South Africa while automakers BYD and Great Wall are selling increasingly well in a number of countries including Ecuador, where Chinese cars now rank third in sales volume in the country.

"Through the Belt and Road Initiative, we will see Chinese brands expand rapidly into the associated markets along the new Silk Road and into Africa," says Wang. "It will be more challenging for Chinese brands to bridge prejudice and governmental barriers to enter and to grow their presence in the US."

Chinese tech giant Huawei fell afoul of these barriers, being blacklisted in the US and banned from working on 5G infrastructure projects in a number of countries including the UK and Sweden due to data security concerns. In response, Huawei has shifted to a focus on developing core independent technical frameworks and ecosystems, while at the same time utilizing the opportunities in BRI countries by securing infrastructure deals in Africa and South America. The company installed most of the equipment for 70% of Africa's 4G network.

In general, the electronic goods companies fare well in developing markets. "Chinese cell phone makers like Huawei, Xiaomi and Tecno Mobile are all developing loyal followings in many emerging markets," says Gu. Xiaomi has a market share of 40% of smartphones in Myanmar and around 20% in Indonesia and Bangladesh, Huawei has around a 15% market share in Sri Lanka and Malaysia, and Oppo has around a 20% market share in Cambodia, Indonesia and the Philippines.

"Chinese brands are being increasingly welcomed into developing countries in Asia, Africa and South America," says Teng Bingsheng, Professor of Strategic Management at CKGSB. "Chuanyi (Tecno Mobile) became the number one in the African market in 2020. Interestingly, it does not have much presence at all in China, so the lesson is to be as much a local firm as possible."

Brand expansion tactics

The change in global perceptions of Chinese brands has not happened overnight and companies have had to

BRAND POWER | The top 12 Chinese brands in terms of overseas brand power

2021 Rank	Brand	Category	2021 Rank	Brand	Category
1	Alibaba.com	E-commerce	7	Hisense	Home Appliances
2	ByteDance	Content Apps	8	Haier	Home Appliances
3	HUAWEI	Consumer Electronics	9	ONEPLUS	Consumer Electronics
4	xiaomi	Consumer Electronics	10	vivo	Consumer Electronics
5	Lenovo	Consumer Electronics	11	SHEIN	Online Fast Fashion
6	oppo	Consumer Electronics	12	Tencent 腾讯	Mobile Gaming

Sources: Google; BrandZ Chinese Global Brand Builders/Kantar

adapt to different markets over the years, and in some cases they have had to build from within.

Price is still a factor in the success of Chinese brands in different parts of the world, but it is no longer the only factor. After sales service, technical capabilities and smart design are also among the things that make Chinese products appealing. And in some markets and some cases, there is a growing sense of coolness about Chinese products. The more successful overseas Chinese brands understand this and are finding benefits in creating their own ecosystems to provide consumers with each of these features and services.

"They are delivering their own products directly to consumers and, in some cases, serving as commerce platforms in their own right," says Wang. "Succeeding in building ecosystems overseas often means partnering with local giants and sometimes multinational corporations, co-creating commerce platforms that are much greater than the sum of their parts."

These ecosystems and Chinese brands' mastery of logistics and e-commerce have also proved to be the cornerstones of their resilience throughout the pandemic, and Chinese brands have often outperformed their foreign counterparts during a tough two years. Despite the total global trade in goods decreasing significantly in 2020, the export growth rate of China's cross-border e-commerce increased by 40%, resulting in companies like fast-fashion label SHEIN dominating the US market—which is predicted to reach $1.1 billion in value by 2025—with a 28% share of fashion sales

In other cases, Chinese brands, despite many facing headwinds upon entering a market, have seen successes in global markets thanks to their increasing focus on localization, whether this be through the acquisition of local companies already familiar to consumers, tailored branding campaigns or the setting up of separate company entities in target markets. "Successful examples of branding campaigns include Haier and Hisense, while Huawei sponsoring local football teams is also another great method," says David Thomas, CEO of Think Global Consulting, which facilitates business in various emerging markets including China. "Plus, hiring locals, acquiring local brands—like Haier's acquisition of Fisher & Paykel in New Zealand—and paying closer attention to the needs and cultures of local markets [helps]," he adds.

Chinese brands' deep understanding of e-commerce has also helped with this localization and maintaining success through the pandemic, for example cosmetics brand Florasis utilized TikTok in the US to launch a new product line in 2020 to great success by giving the product a faux-domestic appeal to US consumers. Despite the company only starting out with 45,000 followers on TikTok, collaborations with local influencers led to associated videos being viewed over half a million times, as well as the hashtag #florasis, having over 7 million views.

"The increasing global success of Chinese brands is notably due to the role of live streaming, key opinion leaders (KOLs), artificial intelligence (AI), social media, etc., which has led to rapid advances in retail marketing," says Thomas. "It's likely that Chinese brands that expand globally pay closer attention to the needs and views of Western customers, particularly the younger consumer segments that are highly engaged in new technology."

Some brands are also using innovative one-off advertising events to grab global attention. In 2019, DJI, the world's leading drone maker, lit up the Shanghai sky with an incredible fleet of 1,500 drones in the form of a QR code. When scanned, the code would take them to a page where the user could download a game, and the incredible stunt drew worldwide interest raking in nearly 2 million views on YouTube.

In terms of the consumer-centricity of products, which many Chinese brands have correctly identified as an important part of localization, brands are closely tracking customer satisfaction and after-sales service in order to get it right. The goal is not merely to build a great reputation for current products and services, but to lay the foundation for an enduring presence and long-term success. "TikTok, for example, leveraged a proprietary AI-powered algorithm developed by its parent company ByteDance to adapt its look, feel and user experience for the Western consumer," says Gu.

Despite many successes, gaining global credibility is a trial-and-error process. SHEIN, which is now one of the world's largest fast fashion e-commerce companies, required several shifts in marketing strategy before it found its footing around the globe. And it had its share of missteps along the way, such as referring to Muslim prayer mats as "rugs" and selling the Hindu and Buddhist *swastika* on jewellery in countries where the symbol is associated with anti-Semitism. SHEIN required a shift away from the Chinese understanding of "political correctness" towards a different, more localized view of what is and isn't okay to use.

Its overuse of ads and notifications were also criticized in global, especially Western, markets. But it has now found a strategy that works. "Micro-influencer marketing, fast delivery and competitive prices, a discount policy and socially responsible positioning, were all required to get the brand to the position it is in now," says Sofya Bakhta.

> It will be more challenging for Chinese brands to bridge prejudice and governmental barriers to enter and to grow their presence in the US
>
> Doreen Wang
> CEO
> Kantar China

Data jams

Besides branding and marketing strategies, a key issue for Chinese brands to bear in mind when entering foreign markets is standards of regulation of data.

"Chinese brands have to encounter fears around data security, IP theft and foreign interference which was not a concern before," says Thomas. "Once it was pointed out that TikTok was owned by a Chinese company—ByteDance—and might even be banned due to foreign surveillance issues and data security issues, they lost favor among US consumers."

Huawei's issues in various countries mostly stem from data security concerns, particularly in the US, and other data-driven tech companies are also being hit hard by increasing regulations around the world. At home in China, recent crackdowns on the tech sector and data storage and usage have led to many companies having to restructure their business and, in some cases, split their China and international products.

"A flexible operation model is required," says Joy Ng, Business Director Asia, at AnalogFolk, a global strategy and consulting agency. "Take WeChat and TikTok as examples. Both apps have two versions—a China version and an international version. This gives them the flexibility to deal with different regulations and censor requirements."

India, the world's sixth-largest economy, has proven a difficult market for Chinese companies to penetrate due to considerable regulatory hurdles. The country has recently banned 54 more Chinese apps from online stores due to security concerns, having already banned over 320 apps since 2020. Despite the issues, there are still opportunities for Chinese brands in India, especially where the country has a weak manufacturing base. In 2020, 77% of smartphone shipments to India were from Chinese manufacturers, and Chinese brands made up four of the top five smartphone vendors. Across Southeast Asia, Chinese brands only lag behind Samsung and Apple in terms of market share, with Xiaomi, Oppo and Vivo making up the top five. While Samsung is ahead with 23.6% of the market, Apple and Xiaomi have been battling it out for second place, with the former sitting on 18% as of April 2022, and the latter on 16.78%. Xiaomi held the second spot between August and Novermber 2021.

The future of brand expansion

Despite regulatory uncertainties, pandemic-related restrictions and problems in the political climate, Chinese brands can look to continue expanding into BRI countries and are especially eyeing continued success in Southeast Asian markets over the West. The dominance of Huawei and Tecno Mobile, among other Chinese brands, in the African market has proved that these regions are valuable targets for future expansion.

More and more Chinese enterprises have been actively exploring overseas markets, cultivating new growth points and satisfying the preferences of consumers from different regions and cultures with more diversified products and services. They've done so by making their companies stronger through a mixture of technological innovation, merging and acquiring overseas brands, fulfilling social responsibilities and shifting consumer perceptions.

"The recognition of Chinese brands in overseas markets is [rising], and the influence of brands continues to rise, with some enterprises that have built up strong market competitiveness in the world and are able to adapt to the various needs of the new stage of international development," says a Haier representative.

For these successes to continue, long-term strategies are key. Doreen Wang says, "thanks to a commitment to continuing their momentum, a willingness to implement Chinese best practices abroad, and an expansion of their ambitions to ecosystems of value, we are seeing them gaining not merely market share, but also the loyalty and admiration of global consumers."

Warming Relations

Sarah Kutulakos, Executive Director of the Canada China Business Council, discusses the relationship between the two countries and some of the barriers to doing business

Chinese-Canadian relations have been frosty over the past few years, and governmental issues have had a knock-on effect on business collaboration on both sides. What was once a thriving bilateral relationship was further restricted by the COVID-19 pandemic, but Sarah Kutulakos, Executive Director of the Canada China Business Council (CCBC), is optimistic about a full revival and extension of the bilateral business and trade relationship.

In this interview she discusses some of the barriers for Canadian businesses working in China, the role Chinese business has played in the Canadian economy and the role that the CCBC plays in improving relations and boosting trade and investment, particularly through their business incubation centers.

Q. In your time at the CCBC, you have advocated for stronger Sino-Canadian bilateral trade and investment. How would you say changed over the last few decades? And how do you see it developing in the next five to 10 years?

A. Over the last few decades, Canadian business has embraced it, certainly as China's economy and middle class have grown. The trade numbers, both in terms of exports for services and products, are still growing nicely, but they're not growing as fast as they should be and we're not necessarily keeping up with our like-minded competitors.

For example, we send about 4.5% of our exports to China, but the US sends 9% of its exports to China. For products and services to both Mainland China and Hong Kong, we export about $39 billion worth of goods and services. But the economic impact of that is more like $77 billion, using OECD estimates, because those exports actually generate more value up through the supply chain, such as through the creation of higher-paying jobs.

The other thing that has visibly changed over the last 10-to-15 years is tourism. Ever since Canada got approved destination status from China in late 2009, visitor numbers continued to grow, but the situation with Madam Meng and the two Michaels (the "three M's") had an impact in 2019. It didn't hit as hard as expected, but then COVID cut everything off. However, I do think tourism levels will rise again once the pandemic calms down, border restrictions are lifted and people can travel.

Q. Aside from tourism, are there any specific sectors that are major opportunities for bilateral trade and engagement?

A. Another one that I really like to highlight is education. We export more education than we do any individual commodity. Chinese students spend almost $6 billion in Canada every year, and they're only about a quarter of our international students. They support a lot of jobs, and they tend to major in things that generate higher tuition for Canadian educational institutions. Also, given that the people-to-people ties are so important, education and tourism are key. It's hard to do business if we don't understand each other, and education can facilitate that understanding. The people who graduate might stay in Canada or might return to China, but they know about the other country. So education is really important for us.

Q. The US-China relationship is currently fraught with tensions, as is China's relationship with much of the West. What are the underlying causes of the tensions? And to what extent is Canada's experience relevant to those other countries?

A. The US-China tensions are a significant obstacle, not only to US companies which are, when you compare surveys, doing a lot better than Canadian companies in China. We added US-China and Canada-China relations to a list of 38 obstacles to conducting business with China in a survey we do every two years.

We've had many people in the last two years report that Canada-China relations are a big problem, but the US-China relationship is now the number two obstacle to Canadian business with China. If a company is selling to the US, as well as to China, then you have lots of complex navigating to do.

The underlying cause of that tension is that the US has an existential crisis when it comes to China. It doesn't want to be usurped as the largest economy, but by around 2028, China will take over. And unfortunately, a lot of people tend to think that's a bad thing, rather than appreciating the global improvements it brings. But it does result in a lot of security and technological tension.

China talks a lot about wanting to be part of the rules-based system. Canadian companies love rules-based systems. At its heart, the business community wants to be able to do predictable business, whether it be with China or with other regions. Our business survey results over the past two years show significant deterioration in the success of Canadian business with China vis-à-vis our like-minded competitors. I think to solve the issues, like-minded countries should come together trying to take action on potential issues. There are mechanisms that exist to do this, including some of the existing dialogue structures but they just haven't restarted yet after the "three M's" and COVID.

Q. You mentioned a list of 38 obstacles to doing business. Can you give a few more examples?

A. The obstacles that we have are in different buckets. We look at policy issues, administrative and regulatory points, as well as the general business environment. The number one issue is Canada-China relations, followed by US-China relations, and number three is mobility—business travelers going in either direction. In 2019, up to 2020, many Canadian companies were not allowing their business people to travel because of the threat of potential detention. And then with COVID, nobody could travel. There are a lot of service-based businesses in China that need that travel, but also, if you're a law firm and you're negotiating something, if you can't go to establish that connection and develop trust, that's a problem.

Another big issue is the level of competition, both in China with Chinese competitors, but also other foreign competitors. Beyond that, there are four that are all administrative obstacles: inconsistent interpretation of regulations, business license approvals being challenging to obtain, data flows and cybersecurity. We think that the fact that eight of the top 15 are administrative issues is a message to the Chinese government that, as much as they talk about wanting to decrease administrative complexity for both foreign and domestic companies, there's a whole lot of complexity left in China. That has been a stated goal of reform, and we would hope that continues to be a priority.

Sarah Kutulakos is the Executive Director of the Canada China Business Council. She has been involved in business in the Greater China region since the 1980s and joined the Canada China Business Council in 2007. She has re-centered the council's activities around providing business services, catalyzing business growth and activity, and advocating for stronger Sino-Canadian bilateral trade and investment.

Q. How do you see trade organizations and relationships, such as the WTO or the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), impacting these problems?

A. The WTO is an organization that I think people have been hoping could be more effective, but it's still a valid mechanism. The CPTPP is an interesting one given that China has now officially said it would like to join. Canada and China were actually negotiating for a potential free trade agreement back in 2017, and one of the issues was that China wouldn't agree to many of the progressive elements the Canadian government wanted to include. But the CPTPP is comprehensive and progressive and if China is serious about wanting to join, that could be very good, because there are already existing standards set.

For Canadian business, anything that helps promote a free and fair playing field is welcome. We just want our companies to be able to do business in China, on the same basis as both domestic and other foreign companies. And given a free and open environment, if we're not good enough, if we're not competitive enough, then shame on us.

Q. There's been an increase in opportunities for international companies to take full ownership of business operations in China in the last couple of years. What do you see as the main opportunities there? And what are the barriers that still exist in that space?

A. Financial services, for sure. There have been a lot of licenses granted to American companies over the last year, and similar Canadian companies all have the potential to negotiate such entrance as well. There's a huge amount of wealth in China that needs to be managed well and pensions and people's livelihoods need to be secured. Canada is very good at that. There have been some applications put on ice over the last couple of years, I think restarting those would be very much welcomed by Canada's financial services community.

Q. What is the current attitude towards Chinese investment in the Canadian property market and other strategic industries?

A. Chinese investment in Canada has decreased significantly. There's also been a less welcoming environment for Chinese investment where, for many years, Chinese deals wouldn't be turned down. But lately you had construction company Aecon turned down and the Shandong Gold TMAC deal was turned down. There was also a large glass plant, a greenfield investment that ran up against some local opposition, so it didn't come to fruition. But at the same time, we still see interest from Chinese companies. Again, we know that the "three M's" problem was a barrier to companies wanting to move on investment. Now it's just a matter of time to see if that picks up. I would love to see a Chinese auto platform set up manufacturing in Canada, for example, to serve the North American market. We continue to try to make sure that Chinese companies know about the opportunities where they would be welcomed and more importantly, once they make the decision to invest, making sure they understand how to operate successfully in the environment. Because just as we foreign companies in China need good local help in order to not mess up, Chinese companies need the same thing in Canada.

Q. How has COVID affected your work and the work of Canadian businesses in China?

A. For CCBC, it has certainly changed the way we interact with members. A lot of our activity involved bridging Canada-China bilateral trade and investment via connecting visitors from Canada to our team in China. For example, it might be a delegation led by a government where we would do B2B matchmaking. A lot of our members would actively seek out our offices as they're huge resources for the business community and for all three levels of government. That has stopped because none of us can get on a plane. One of the big activities we've done over the last year was simply helping members to get people in. It is possible, but the quarantine requirements are not simple.

Q. You've helped to create business incubation centers (BICs) in Beijing, Shanghai, and Montreal. How would you describe the work that these centers do? And can you provide any examples of success stories brought about by the BICs?

A. The ones in Shanghai and Beijing are focused on helping Canadian companies get started with a presence in China. A lot of companies are just starting out and want to evaluate partners, or just need one person in the same time zone to visit clients. Supporting that via registration of an entity is a lot of administrative hassle, and companies, especially small ones, really just want to focus on their clients and their products.

A lot of times this can be done with a legal representative in China—somebody who's working out of a representative office. Provided that the member can comply with the regulations of our representative offices, which is very easy to do, they can have somebody representing them in the market until they decide what to do next.

Q. How do you see the incubation centers developing over the next few years?

A. I would say probably more of the same. Over the past year-and-a-half, particularly with COVID, a lot of Western companies have discovered that they can sell in China through e-commerce. We have some members that do great work helping people to set up selling in China, and they don't even need to be there. But at some point, they're going to say we need to have eyes and ears on the ground in China to see what's happening, to evaluate new channels and things like that.

Q. To what extent is China's "Dual Circulation" policy affected businesses in China?

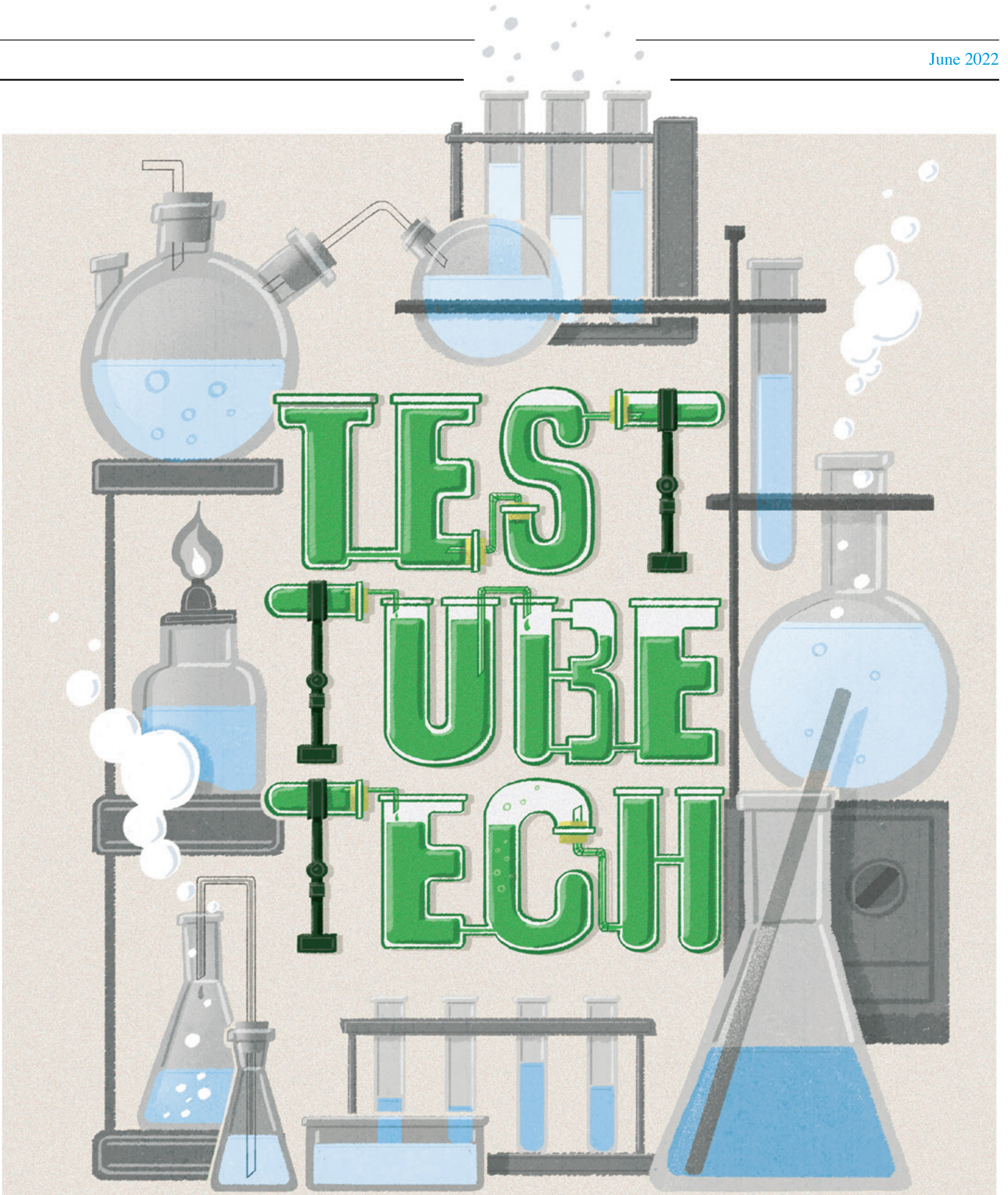
A. On "Dual Circulation," I think it's still a concept misunderstood by much of the business community. In the survey that I mentioned, in addition to business obstacles, we also know that there are a number of laws, regulations, policies, or major issues that could have either a positive or negative effect. And "Dual Circulation" was one we put on there, with 21% of respondents saying it had a potential negative effect, while 34% think it has a positive impact, either somewhat positive or strong positive.

One of the good things about China is that, even though some of these concepts like "Dual Circulation" may take a while to absorb, they write everything down. The Five-Year Plan, for instance, what a gift, right? It is so easy to see, in detail, what China wants to achieve, and whether or not you can fit with it. For "Dual Circulation," it's clear that China knows it needs to become domestically reliant on many things, and yet can't just close themselves off. I think in explaining "Dual Circulation," it's clear that there's still opportunities for foreign companies. Companies need to see where they fit.

Q. How do you see the overall Sino-Canadian relationship developing over the next 5 or 10 years?

A. I'm hoping that it perks up, because so much in the temperature of China is determined by the government relationship. Right now, things are still very cold, so we're waiting for the temperature to rise. I think there's a lot of goodwill, there's a lot of good history there, but Canada and China both need to know what they want from the relationship. We are a small country, but it's useful for China to have friends and collaborators, even if we're competitors at times, that aren't the US. I'm hoping we can take advantage of that.

Interview by Patrick Body



China is nearing the cutting edge of biotechnology, which is having a significant impact both at home and around the world

By Shi Weijun

Image by Yuyu Zhou

China is increasingly playing a world-leading role in biotechnologies, particularly in cancer treatments

One new drug is being tested in late-stage lung cancer trials, another has the potential to prevent tumors without attacking the immune system and a third is a new therapy for targeting a cancer with a personalized drug molecule. What all three have in common is that they were created in China and their rights have been snapped up by Western drug giants, reversing the trend of decades.

In the past 18 months, the large western drugmakers Novartis, AbbVie, and Seagen have licensed the rights to three novel cancer drugs developed by the Chinese biotech companies BeiGene, I-Mab, and RemeGen respectively. The three deals combined involve payments of about $1 billion upfront and several billion more if the drugs are successful in clinical trials and hit certain revenue targets.

"We're seeing more and more Chinese biotech companies start to license out their innovative drugs to overseas markets," says Chris Liu, senior portfolio manager for China-A Investments at investment management firm Invesco. "Currently the new drug market in China is still dominated by foreign players, but we expect China players to gain more market share."

The blockbuster agreements demonstrate how China—once a biotech backwater—is now rapidly emerging as a world leader in this scientific field. Growing Chinese prowess has been made possible by a host of factors, including an accommodating regulatory environment, favorable labor costs, and expertise in precision manufacturing.

"China is a huge player in the global biotech scene. You can't talk about biotech now without talking about China's involvement," says Joshua Chao, a senior biotech analyst at PitchBook, a SaaS company that delivers data, research and technology covering private capital markets. Not only is Chinese biotech talent pushing the domestic biotech industry forward, it is also fundamental to the success of biotech companies in the United States. The number of US biotech patents by Chinese inventors has been consistently rising with over 8,772 separate patents registered in 2019 alone.

Tinkering with nature

Biotech can be broadly defined as any technology that uses living organisms or biological systems to create products, such as medicine and pharmaceuticals, and it is also applied in other areas, such as the production of food and biofuels.

But biotech does not include synthetic chemical creations.

"Basically, any company that works on a biological drug is in biotech," says Chao, who notes that drugs or therapeutics can be categorized as either biological or synthetic. "Advil, Tylenol, a lot of things that come in a pill are synthetic pharmaceuticals. Biologicals, on the other hand, are antibodies, cell therapies, monoclonal antibodies."

The multibillion-dollar deals signed by China biotech leaders BeiGene, I-Mab and ReneGen show how the industry is revolutionizing medical treatments. Understanding the biology of cancers is particularly important for patients since the tumour cells of two different individuals can look very different under the microscope, even though the patients may be suffering from the same cancer type, says Damien Ng, executive director and thematic research analyst at private Swiss bank Julius Baer.

"In other words, personalized cancer treatments offer the best chances of success to patients," says Ng. This is especially critical in China, which accounted for 24% of newly diagnosed cancer cases and 30% of cancer-related deaths globally in 2020.

When it comes to oncology, Chinese biotech companies are at the forefront of world-class research and development into new treatment types, and local scientists and researchers have made breakthroughs in approaches that are also being pursued by Western Big Pharma. One particular area where Chinese pharmaceutical companies have made waves is development of PD-1 and PD-L1 checkpoint inhibitors, a type of large molecule drug with outstanding results in empowering the immune system to fight cancer. The number of clinical trials in China investigating combined PD-1 and PD-L1 therapies grew the fastest in 2020 out of eight major markets including the

US, UK and Japan—a sign of accelerating innovation in Chinese biotech.

"PD-L1 is the area where we see most drug R&D investment from many Chinese biotech firms because the drug is effective against a very wide range of cancer types," says Chris Liu. "Quite a few PD-1 drugs have been approved and included into the national reimbursement drug list, which have boosted sales in recent years in China."

The urgency of finding new, viable health care solutions is important given China's spiraling national health care expenditure. Total spending by government, companies and individuals reached RMB 7.23 trillion in 2020, topping 7% of China's GDP for the first time ever—although that is still low compared with 19.7% in the US.

And over the next decade, China's health-related expenditure is forecast to continue growing several percentage points ahead of GDP growth, due to factors such as an aging population, rising disposable income, and easier access to better health care.

The demand for new therapies in the world's most populous country now places China's pharmaceutical market behind only the US in value. It was already worth $149.8 billion in 2019, and is expected to more than triple to $468.2 billion by 2029, according to GlobalData biotech analyst Samisha Khangaonkar.

"The central government has identified biotech as a key industry for economic development, so it seems poised for a significant amount of growth," says Khangaonkar.

China's biotech role

Despite it not being particularly well publicized China has been a part of some biotech firsts over the past decade. For example, BGI Group, formally known as the Beijing Genomics Institute, as far back as 2010, sequenced the first ancient human's genome from the roughly 4,000-year-old permafrost-preserved hair of an extinct Palaeo-Eskimo. They have also achieved advances in health care and in the quest for food security.

The scale-up of China's biotech capabilities was not difficult as the foundations were already in place. For years, China's drug industry concentrated on replicating Western medicines—partly because getting new drugs approved was a frustrating and time-consuming process, which encouraged risk-averse drugmakers to stick to safer revenue streams. This helped the country become a global leader in the manufacturing of generics—low-cost copies of brand-name drugs, which make up approximately 90% of currently marketed products in the country.

Regulatory reforms and national strategic initiatives have recently shifted the focus of the pharmaceuticals industry from generics manufacturing toward R&D innovation. Anti-aging and stopping the human clock in the search for immortality is a key driver in health-related biotech research, and China is an emerging player in the regenerative medicine research space of medical biotech, with more than 320 cell and gene therapies in the pipeline. In early 2021 scientists in China successfully used CRISPR gene-editing technology to reverse some signs of aging in mice, and the Chinese government has shown strong support for related research.

China's leadership designated biotech as a "strategic emerging industry" in an outline of the 14th Five-Year Plan covering 2021-2015 published last year, and this has drawn both talent and capital to China-based biotechs. "They have a lot of smart scientists and a lot of smart academic institutions chasing a lot of the same problems that we see in the US," says Chao.

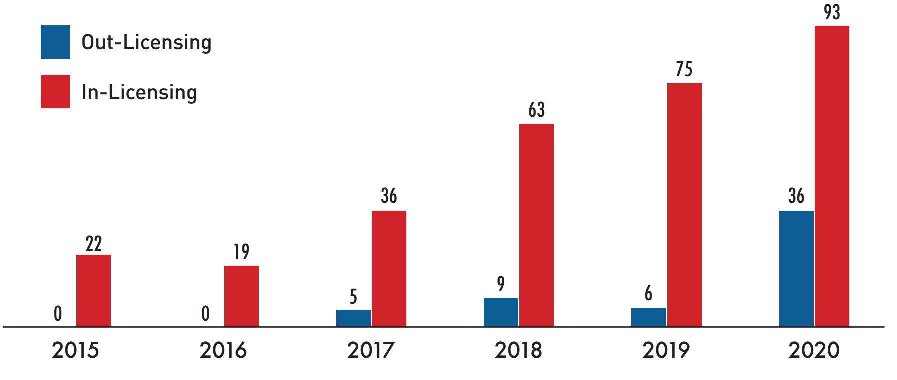
China overtook the US in 2015 to become the world's most productive nation in terms of the total number of biotech research publications, according to Scimago Journal & Country Rank, a public database that measures and ranks countries by science output. The US still ranks ahead in the number of citations per paper—a commonly used metric to evaluate the impact, quality and significance of published research—but China is rapidly narrowing the gap.

Meanwhile, the number of biotech science parks in China grew from about 400 from 2016 to 600 in 2020, reflecting the government's priority to develop the sector.

China has also worked to address longstanding challenges over data transparency and weak regulatory oversight that cast some doubt over the country's reputation in pharmaceuticals. "Ten-plus years ago, I think China fared worse reputationally on the drugs and therapeutics side. That's probably not the case now, the attitude of global investors has changed a lot in the last few years. Chinese biotech companies are now seen as legitimate and their technology is sound," says Chao.

China's rapid development of homegrown COVID-19 vaccines also drew attention to the potential of its biotech sector. Chinese companies developed three vaccines that are in wide circulation globally, one by the private biopharma company Sinovac and two by state-owned Sinopharm.

LICENSE TO PILL | Volumes of licenses for pharmaceuticals, both into and out of China, have been growing



Source: YAFO Life Science Research

While the efficacy of these vaccines lags behind some of their foreign counterparts, partly because they are not using newly discovered mRNA technology, their distribution to populations around the world has proven essential to easing deaths rates from the pandemic. "No matter the COVID-19 vaccines rely on inactivated viruses or mRNA technologies, their discovery is already a remarkable scientific breakthrough that has been achieved in such a short space of time," says Ng.

China itself is the global leader in terms of production volume of vaccinations, having administered more than 2.2 billion single doses of vaccines up to the end of last year. Chinese biotech firms currently have more than 120 vaccines and therapeutics in the pipeline for COVID-19—a number that is continuing to rise.

Coming of age

Unlike the Western pharma giants which work with a broad spectrum of drugs, Chinese pharma and biotech players tend to be focused on individual industry sectors. For example, Harbin Pharmaceuticals focuses on generics manufacturing, while Jiangsu Hengrui Medicine is a leader in pipeline biologic drugs and there is little overlap between the companies.

Companies are the most visible aspect of China's biotech scene, but the state plays a significant background role. One of the important sources of industry support has been the Ministry of Science and Technology, which has taken a leading role in setting goals—for instance, in 2017 the ministry called for the sector to be worth at least 4% of national GDP by 2020.

In addition, China's university system, also state-run, has been beefed up to accommodate domestic biotech ambitions. Heavy investment in higher education has seen the number of high-quality engineering, biotech and biochemistry graduates go up dramatically. In 2020, China produced over 226,000 engineering master's graduates, more than double the next closest subject.

Given the biotech advances that China has achieved, it is no surprise that international cooperation with Chinese players is rising, as foreign drugmakers look to capitalize on their expertise. The partnerships struck between Novartis and BeiGene, AbbVie with I-Mab, and Seagen with RemeGen—coupled with the growing focus on R&D and innovation in China—underline the extent to which major pharma companies from the US and Europe are interested in establishing themselves in China to gain access to the R&D of Chinese companies as well as the sizeable market.

Other companies, meanwhile, are taking a more developmental approach to entering the Chinese market. AstraZeneca for instance created a new global R&D center in Shanghai in 2019 and invested in a new life sciences cluster in Wuxi, 100 km to the west of Shanghai, with the aim of fostering collaboration with Chinese drug developers. And in 2020, Danish pharmaceutical company Novo Nordisk announced its 'China Essentials' program that aims to file clinical trial applications for new products simultaneously in China and globally for the first time, aiming to apply this to 90% of their applications by 2025.

There has also been an acceleration in outbound Chinese investment into early-stage biotechs overseas, largely in the US and Europe, but also in Singapore and Australia. Health, pharmaceuticals and biotech companies captured the lion's share of Chinese venture capital investment in the US in 2020, accounting for 132 of 249 transactions in total, up from 96 in 2019.

"Acquiring know-how is one of the major elements of China's biotechnology growth and strategy to catch up with its peers," says Ng. He notes that while 3% of Chinese outbound investment is state-sponsored, the rest is from private Chinese companies.

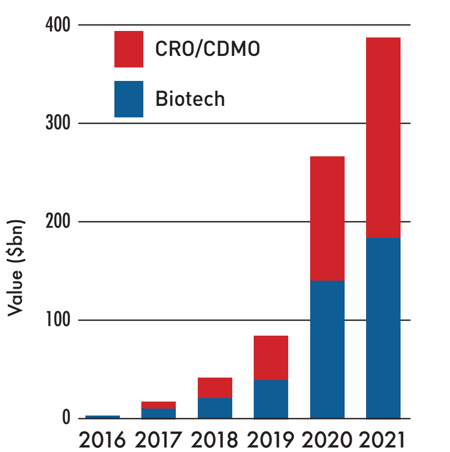
But the constant danger of geopolitical risk between the US and China may thwart future Chinese efforts to venture into the world's biggest pharma market. Hong Kong-listed WuXi Biologics for instance, found itself in the crosshairs in February after it was added to the US government's "unverified list" of Chinese companies subject to tighter control of imports from the US.

New data security laws and enduring doubts about the quality and availability of data behind some of China's regional advance therapy approvals, also have implications for the success of Chinese drugs internationally. For example, the US Food and Drug Administration (FDA) in February voted overwhelmingly in favor of requesting more information from Innovent Biologics over a drug

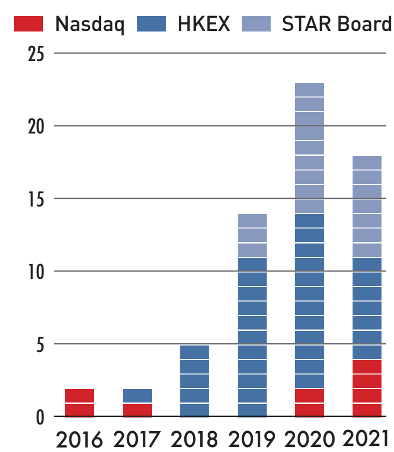
VALUE ADDED

Chinese Contract Research Organizations (CROs) and Contract Development and Manufacturing Organizations (CDMOs) have ballooned in value

Total market value of listed innovative China biotechs on major stock exchanges



Number of newly listed biotechs and ecosystem players, by exchange



*As of August 2021
Source: McKinsey & Company

for lung cancer. The Hong Kong-listed Chinese drugmaker trialed the drug only in China, and had banked on the single-country clinical trial being enough to win US regulatory approval. The verdict could have implications for the more than 25 drug applications under review by the FDA that are based solely or mainly on clinical data from China.

"Advances in drug development, especially regarding regenerative medicines, in China might not extend to other regions if international [data] standards are not met," says Khangaonkar.

> Acquiring know-how is one of the major elements of China's biotechnology growth and strategy
>
> Damien Ng
> Executive Director
> Julius Baer

Biotech's business case

The broad range of applications for biotech—from medicine and food, to industry and the environment—mean there is massive commercial potential for Chinese firms to exploit. Beijing has also warmed up toward the use of biotech in agriculture, as it seeks food security for the world's biggest population. In early 2021, China's state planners directed the Ministry of Agriculture and Rural Affairs to construct seed "production bases" to modernize the country's seed industry and to expedite major biotech breeding projects. This came after China granted approval for its first genetically modified (GM) crop for cultivation in a decade at the end of 2019.

"I'm increasingly confident we're on the verge of a breakthrough with regard to China commercializing GM crops for domestic cultivation," says Even Pay, associate director of agriculture at Trivium, a China policy research firm.

"There's a huge role for agricultural tech and plant sciences in China," says Chao. "You have a lot of mouths to feed in China, so if you're able to develop food products—whether that's grains, vegetables or fruits—that are more robust or resilient to pesticides or insects, that's always great."

Then there is the opportunity for biotech to help China tackle well-documented demographic challenges, mainly the aging of its population. Some 28% of China's population are expected to be older than 60 by 2040, compared with 19% in 2020. Old age is often associated with the frailties of life in the form of a greater likelihood of contracting diseases such as Alzheimer's and cancer, and a wide range of health conditions relating to teeth, sight, mobility and hearing.

"China's demographic transition, together with changes in lifestyle and diet, means that the continued rise in chronic diseases will present ever-greater challenges for the Chinese society if no adequate health care solutions are found to tackle them," says Ng. "Taking this into consideration, Chinese companies are likely to put their near-term focus on the unmet needs of their country's aging population and the rising incidence of chronic diseases."

"We're beginning to see in China a lot of diseases that you would associate with Western countries due to poor lifestyle management, like diabetes from obesity, lung cancer from smoking… and so a lot of biotech companies realize that there is a huge market within China," says Chao.

At the same time, biotech's fast-paced nature and rapid development has opened it up to thorny issues, including ethical warnings that scientists are interfering with nature with potentially unimaginable outcomes. This played out prominently in late 2018, when Chinese biomedical researcher He Jiankui dropped a bombshell on the global scientific community by revealing he had created the first-ever genetically modified twin girls—the so-called CRISPR babies, named after the cutting-edge gene editing technique that made the experimentation possible.

Widely condemned, He received a three-year prison sentence in 2019 for "illegal medical practices." Still, the scandal underlined how biotech can push new biological frontiers that skirt or cross academic, legal and societal red lines.

"It's not just China, there are rogue scientists everywhere. Chinese scientists are always pushing the envelope of what they can do," says Chao. "It's a little bit scrappy… but at the same time, if the counter-argument is that if it pushes the envelope of the current realm of knowledge, then it still adds to the knowledge pool whether you're doing it responsibly or not. That is probably the rationale for a lot of Chinese scientists."

Biotech for the people

For now, China's rising investments in the biotech and life sciences industries are mainly motivated by problems in the here-and-now. Chinese companies are narrowing their near-term focus on the unmet needs of their country's aging population and the rising incidence of chronic diseases, as well as exploring, just like companies in the West, the great aspirations of curing cancer, living forever or even breeding superhumans.

"These advances are currently firmly rooted in the realm of fantasy for any nation's biotech sector and not just China's," says Khangaonkar. "Maybe in the far distant future these advances may be possible, but for now the biotech sector should focus on perhaps the more prosaic but no less inspiring tasks of helping those people with unmet needs."

New Technology, New Choices

The adoption of AI technologies into society will disproportionately affect different sectors and raise ethical questions that need to be addressed

By Liu Zhiyi, Digital Economist/Executive Director of the Center for Computational Law and AI Ethics, and Distinguished Researcher of the AI and Marketing Research Center of Antai College of Economics and Management, Shanghai Jiaotong University

Artificial intelligence (AI) has undergone dramatic development since first emerging to becoming the core driver of the next industrial revolution. It has quickly grown from algorithmic models in labs to powerful industrial applications and is now facilitating major transformations of many industries. The development of intelligent algorithms has encompassed deep learning, Big Data technology and the expansion of supercomputing capabilities such as cloud computing. All of these have been crucial to the development of AI and are now being widely used across multiple industries and fields of study. AI has also heavily influenced global economic and social structures, and will no doubt continue to have an even greater impact on the development of human society in the future.

Robotics, natural language processing (NLP), speech recognition and autonomous driving, for instance, are just a few examples of the practical applications of AI and each has gradually grown in importance, with constant breakthroughs in related technical fields and application innovations emerging.

These innovations are, in the short-term at least, mostly concentrated in specific regions of the world—such as China, the US and parts of Europe—and only in certain industries. But looking towards the future, as AI and robotics systematically enter social and economic systems they will alter the fundamental logic of how everything operates from the bottom up. Such dramatic changes pose many challenges and questions that must be addressed to ensure a smooth integration of AI into our world.

Employment

It is well understood that AI is bringing about major changes to the economies of all societies in which it is utilized, and the most obvious change is in terms of employment. There is a narrative which states that the introduction of AI will create new jobs by raising productivity and real income levels, while at the same time replacing many older jobs, and the key is to find a balance of creation and replacement. It is predicted that AI technologies will replace around 30% of existing jobs in China over the next 20 years, but is unlikely to create anywhere near as many replacement roles, and this disparity will impact many industries and sectors.

Such effects will manifest themselves in two ways, both through "substitution" and "income effects." Substitution is the replacement of workers with AI and robots, leading to a reduction in jobs for humans, particularly in industries such as agriculture and manufacturing.

While "income effects" will see companies needing to hire more people to meet the new demand created by the arrival of AI tech. This will be common in service sectors such as health care, where medical robots will need supervision from those trained in the use of AI technologies—a created job.

In countries with large service sector-driven economies, the level of "substitution" will be lower and the impact of the introduction of AI on employment will be less marked. However, global predictions of the long-term impact on employment of these technological advances, which are based on technical characteristics and development trends, are mostly pessimistic.

Making Changes: The utilization of AI in social governance is a necessary step forward

Education

With the development of AI technology, traditional methods of teaching, learning, research and governance are all being challenged. From a macro perspective, adoption of AI technologies will have an impact on four main areas of education: education management and supply, with AI services being used to supply corresponding education management content; learning and assessment, such as the grading of tests; the empowerment of teachers to improve teaching quality; and meeting the increasing requirement for lifelong learning. Within each of these areas there are a host of related ethical issues that need to be considered, and the US and European Union are already pushing to make sure that AI risks are accounted for.

In China, AI in education has been used mostly to create digital, interactive classroom tools using Big Data networks, which in turn significantly improve educational capacity and performance. A typical example is the introduction of tablets in schools, which can be used as educational "chat bots" and interactive sources of information, whether through standardized questions or through AI, natural language processing and machine learning. Such programs also exist in other countries.

An advantage of this is that it helps to reduce the costs of education and teaching as much of certain content can be handled without teacher involvement. However, there was recently an instance where an AI application was used to monitor students' level of attention in class, track attendance and predict teachers' performance—all things that raise ethical questions around the efficiency-centric attempt to optimize human behavior.

AI must be implemented in a way which allows for sustainable development, takes into account the need for human dignity and values, and is credible—it needs to work. Each of these requirements needs to be seriously addressed before the widespread adoption of an AI technology.

Health care

In addition to changes to education and employment, it should be recognized that the content and delivery methods of health care systems will change as a result of the introduction and development of AI technology. This includes a vast array of different sub-sectors such as surgical and health care robots, intelligent public health

> **Looking back at the history of educational development, every technological change has brought about significant changes in approaches to education**

> The adoption of artificial intelligence is altering people's career structures and lifestyles, which is one of the largest changes since the advent of the "smart" era

and epidemic prevention systems based on Big Data, intelligent transportation facilities, and precise allocation systems for various public service resources.

Given that the health care industry, whether that be clinical care, biomedical research or medical device manufacturing, has a direct impact on people's lives and well-being, the potential for knock-on impacts from AI development are huge. China's medical industry currently faces many endemic issues, but at the same time it is digitizing rapidly and the development of AI technology continues to deepen with medical robots, intelligent consultation, and other medical AI applications all emerging.

Insurance giant Ping An has an app, Ping An Good Doctor, which is a so-called "AI Doctor." This can function as a diagnostic tool, and just as with teacherless education systems, the app can respond with standardized comments without the presence of a human being. AI-based diagnostic tools can also be used to predict clinical conditions and increase optimization of systems, such as has been seen in Shanghai, and China more broadly, during the COVID-19 pandemic. With the vast amount information collected on each individual there is the possibility that the entire virus chain can be monitored incredibly quickly and the virus located and contained.

But at the same time, this raises questions related to people's privacy and control over their own personal data—an issue that is being addressed worldwide. These data sovereignty concerns are particularly relevant when it comes to the intensely personal nature of health care, but they also spread into social governance as a whole.

Governance

The connection between commercial organizations and public administrations on technology platforms has greatly increased the interaction between governance subjects and governance objects. And while it can provide a greater level of convenience in many cases, it has also increased the risk of rights boundary violations and information security risks, as well as potentially further increasing the digital divide. Biometric information recognition is used by public service institutions and government departments when they deliver services to the public, and facial recognition and virtual digital imaging are becoming a growing part of public infrastructure.

But, based on data from the China Internet Network Information Center, there are still over 100 million people in China who do not have access to the internet, and a large proportion of those are vulnerable groups such as the elderly and the disabled. This means that commercial organizations and public administration organizations may not be able to connect with them effectively on technology platforms, resulting in possible denial of access to social public services and guarantees. Such an expansion of the digital divide may lead to the further division of rights.

Given that each individual is supposed to have the right to decide whether their private data, such as biometric information, will be used for other purposes, choosing not to share this data may deprive citizens of access to certain societal benefits in lieu of reducing their technological risks or defending their private data. A refusal to allow new technologies to be deeply ingrained in their lives can impinge on their rights to basic social public services and infrastructure. The relationship between convenience and security requires a concerted effort from the legal system to recognize and enforce the moral standards and norms of social life among members of various social groups, including families, to ensure social harmony and sustainable development. This indicates that the means of social governance must become more diverse and intelligent. There must be a process of active adaptation by governments, social organizations, participating businesses and individual citizens.

Making choices

From a global perspective national AI regulators are mostly composed of political entities and need to form effective linkages with communities of expertise when addressing the challenges of new topics such as AI. Therefore, regulators should utilize individuals with specialized knowledge as the cornerstone of governance and build up a focused governance team covering AI-related mathematics, computer science and other disciplines to provide the necessary knowledge reserves and intellectual support for regulation.

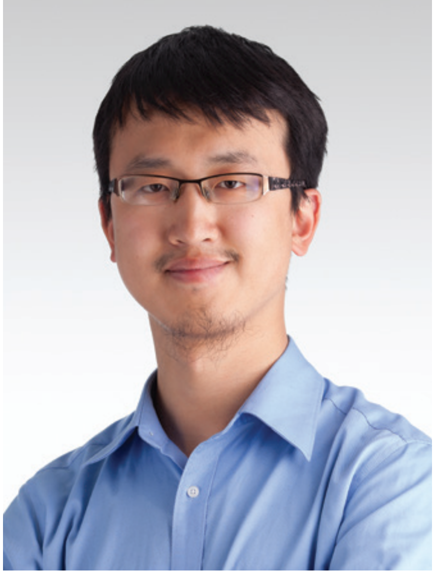
What we need to make clear is that the principles, subjects and tools used for governing AI differ from traditional governance frameworks, meaning there is a need for greater agility in AI governance. It is necessary to continuously improve technological approaches, optimize the governance mechanisms, detect and solve any possible risks in a timely manner, and continuously carry out research and due diligence on the potential risks of more advanced AI. Only if countries around the world jointly seek effective paths and explore solutions to global problems can AI better benefit humanity in the near or even distant future.

Shifting Sands

Despite a downturn in the economic outlook of several of China's major sectors, China economist Chen Long, co-founder and partner at Plenum, believes that the country is still very much heading in the right direction

China's economy has been going through significant changes over the last two years, with some sectors such as property and education feeling the heat and other, largely digital, sectors booming. As a co-founder and partner at economic research firm Plenum, Chen Long sees a clear route through the turbulence to an improved growth system for the country.

In this interview, Chen Long discusses how the property sector is becoming less important as a driver of China's economy, how growth is shifting from quantity to high-quality growth and the motivations behind recent regulatory crackdowns.



Q. After 40 years of dramatic economic growth driven by the market reforms of Deng Xiaoping, China's economic agenda is now changing with a new stress on "common prosperity" and domestic innovation. What are the implications of this?

A. The government has been focusing more on redistribution through common prosperity because we have plenty of people who have become rich, but we also still have severe poverty. After the poverty alleviation campaign of the past years, the general situation in China has improved, but we still have a lot of people on low incomes and that means the income disparity in the country is still actually quite severe. It's a more pressing issue for the government than it was 40 years ago when everyone was so poor that you needed to have some get rich first.

I feel like the government has recognized that, because the facts have changed, there is a need to change the policies. I think it's a sensible thing and something completely to be expected.

The implication for domestic and international business is that there are new opportunities for them to help the government in terms of this wealth re-distribution. I don't think this is going to be as big a change as the "Reform and Opening Up" years because that, in and of itself, is still a main theme of development in China. In the Sixth Plenum last November, it was clearly said that the Party would stick to reform and opening-up. Beijing is not moving away from it.

Chen Long is co-founder and partner of Plenum, a research firm covering Chinese economy and politics. Prior to that, he was a China economist at Gavekal Dragonomics.

Q. What do you see as the significance and the impact of the "common prosperity" policy?

A. It may well be very significant, but it has been put on the back-burner a little, given current events. In July and August 2021, many people saw it as aiming at the rich and the need to redistribute their wealth. But now it has been clarified to show the country is still encouraging growth and entrepreneurship. If that turns out to be the case, the impact of the policy will be big, but probably not be as negative as many people feared at the beginning.

Q. What are the main political and economic trends that serve as indicators for change in China that people around the world should be aware of?

A. In general, the West has a much better understanding about China's economy than it did 10 or 20 years ago and they better understand the underlying drivers of the economy, which are property, investment and consumption. They are all driven heavily by government policies, especially monetary and fiscal policies. China's economic cycles are short compared to those in the West, with an economic cycle being as short as two or three years. People are currently talking about a slowdown, when just a year or so ago we were talking about the booming Chinese economy. There is of course rapid change in the property market and monetary policies, and the government has played a big role in influencing some of the other key sectors in the economy. We have to watch the policy directions closely.

The property policies change every year. Right after the pandemic in China, a lot of cities and provinces loosened their property policies, even offering subsidies for apartment buying. But after the summer of 2020, many cities reversed that trend and started tightening policies again, both in terms of purchase restrictions and on the monetary side—it became much harder to get a mortgage and interest rates became higher. There were roughly 400 small related policies launched around that time: things just keep changing all the time.

> **I don't know if anything in particular will replace the property sector as a major catalyst for growth, it's more that growth in general will slow a bit, and I think the government has accepted that**

Q. The property sector has consistently been the backbone of Chinese economic development over the past 30 years or so. How do you think recent events will affect the prospects and valuations in the sector?

A. The key driver of the property market was the fast urbanization process, with the urban population rate having risen from the low 20%s in the 1950s to over 60% today. Other than that, living space per capita has increased quite a bit and the population itself was growing rapidly.

These three forces are going to change quite a bit from now on. The easiest thing to predict is that the Chinese population will probably peak in the next four or five years, and that's an optimistic prediction. The urbanization rate reached 64% last year and although it can probably reach as high as 80%, it can't go much further than that. Also, it's going to take longer, the higher it rises. Same with the growth of living space. It's already grown a lot and will grow at a much slower pace. I think it's probably fair to say that the golden age for developers has ended.

I don't know if anything in particular will replace the property sector as a major catalyst for growth. It's more that growth in general will slow a bit, and I think the government has accepted that.

Q. So, do you think the days of high growth are over?

A. Not only do I agree with that, it's reflected in the 14th Five-Year Plan, the 2035 vision, and everything Xi Jinping has been talking about recently. He's been emphasizing the shift from quantity to high-quality growth because he well knows that an average of 8% growth is unsustainable now. In 2021, we did see 8% growth, but it's because we had a low base the year before. This year, the target was 5.5% but even that's not a guarantee now with lockdowns and other issues.

Q. Speaking of 2020, what do you think were the main drivers of China's recovery from COVID-19?

A. It varied quite a bit. In February and March, a lot of provinces and cities were closed, and production was shut down so the first step was reopening the economy. After that, there was a big push in the property and automobile markets, which both received subsidies from local governments. Additionally, many people were surprised that export was strong, but managing to re-open quickly meant that China was able to meet demand from the rest of the world.

But then last year we saw the property sector suffer under new regulations and the automobile sector struggle with chip shortages, which just left exports as the main recovery driver.

Q. Shipping and logistics costs have gone through the roof over the last year or so. How do you expect that to change?

A. The shippers are benefiting from it. They were suffering before 2020 due to the tariffs Washington put on Chinese exports but, since the end of the first phase of COVID, Chinese shippers have done well. I think how long this lasts depends on how long COVID lasts. Shipping was losing money for years and it was regarded as overcapacity, and shipbuilding wasn't doing so well either. But now they have all moved from overcapacity to capacity industries, the shipbuilders are busy building ships, shipping companies are buying new ships and charging huge prices. But I assume this will probably end in a year or two, when things go back to the way they were before.

Q. How would you describe the current state of the China-US relationship?

A. I would say it isn't at rock-bottom any more. I think the relationship was at its worst when the 2020 US presidential election was approaching. Trump and his team spoke very poorly of China, and both sides sanctioned officials from the other side. In early 2021, the relationship did not recover as fast as many people expected as Biden didn't revert Trump's policies quickly. By the end of 2021, the situation had started to improve quite a bit. Xi and Biden had a call in September, local officials were talking, Meng Wanzhou was released, and both sides agreed to relax journalists' visas. The war in Ukraine has put the relationship to test again, but so far both sides appear calm.

Q. What is your take on the crackdowns on the tech, gaming, and education sectors?

A. The key part of the crackdowns is preventing the disorderly expansion of capital. People at the top levels believe there's a distinction between orderly and disorderly capital expansions, and it seems that Beijing is not happy with what some of the tech companies have been doing, such as entering into industries that aren't directly related to what they do.

For the gaming and education sectors, officials are struggling with issues around China's declining birth rate and complaints that it is too expensive to raise a child. Some officials see afterschool tutoring costs and the negative aspects of games as being part of that problem.

> We have seen the industrial sectors outperforming consumer sectors for two years now, and the latter can only recover once life returns to normal

I don't think they're punishing the private sector or nationalizing these sectors, it's more like correcting bad behaviors. It was harsh on the afterschool tutoring businesses as some of them had to shut down, but for tech companies, as long as they change their behavior and spend more time on hard tech instead of soft tech, things are manageable. It seems to me that the leadership is concerned about developing self-sufficiency in hard tech in the face of US export controls, they want Chinese companies to spend more time on it.

Q. How do you see China's economy progressing over the next five or 10 years? And what role do you think consumer spending as a driver of growth will play?

A. That's hard to say, but in general I would suspect growth will be a little bit lower than it was in the last 5 to 10 years. We're not going to be reaching the 6% or 7% highs we've seen in recent years and will be edging closer to something around 4%. This is something that the government has made clear they understand and I agree that that's the direction we're heading in.

In terms of consumer spending, COVID and the associated lockdowns have hit it very badly. We have seen the industrial sectors outperforming consumer sectors for two years now, and the latter can only recover once life returns to normal.

Interview by Patrick Body

CKGSB BUSINESS CONDITIONS INDEX

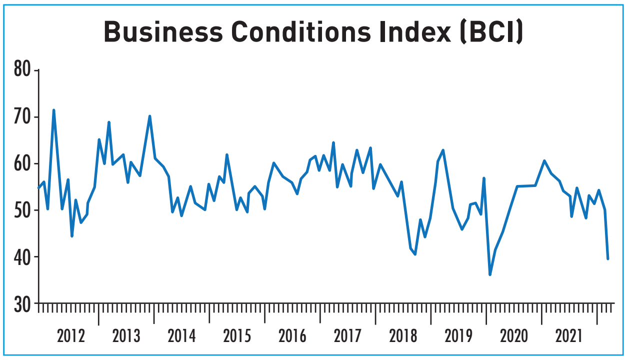
Times of Trouble

CKGSB's Business Conditions Index, reflecting confidence levels in China business, shows the serious effects of COVID-related lockdowns

The BCI is directed by Li Wei, Professor of Economics at the Cheung Kong Graduate School of Business

The April CKGSB Business Conditions Index (BCI) fell to 40.8 from 51.3, well below the confidence line of 50.0, reflecting impossibly hard times. The ten-point drop indicates that our sample of successful business owners in China are very pessimistic about business prospects for the next six months.

All but the industry competitiveness index have fallen. But this only benchmarks our sample against their rivals, and says nothing about operating conditions. For this reason, we can say there was an overall decline in confidence in Chinese business in April. Since the BCI and its related indices look to the upcoming six-month period, this means difficult times ahead. Comparing today with the situation over the past two years, we see the current situation is just as severe as that of March 2020, when the original COVID-19 lockdowns were in place, and GDP growth in the second quarter will reflect this.



Introduction

In June 2011, the CKGSB Case Center and the Center for Economic Research initiated a project to gauge the business sentiment of executives regarding the macro-economic environment in China—calling it a business conditions index. Under the direction of Professor Li Wei, the two research centers designed and tested the BCI survey in July 2011. In September 2011, the first survey was carried out. 124 surveys have now been completed between May 2012 and April 2022 and 120 reports published.

The CKGSB Business Conditions Index (CKBCI) is a set of forward-looking diffusion indicators. The index takes 50 as its threshold, so a value above 50 means that the variable that the index measures is expected to increase, while a value below 50 means that the variable is expected to fall. The CKGSB BCI uses the same methodology as the PMI index.

Key Findings

- All but one of the BCI indices fell in April due to COVID-related restrictions in place across the country
- The short- and medium-term outlook for companies predicts tough times ahead
- The Corporate Profit Index dropped from 53.2 to 35.3

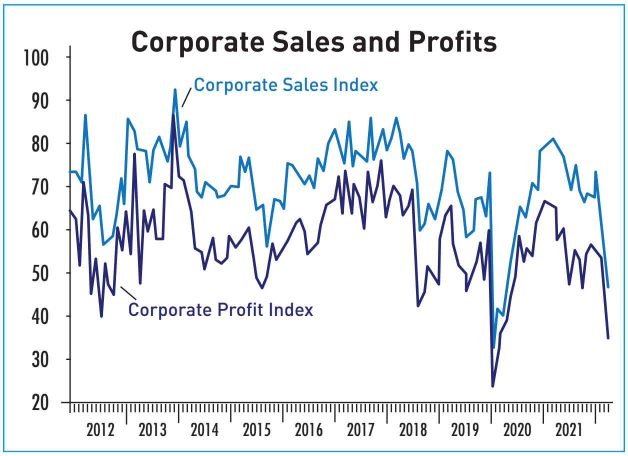
Analysis

The CKGSB BCI comprises four sub-indices: corporate sales, corporate profits, corporate financing environment and inventory levels. Three measure future prospects and one, the corporate financing index, measures the current climate.

This month, all four fell. The corporate sales index fell from 67.3 to 47.0, and the corporate profit index dropped from 53.2 to 35.3.

Corporate financing prospects continued to struggle, with the index down from 46.2 to 41.9 this month. The inventory index fell again, from 41.9 to 40.6 this month. In terms of inventory and finance, the companies in our sample have had a persistently negative outlook ever since our survey began in 2012, and this month is no exception.

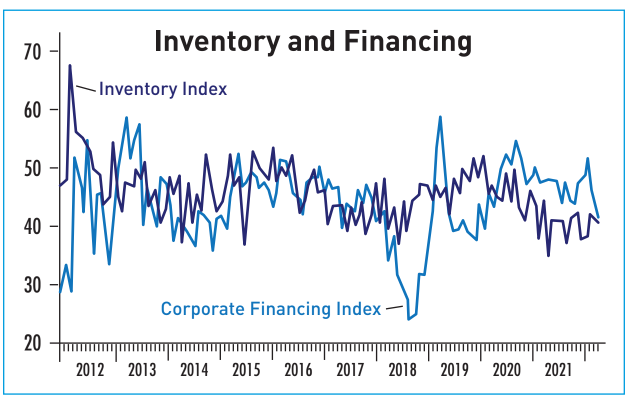
April's labor cost forecast registered 80.5 compared to 76.6 in March. Overall costs also fell from 85.6 to 82.9.

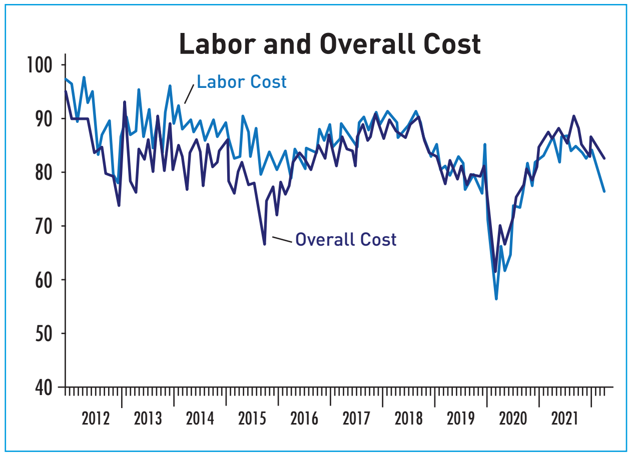


The investment and recruitment also experienced a sizeable drop. These indices have been consistently at the more confident end of the scale since the BCI began. In recent months, both have trended downwards, especially recruitment. Both indices fell this month, with confidence in investment prospects dropping to 55.7 from 62.6 from last month, and the recruitment score to 56.7 from 66.2 last month.

Conclusion

The country's battle with the Omicron variant through strict measures to prevent its spread, has been disastrous for the economy. Logistics has been heavily impacted, with many

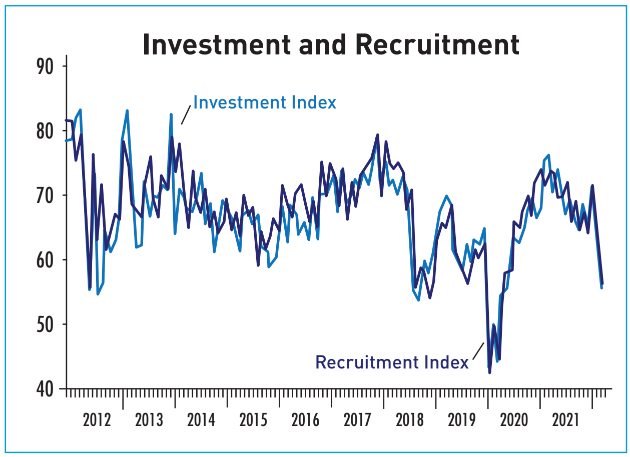




transportation holdups that have added to financial pressures.

In addition to maintaining the healthy flow of logistics, we need to keep work and production up and running, especially for small and medium-sized enterprises. The government and society as a whole need to stand behind companies, giving them financial support to tide them over until the situation improves.

In addition to supply side issues, demand also needs



attention. Allowing people out of their homes, especially in areas that have been mainly cleared of infections, is an essential first step. After so long indoors, incomes will have dropped sharply, and spending power too. This is a good time for the government to exert its macro-economic power. Consumer coupons could be used to encourage consumption, to not only meet the consumption needs of residents, but also to boost sales issues on the supply side.

Under Shanghai's strict quarantine rules, many foreign employees and experts have left the city or country. These are people who bring with them the latest technological or managerial knowledge and promote the development of China's economy, and they are needed. We hope that these professionals from overseas will be offered certain preferential policies, such as lower income tax rates, in an effort to keep them in the country.

AUTO AUTONOMY

"Chinafornia" startup Pony.ai is a forerunner in autonomous driving technology worldwide and its product testing both domestically and in the US give it an edge

By Sherry Fei Ju

Image by José Luna

Pony.ai's driverless taxis are helping usher in a new era of transportation and changing the face of the taxi industry forever

It's a few days into 2022, and Judy Jiang has been waiting around 20 minutes in one district of Shanghai when her robotaxi pulls up in front of her. For now, there is an operator sitting in the front who only takes over in extreme circumstances, but pretty soon he'll be gone too.

The taxi that picks Judy up is one of a fleet of several dozen experimental vehicles established by the Toyota-backed Pony.ai to test its autonomous vehicle technology that it hopes can be rolled out from its bases in China and California to millions of cars around the world.

Despite still being in a testing stage, Pony.ai's robotaxi service is already proving popular, perhaps due to it currently being free of charge in Shanghai. "Sometimes there are so many people using the service and users have to wait in line for half an hour or even 50 minutes for a Pony.ai ride to arrive," Judy says. "Taking the robotaxi is just like using any other ride-hailing service."

After getting on board, Judy is able to relax in the backseat of the car, while it navigates automatically through the Shanghai traffic. "The car is very comfortable, and all driving is automatic—the driver takes over if there is a problem but that rarely happens," adds Judy. "Overall, the self-driving speed is not fast, and I always take naps during my 30- to 40-minute rides home."

Pony or unicorn?

Autonomous driving startup Pony.ai was founded in 2016 by former Baidu and Google veterans James Peng and Tiancheng Lou. Headquartered in Silicon Valley, the "Chinafornia" company has been offering test operation services for the public in its home state in the US, as well as in Shanghai, Beijing and the southern province of Guangdong in China. Within the test areas in these Chinese metropolises, free-of-charge ride-hailing services are available for residents interested in using the newly emerging autonomous driving technology.

Since its founding, Pony.ai has attracted heavyweight investors including Toyota, Sequoia Capital and Canada's Ontario Teachers' Pension Plan Board (OTPP). As of March 2022, the company was valued at $8.5 billion, making it the highest-valued autonomous vehicle (AV) company with operations in China, with over $1.1 billion raised in total funding.

In 2021, the AV startup was one of the first two companies, alongside Baidu, to win approval to launch a limited number of driverless taxis on the streets of the Chinese capital for commercial operations. The provisional license in Beijing is for Pony.ai a milestone in its move from technical testing to the commercial validation stage of its AV technology. And the company plans to release its 6th generation autonomous driving system onto China's roads in 2022, in a modified Toyota Sienna designed for mass production.

In the US, Pony.ai has also been partnering since 2019 with Hyundai Motor Company to operate driverless taxis in tests in California. Last year alone, the company logged over 490,000 kilometers driven in California, the third most of any autonomous driving startup. They placed behind Alphabet's Waymo which clocked 3.38 million km and GM's Cruise which managed 1.42 million. Behind Pony.ai in fourth place is Amazon-backed Zoox, which managed just over half of their total, logging just under 250,000 miles.

Pedal to the metal

In a bid to challenge US dominance, Chinese AV companies are in a race to put their autonomous vehicles on the road. Tests with driverless taxi services have been underway in more than half a dozen cities in China, including Beijing and Shanghai.

According to an estimation by consulting firm Roland Berger, there are currently over 1,000 autonomous vehicles operating or testing on the road across China. As well as those run by Pony.ai, the majority are run by leading domestic AV companies including Baidu, WeRide, AutoX and ride hailing giant Didi Chuxing.

"Pony.ai has an autonomous driving test license both in California and China and it is the only AV startup that engages the R&D and the application of AV technology for both passenger vehicles and commercial trucks at the same time," says Xing Lei, former chief editor of *China Automotive Review*.

Pony.ai says the company has been one of the top 3 AV operators—again, behind Waymo and Cruise—in terms of testing mileage for the past two years, according to the California Department for Motor Vehicles. The company was also the first AV company to conduct autonomous trucking tests on an open highway in China and it is the only company with autonomous trucking permits in both Beijing and Guangzhou. In December of last year, Pony.ai formed a joint venture with leading Chinese logistics and freight forwarding company Sinotrans to build a smart logistics network featuring autonomous driving trucking technologies. The joint venture is expected to commence operations in early 2022 with an intelligent logistics fleet consisting of over 100 trucks.

The China-California dual track is mainly what sets Pony.ai apart from its Chinese competitors, according to Xing.

With cross-continental genes since inception, Pony.ai is very confident in its product, given the accumulation of miles it has driven and tested. "One of our competitive advantages lies in the development of our 'virtual drive'," says Lawrence Steyn, Chief Financial Officer of Pony.ai. "Thanks to testing robotaxis across global testing sites with very different traffic and driving conditions, we believe our tech stack is among the world leaders in the autonomous vehicles industry."

This claim appears to be backed by the statistics. In 2021, Pony.ai cars only experienced a "disengagement"—an incident where the safety driver had to take over control of the vehicle—every 23,420 km on average. This puts them ahead of both Waymo and Zoox where they have occurred on average every 12,675 and 11,886 respectively, and only Cruise can boast a better ratio, experiencing a "disengagement" every 67,627 km. This demonstrates not only the capability of Pony.ai's tech, but also its relative safety.

And full autonomous driving is getting closer for Pony.ai. Currently worldwide, only Waymo and Cruise can operate driverless robotaxis, and that is confined to San Francisco. But Pony.ai's robotaxis are currently deemed to be at level 4 (L4) autonomy, according to the classification system published by the standardization body SAE International. Full automation, without the need for any human intervention, is L5. Comparing this to Tesla and EV startup Xpeng's Chinese offerings that sit at L2 and L2+, it's clear to see that Pony.ai is a front runner.

Domestic and driverless

Now the world's largest automotive market, China has the potential to become the world's largest market for autonomous vehicles and it is predicted that China's shared mobility market will reach a valuation of RMB 2.25 trillion ($352 billion) by 2030. For AV companies like Pony.ai, the rewards for successfully penetrating the China market could be enormous.

The advent of internet technology and the app-based economy has been far more transformative in China than anywhere else in the world, says Bill Russo, a former Chrysler executive and now chief executive officer of Shanghai-based consultancy Automobility. "I believe that the robotaxi is not only going to commercialize faster here in China, but it's also going to have a far more disruptive effect on the economics of the automotive industry than anywhere else in the world," he adds.

A government-backed infrastructure ecosystem is also a crucial element for the commercialization of robotaxi services. "The development of autonomous vehicles is not simply driven by technology, but also requires the empowerment and support of an entire ecosystem," says Neil Wu, Partner at consultancy firm Roland Berger.

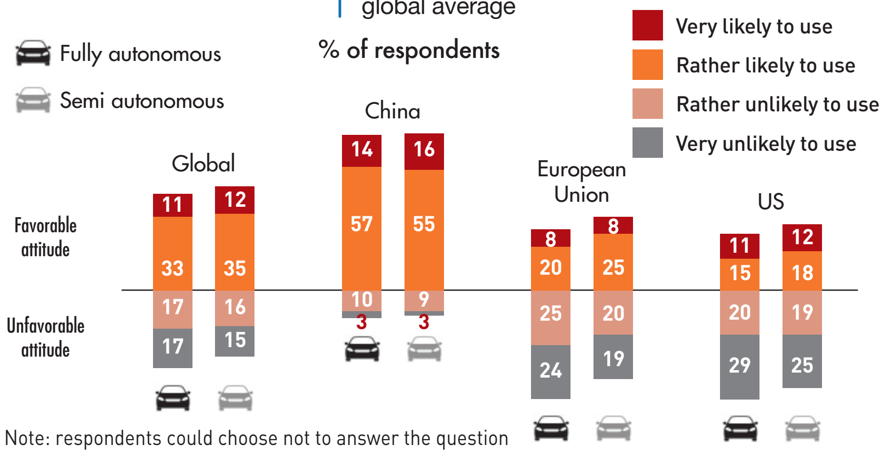
Pony.ai has announced partnerships with China's state-owned automaker FAW Group, GAC Motor and T3 Chuxing, a ride-hailing venture backed by Tencent and Alibaba, to promote its robotaxi services for the Chinese market. To date, nearly 500 companies have been issued autonomous driving road testing licenses, and the number of cities open to autonomous driving road testing continues to increase.

Pilot cities including Beijing, Shanghai and Chongqing are also orchestrating the activities of research institutes, automobile OEMs and AV technology companies driving the future development of autonomous driving infrastructures.

But some in China remain skeptical about how soon a regulatory roadmap to full implementation can be produced. Until now, no specific law or regulation has been introduced for the purpose of autonomous driving or robotaxis. "In the future, whether it is for robotaxis or for autonomous passenger cars, self-driving must operate within a certain legal framework because of the safety issues involved," says Zhong Shi, a member of China Automobile Dealers Association Expert Committee and senior

AUTONOMY, A-OK

Chinese citizens have a much higher acceptance rate of autonomous vehicles compared to the global average



Note: respondents could choose not to answer the question
Source: Arthur D. Little Analysis

automotive analyst based in Beijing. "Under the current regulatory situation, there is no official legal standing on this issue."

Long way ahead

Chinese autonomous vehicle companies still have a long way to go until they can reach full commercial deployment. An important challenge facing these AV companies, including Pony.ai, is how they can expand beyond their current areas of operation.

"Only after operations could run smoothly in cities of several million or even ten million for a few years, can the industry become commercialized and applied nationwide as a mature model," adds Zhong.

And it is also necessary to remember that the technology will face a different set of challenges on meandering rural roads, and licenses will not be doled out nationally but only on a province-by-province basis after testing. Nonetheless, McKinsey & Company estimates that by 2030, robotaxis without drivers could account for 22% of the shared mobility passenger kilometers in tier-1 cities, such as Shanghai and Beijing.

Pony.ai, on the other hand, is optimistic about offering autonomous taxis in Tier-1 cities well ahead of 2030, considering the current technology and its pace of development as well as the company's engagement with regulators, according to Steyn. "We also believe that once the roll-out starts, it will move quite quickly given the tremendous technological benefits like enhanced safety and the attractive financial profile of robotaxi services," he adds.

In addition, despite the huge market potential in the world's most commercially aggressive internet economy, rolling out Pony.ai's full-stack autonomous driving solution requires a feat of engineering and massive investment. Following Beijing's industrywide crackdown on tech companies in 2021, Chinese AV companies now face a common hurdle of having great difficulty accessing foreign capital markets.

In August, just two months after discussions surfaced around a possible Pony.ai public listing plan in the US, with a rumored valuation of $12 billion, reports surfaced that the company had suspended any such IPO plan.

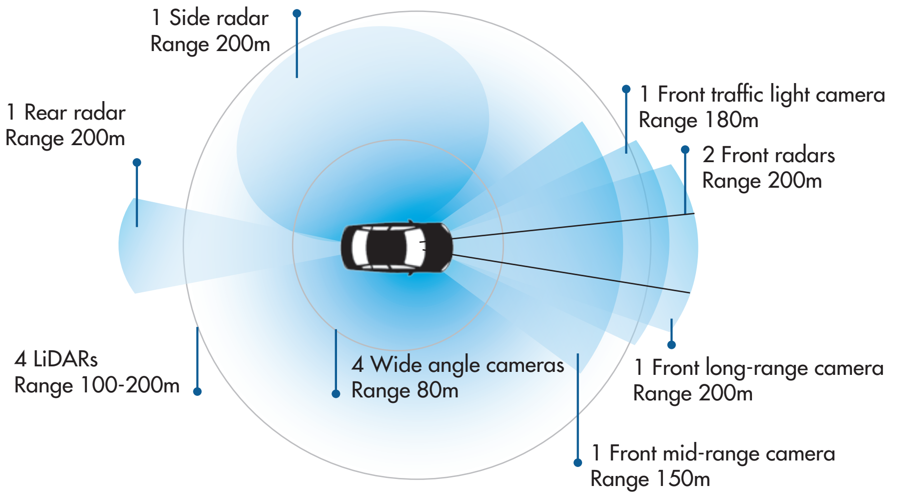
Following reports of the IPO shelving, Chinese tech media *Late Post* said last November that Pony had merged its self-driving truck development team into its passenger car development team and two of the company's founding members had left Pony.ai for other autonomous driving competitors.

Pony.ai's CFO Steyn says that the company has never confirmed any plan for a public listing, but adds that the company believes that doing a public listing is the right way to go. "Until the right capital markets window and the right point in Pony's development, we will continue to benefit from our supportive and world-class investor base," he adds.

Out on the road, it hasn't all been plain sailing for Pony.ai. Reuters reported last December that Pony.ai's driverless fleet testing permit has been suspended in California by local regulators only six months after it had been approved. The California Department of Motor Vehicles suspended the permit on November 19 following a reported collision in Fremont on October 28. At the time of writing, Pony.ai did not hold any active testing permits in California.

"Pony.ai was founded just over five years ago with the view that to accelerate autonomous vehicle milestones, we needed to embrace parallel development along numerous vectors," says Steyn. "Running this broad test program comes with significant organizational complexity and financial costs, especially for a startup, but we believe creates a 'nimble' software architecture."

SENSITIVITY | Autonomous vehicles require a range of different cameras and sensors to function safely



Source: Pony.ai

Galloping forward

Looking ahead, Pony.ai could benefit from placing more stress on its truck businesses as it gives them more varied data to utilize for development, auto expert Xing says. "They could potentially go on the double-track into both commercial and passenger self-driving, just like Waymo and Aurora did," he says.

Among the many that remain optimistic about China's future in driverless transportation is Lian Zerong, a frequent user of Pony.ai's robotaxi services in Guangdong Province's Nansha Development Zone, where Pony.ai has been road-testing for more than three years.

"In today's society, technology can achieve anything," says Lian. "I'm sure Pony.ai's technology must be mature enough for the company to be able to carry people on the road in vehicles. Even if one day there were no one at the driver's seat anymore, I would still take the ride."

CKGSB CASE STUDY

Decisions, Decisions, Decisions

Oat drink company OATLY successfully navigated its entry into the China market via three key choices, including who it should partner with and how it can future-proof its business

By Professor Teng Binsheng, Professor of Strategy, CKGSB and Wang Xiaolong, Senior Researcher, CKGSB Case Center

"It's like milk, but made for humans!" is one of the many humorous slogans used by OATLY, a Swedish plant-based protein drink brand that entered the Chinese market in 2017, quickly becoming a major success. The company's oat-based products are now prominently featured in major coffee chains, retail channels and high-end hotels, but the company's success in the China market did not come easy.

Prior to its China entry, OATLY's key markets were Europe and the US, but the company's Asia president David Zhang had grand ambitions for the company in China, aiming to place the brand in the top 1% of the China milk-alternatives market. The company's flagship product, oat milk, uses a unique enzymatic technology that brings about a chemical change when the oats are liquidized, unlike soy milk and walnut milk which feature a physical change through grinding.

But differentiating itself in a market already choc-a-bloc with dairy-alternatives was a challenge. China has also had a vegetarian culture for thousands of years, with many Chinese already growing up drinking soya milk, so purely being a dairy-alternative was not as big a selling point as it was in the West.

Beyond this, the company had problems with product positioning, meaning it had to be instrumental in creating a formal plant-protein product category in shops and online. Early on in 2017, Zhang was not confident of the prospects for OATLY in the China market, but several smart strategic decisions allowed the company to succeed well beyond anyone's expectations.

An illustrious history

The OATLY brand was founded in 2001 by Rickard Öste, a researcher who developed a pioneering "enzymatic technology" that breaks down cereals into a liquid while retaining the main nutrients, providing a dairy-flavored plant-based drink for lactose intolerant people. The proportion of lactose intolerant people varies from region to region and in Asia around 70%-80% of people have some level of lactose intolerance. OATLY decided to focus on this demographic as a unique selling point in its home market of Sweden, and by 2012 the company's revenues reached $29 million a year. But it was still mostly limited to the Scandinavian market, and the company was far from being a world-renowned brand.

In 2012, OATLY appointed Toni Petersson as CEO and his entrepreneurial experience, which spanned a wide range of sectors, was a marked change from the existing company board members' mostly academic background. Petersson launched a radical organizational change to incorporate more creativity into the company's DNA. OATLY differentiated their brand by curating the image of a humorous and sustainably-minded "milk challenger," using slogans such as "WOW! No cow!" And the company continues to challenge the dairy milk industry with its image as the creator of a new generation of protein drinks, with the low cost of its products also helping them gain attention.

OATLY's brand vision is made up of two key elements: 1) helping consumers achieve balance in terms of nutrition and mind; and 2) contributing to a more balanced planet. OATLY's primary Swedish production plant uses 100% renewable energy and the leftover production materials are used as secondary resources. The company has started using electric trucks to transport its goods in Europe, as well as integrating sustainable actions into the company's annual planning to neutralize the company's carbon footprint.

The first key choice

The initial challenge that David Zhang faced in working out how to successfully enter the China market was dealing with the structure of retail channels. Very few aspects of OATLY's success in retail channels in Europe and the US were relevant to the China market and the company basically shifted from retail to what it calls the "café channel." Consumers in the West generally make their coffee at home, and, driven by opinion leaders, retail stores remain the largest channel through which consumers buy OATLY.

But in China, facing initially disappointing retail sales, Zhang decided to target the booming café culture in China's major cities.

In early 2018, Zhang's team, based in Shanghai, saw an opportunity for their top-selling product, the "Barista" oat drink. Boutique café culture had recently taken off in Shanghai and the OATLY product met the requirements of the culture's consumer base in several ways—it was sustainability-minded, it could act as a dairy-alternative and it was in the right price range.

The company approached each of the many cafés individually in search of product placement and brand exposure, leading to the creation of OATLY's "Three One" strategy—one city (Shanghai), one market (boutique cafés) and one product (Barista).

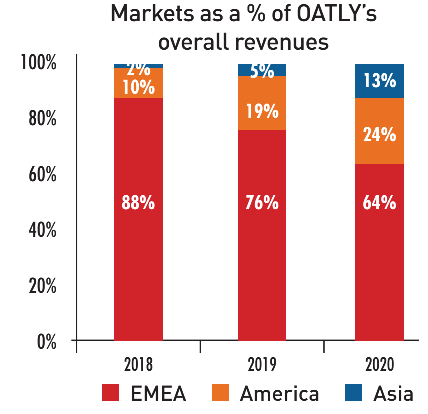
It wasn't a smooth process, but the brand found that the quality of their products played in their favor as professional baristas found OATLY Barista had several advantages over its competitors in the preparation of coffee. The taste and texture of oat milk was preferable to many consumers compared to almond or soy milk, and with time and persistence, more and more cafés around Shanghai were willing to use OATLY products in their drinks.

The Barista product is slightly more expensive than the alternatives, but Zhang used that fact to arouse the curiosity of customers. OATLY encouraged the cafés to display a notice at the counter stating that the traditional latte had been replaced by an oat milk latte, resulting in a slight price increase. Consumers would then inquire and the café assistants could casually introduce them to OATLY's environmental advocacy, the sustainability concept of replacing milk with oat milk, the nutritional benefits of oats, etc. The boutique café consumer demographic was also able to comfortably absorb the slight price increase.

RISING SHARES

OATLY's Asia market share, with China as the main driver, rose dramatically between 2018-2020

Market Value ($mn)			
	2018	2019	2020
EMEA	103	155	268
YOY ↑		49.8%	73.0%
America	12	39	100
YOY ↑		217.2%	155.6%
Asia	2	10	54
YOY ↑		336.4%	427.0%
Total	118	204	421
YOY ↑		72.9%	106.5%



Source: OATLY

Within just a few months, the company had partnered with hundreds of cafés that were, in turn, recommending others to establish partnerships with OATLY thanks to the additional revenue and brand tone reinforcement that OATLY offered. Then the brand started to take off organically. Cafés without OATLY couldn't stay competitive as OATLY's sustainable and healthy image had become part of the identity of boutique cafés. By the end of 2018, the company had partnered with over a thousand cafés, many of them high-end with prominent OATLY product placements.

In Europe and the US, OATLY was pitted against the milk industry as a "milk challenger," but in China Zhang positioned OATLY alongside dairy in order to cater to consumers' positive perceptions of milk. Its breakthrough in the café channel allowed OATLY to rid itself of the image of being a "foreign soy milk," but it was still unclear which umbrella category it belonged to and this left OATLY unsure about where to place its products in supermarkets or on online e-commerce platforms such as Tmall.

The OATLY China team suggested to Tmall that it develop a new product category, and Tmall created the "Plant Protein" category, and a "Plant Protein" purchase zone during the 2018 "11.11" sales festival, where OATLY sold out its stock of 5,000 cartons in 11 minutes flat.

With the jump in sales, OATLY Asia was consistently in a state of supply shortage, and used online sales channels only when there was enough stock available. OATLY's factories were overseas and shipments were costly and time-consuming. Unable to fully meet the demands of the exploding China market, the company was on shaky ground, particularly with the rise of imitators and non-exclusive café partnerships.

The second key choice

OATLY's next decision was deciding who else to partner with in the China market. In February 2019, OATLY's success in boutique cafés drew the attention of well-known chain café brands, which began to purchase OATLY products for testing. The OATLY Asia team decided that partnering with the leading chain café brand—which cannot be named here for legal reasons—in China was the best option, but initial negotiations failed due to limited supply chain output and the strict requirements from the chain café group.

During the talks, Zhang had to repeatedly remind his head office of how useful such a cooperation would be for opening up the China market for OATLY. He also had to ensure, through various means, the stable arrival of product, brand exposure and "non-exclusivity", three seemingly impossible tasks. Zhang also

Bottoms up: The OATLY range in China was led by its Barista drink

rejected a number of good offers from other chains in China, because he saw OATLY's best option for its first partnership to be with the top chain brand in the market.

For various reasons, the negotiations related to the café chain's China operations stalled and Zhang shifted to the chain's operations in Hong Kong, quickly reaching an agreement with them. With OATLY milk now available in Hong Kong cafés, he then went on to sign up the chain's outlets in Thailand, Singapore, Malaysia and Indonesia.

Increasing sales in these regions made the café brand's mainland China team realize the potential of partnering with OATLY and, finally, they also agreed to sign an agreement. In 2021, OATLY's total global revenues reached \$643.2 million, with Asia—and China as the main market within it—now contributing \$126.9 million, a 136.5% year-on-year increase on 2020.

Thanks to this initial deal, OATLY and its products can now be found in Starbucks, KFC, McDonald's, Pizza Hut, Pacific Coffee, Luckin Coffee and other large chain brands across the food and beverage sector in China. With OATLY becoming almost ubiquitous in China, the company decided to build three new factories, two in eastern China and one in Singapore.

The third key choice

The final conundrum revolved around maintaining the company's first-mover advantages and branding successes. OATLY's success in the China market also gave rise to the rapid appearance of a number of imitation brands, including other plant-based and oat drink brands over the last few years. Analysts expect the global plant protein market to grow in value from \$4.6 billion today to \$85 billion by 2030.

Oat-based products have suddenly become big business and major brands such as Coca-Cola, Nestlé and Unilever are beginning to develop oat milk products, while international plant-based brands such as Califia and Minor Figure are also entering the market. Meanwhile, domestic Chinese brands like OAKIDOKI, Cereal Planet, OATOAT and Daily Box continue to emerge. Traditional brands featuring almond milk, coconut milk, soy milk and walnut milk have also been impacted by the new "plant-based" concepts championed by OATLY. Major drinks players YILI and Nongfu Spring have also recently launched new plant-based products in various forms.

In order to maintain their market position, OATLY now sells a wide variety of products, such as oat milk specialty drinks, oat ice cream, bakery and pastry products. They also now run regular activities to boost both their business and image, including providing professional barista training for young people with hearing impairments and promotion of OATLY's sustainable recycling programs.

OATLY has also joined forces with other brands, and particularly with Tmall, to promote various concepts underlying the company's business and activities. In December 2020, the "Tmall Plant Protein Alliance Summit" was held, launched by Tmall's parent Alibaba and hosted by OATLY, to discuss "more possibilities for the future of plant-based food."

Opportunities and challenges

The product power of a nearly 30-year focus on oats, and the success in the food and beverage chain channel has made OATLY a phenomenon in China. In May 2021, OATLY listed on NASDAQ with a strong group of investors, but it is still not yet a "big company" and its overall operational capabilities have yet to be solidified in the face of global competition. The company may have had first mover advantage, but it is also the product to beat for other brands.

The emergence of different brands can help expand a market, but the competition can also lead to a price war that inevitably brings down profit margins. The market in China is growing spectacularly, and there is the possibility that OATLY, with its relatively limited production capacity, will turn from a high-end brand to an ordinary one, and eventually become marginalized, with many major brands trying to capitalize on the oat milk trend.

But in any case, there is plenty of room for OATLY to grow when seen in the context of the global dairy market that is valued at over \$1 trillion. The company has launched a wide range of products in addition to its Barista range of coffee-friendly oat milk, and it is carrying out a number of brand campaigns to enhance the brand's tone and core concepts.

The success of OATLY in China entailed not only the establishment of a brand, but also the creation of a new product category. While the competition is tough in light of China's new carbon neutrality targets, its consumer class becoming more product-conscious, and the increasing importance of doing "business for good," OATLY stands a strong chance of having long-term solid success in the China market.

NO PLACE LIKE HOME

Chinese tourists are increasingly looking inwards for travel due to border restrictions, and the options available to them have flourished because of the demand

By Rosemary McDonald

Image by Jason Wong

Domestic tourism has received a boost from border restrictions, but recurring lockdowns offer a challenge for many businesses

It was not so long ago, before COVID appeared, that Chinese tourists seemed to be on the verge of taking over the world and had already become the dominant source of visitors and travel-related revenues for many destinations. But China's borders have now been closed for more than two years and in that time everything has changed.

"Before the pandemic I would spend three months a year traveling outside of China," says Alice Yi, a 27-year-old filmmaker from China's eastern Jiangsu province. "Now, due to the borders closing, I spend those three months traveling inside China." Like Yi, many in China are discovering new destinations in their own backyard.

Although hindered at times by recurring lockdowns, China's domestic tourism market has expanded at a rapid pace in the last two years, due in part to restrictions on international travel, but also the explosion in popularity of winter sports thanks to the recent Beijing Olympics and a renewed interest in Chinese cultural hot spots. Those who would previously have headed to foreign countries in search of fresh experiences are now looking at rural China, outdoor activities and all-encompassing trips with a uniquely Chinese character.

"A lot of my travel plans used to be focused on languages," says Isabelle Cheng, a 35-year-old marketing executive from Beijing. "I went to France and practiced my French with the locals and went to Mexico for Spanish in university. This kind of experience is absent now when I have to travel within China, so I spend more time in nature, away from people."

While the world's tourist destinations are struggling to fill the gap left by no-show Chinese visitors, the situation has created a plethora of domestic opportunities.

"Over the last two years, China's domestic tourism market received a boost," says Jane Sun, CEO of Trip.com Group, one of China's biggest online travel companies. "Far-flung and remote provinces with much to offer in terms of natural beauty and outdoor activities have become increasingly popular."

From China with love

Chinese prosperity levels reached a tipping point in the early 2000s and growing numbers of people, with enough disposable income to consider travel, immediately reached for the top destinations in Southeast Asia, Europe and the US. Over the past two decades, Chinese travelers and their spending have completely remade the tourist industry across the globe, and the country was consistently ranked as the top contributor to global tourism revenues since 2008. According to the UN's World Tourism Organization (WTO), Chinese tourists spent $254.6 billion overseas in 2019, accounting for almost one-fifth of global tourism spending. Then came the pandemic.

Over the last two years, with border closures, the shutdown of the international travel network and economic problems

> **A new appreciation of the breadth of what China has to offer for domestic travel has spurred exciting travel brands and new experiences**
>
> Chloe Reuter
> Founding Partner
> Gusto Luxe Consultancy

of all kinds, travel spending by Chinese people with itchy feet has almost entirely been redirected inwards, and the country's tourist offerings have remade themselves to accommodate the new and unexpected flood of visitors. China's domestic travel industry and related sectors employ around 80 million people, with annual revenues at close to a trillion dollars, around two-thirds of which is tourism related, with the other third consisting of business travel and personal trips.

Historically, the country's domestic travel was focused on the Golden Week National Day holiday in October and the two-week Chinese Lunar New Year break that falls in the first couple of months of the year. Prior to the pandemic, these breaks were used by many of the country's workers to return home and spend time with family, but due to continued COVID-19 flareups and resulting lockdowns, many now choose to holiday somewhere close by.

The result is that while travel numbers in 2022 are likely to still be down on the six billion domestic trips seen in 2019, China's domestic tourism industry has over the last two years dealt remarkably well overall with the challenges it has faced.

There is still an unquestionable thirst for travel among China's 1.4 billion people, and within the sector's recent shifts, the traditional idea of a hotel including a room in a resort on the beach is increasingly being challenged by travelers looking for something more interesting or unique.

"We will continue to see a robust domestic travel market and this has given rise to some interesting travel trends," says Chloe Reuter, Founding Partner of Gusto Luxe, an integrated luxury agency that provides consultancy, creative solutions and digital innovation for luxury brands. "A new appreciation of the breadth of what China has to offer for domestic travel has spurred exciting travel brands and new experiences."

> **More Chinese tourists now prefer short-distance but high-quality trips**
>
> Denise Cheng
> Market Analyst
> Daxue Consulting

Back to their roots

Some Chinese tourists, especially those in the upper-middle classes, are increasingly seeking out rural getaways, allowing them to reconnect to a heritage and way of life that have been lost in the sprawling metropolises of modern China. In March 2021 alone, rural tourism-related bookings on Trip.com Group's Ctrip app—which is called Trip.com outside of China—increased by over 300% compared to pre-pandemic levels in 2019

One such place is the Linden Centre, which offers an immersive experience in a typical farming community in China's countryside—their flagship hotel is situated south of Dali in China's southwestern Yunnan province. Founded in 2008 by Brian Linden, a former American journalist who first came to China in 1985, the Linden Centre aims to provide a more "genuine" form of experiential and cultural tourism, and ensure that the locals situated around the hotel are able to benefit, socially and financially, from the visiting guests.

"I see the Chinese now embracing this model a lot more," says Brian Linden, founding partner and president of the Linden Centre. "And we find that many of our guests are coming knowing that we don't have large bathtubs or infinity pools, but because of how we interact with the community, as well as our content, our free programming, lectures and education programs."

Despite an increase in tourists to destinations akin to the Linden Centre, and a clear interest from local governments in many parts of the country in expanding such tourism, the definition of what is an acceptable "rural" and "sustainable" tourist experience differs from person to person. Previously, for many visitors, luxury and location took precedence over community involvement.

"In terms of rural tourism in China, it sometimes means little more than providing a luxurious or comfortable hotel in a remote area," says Linden. "Some rural destinations that have used such a model to develop are often less than successful because they lack convenient transportation links and more traditional tourist attractions."

But there is no doubt that this sector is growing. "In 2022, the future of travel will be niche, sustainable travel," says Carol Chen, founder of Diadema International Travel, one of China's first high-end customized travel agencies. "It will be ecological travel, paying attention to quality and to details, and giving back to the community or local residents."

"Our guests often tell me that they no longer want to visit the more commercial old towns where you walk from store to store and bar to bar," says Linden. "It's a good sign, something I didn't hear 10 years ago from my Chinese guests."

Red tourism

The government has also been promoting new types of cultural tourism, encouraging Chinese citizens to get more in touch with their country's history. With the centenary of the ruling Communist Party in 2021, the government boosted promotion of "Red Tourism" routes which include historical sites with a modern revolutionary legacy. In 2020, "Red Tourism" sites recorded over 100 million visitors, and this year travel apps have recorded a huge increase in searches for the term. In 2019 "Red Tourism" accounted for over 1.4 billion visits and revenue of $62.2 billion. Some areas such as north China's Beijing-Tianjin-

Hebei region noted a 240% increase in tourism in 2021, which was attributed to "Red Tourism."

"Travel restrictions disabling outbound travel have strongly pushed Chinese people to explore sites with historical significance for communism," says Denise Cheng, market analyst at Daxue Consulting. "More Chinese tourists now prefer short-distance but high-quality trips, and these seem to fit the bill."

Adventure awaits

For China's younger travelers, many of the destinations growing in popularity are also nature-based, but more on the adventurous end of the spectrum. Outdoor sports-related activities that would have traditionally been enjoyed in other countries, such as camping, hiking and skiing have become increasingly common within China's borders.

"Before COVID-19, every year I would usually travel overseas to three to four countries for outdoor trips, but luckily, China is massive and has a lot to offer with diverse landscape and cultures," says Xiaowei Zhang, a 28-year-old marketing manager for an international sports brand. "If I can't travel overseas in 2022, I will continue to explore more domestically—particularly Xinjiang and Inner Mongolia, high-altitude mountain adventures, plus mixing in some surfing in Hainan."

The Beijing 2022 Winter Olympics played a huge role in the boom in sports-related holidays, with many new Winter sports-related facilities being constructed around the country with the aim to get China's citizens excited for the games. Sports-related travel bookings were up 97.6% during the summer of 2021, in comparison to the same period in 2019.

Mountain resorts such as Changbaishan and Beidahu, both in China's northern Jilin province, have seen a big jump in visitor numbers, and there is a new indoor skiing center being built in Shanghai to encourage more participants. This includes Wintastar Shanghai which, when opened this year, will become the world's largest indoor ski resort, boasting a 90,000 square meter alpine-themed indoor ski park, a Nordic-themed water park and a hotel.

"In 2021, under the influence of the Olympic Games, we saw people eager to enjoy healthier sports- and activity-based trips," says Jane Sun of Trip.com Group, which owns online travel brands such as Trip.com, Skyscanner and Ctrip. "More recently, 'Winter Olympic Games' searches on Ctrip doubled in December 2021 compared to the previous month, and 'skiing' tagged user-generated content on Ctrip Community, a travel content platform on Ctrip, soared 224% in Q4 last year compared to the same period in 2020."

Some of China's younger travelers have also become increasingly adventurous in their choice of destination, in that they're not picking one at all. An emerging trend is the "blind box" holiday where buyers pay a fixed price for a holiday where they choose a departure city, but the destination is unknown. If they do not like the "content" after opening the "box," they can request a full refund from the company organizing the trip.

Holidaying at home

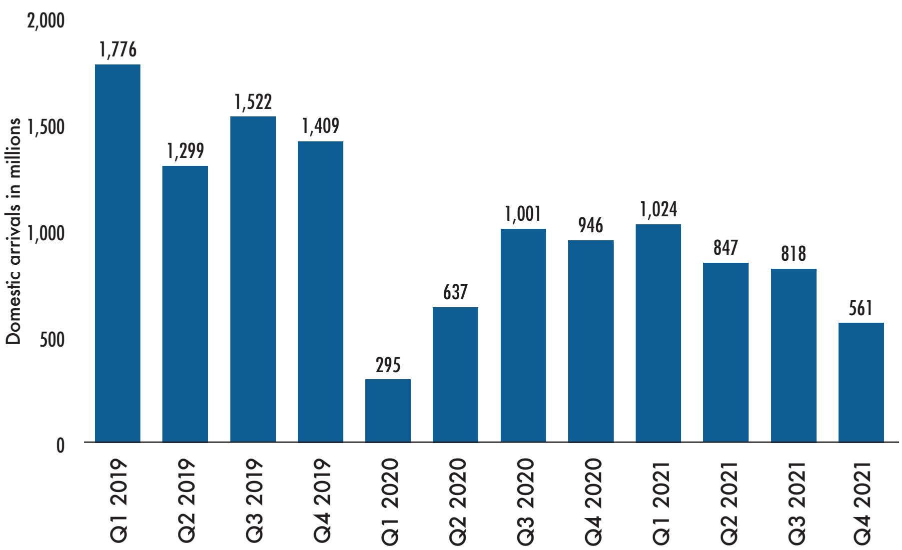
There has also been big growth in "staycations," with people choosing to "get away from it all" by not going very far at all. Fears of quarantines and travel restrictions have been a boon for local tourism in urban areas around China, and this is especially true for those who have younger or elderly relatives that might struggle to travel under more stressful circumstances.

"Families are paying a lot of attention to safety measures," says Jane Sun. "That's why cities like Shanghai, Beijing, Guangzhou and Shenzhen remain popular due to the ease of transportation and broad appeal for families."

One "staycation" success and a constant family favorite has been theme parks, especially those run by the international giants Disney and Universal Studios. Shanghai Disneyland has done remarkably well through the pandemic, although the recent Shanghai lockdown forced it to close temporarily, and the Universal Studios Theme Park in Beijing sold out tickets for its opening day in September 2021 within one minute, and had completely sold out for the next three months within three minutes. China today has over 3,000 theme parks, but in most cases the local parks lack the licensed IP to create unique experiences of interest to today's Chinese families, which sets them behind the international behemoths.

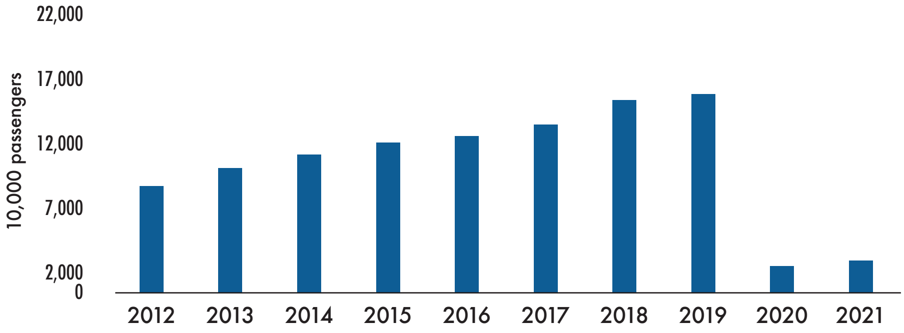
Many of China's more wealthy families are spending time at the growing number of boutique and luxury hotels that surround the major cities, in order to differentiate their vacation time from their everyday lives. This has led to a sudden jump in the

STAYING HOME | The number of domestic arrivals within China hasn't returned to normal quite yet, but it has shown a resilience



Source: China National Bureau of Statistics

FINAL STOP | China's outbound travel numbers have dropped significantly due to border restrictions



Source: China Tourism Academy

number of luxury hotels opening across the country, aimed wholly and solely at local wealthy people.

In December 2021, Hilton Worldwide Holdings opened Hilton Lanzhou City Center in Gansu Province, marking its 400th hotel in China. During the same month, it also launched its first Home2 suites brand hotel in Shenzhen providing a more flexible option for longer stays. Another example is the Ritz-Carlton which has recently opened an "ice hotel" in the northern city of Harbin, and announced plans for a new outlet in Ningbo, in the coastal province of Zhejiang.

Digitalization has also offered the opportunity of virtual travel to those staying at home. "Digital tour products such as virtual travel, performances and exhibitions have also become a rising trend among Chinese travelers," says Denise Cheng. "Although not everyone is able to physically travel, technology has enabled everyone to travel virtually."

Accessible via Chinese online travel agencies such as Mafengwo, Fliggy and Tuniu, as well as e-commerce apps like Taobao, scenic spots, museums and galleries are offering virtual video tours, some of them can even be accessed for free. The 360-degree views of the destinations are accompanied by audio guides, AI tour guides and lectures that can add detail and provide the learning experience that so often accompanies a trip to places of interest. There are also some individual tour guides continuing to make a living by offering personalized "walking" tours that they broadcast from their phone, answering questions as they go.

It's good news, then?

Despite the diversification and robustness of China's domestic tourism market over the last two years, the pandemic has hit some sectors of the country's travel industry hard, particularly the business hotel end of the market. "The number of hotels in China has dropped from over 680,000 just two years ago to around 450,000 today," says Yereth Jansen, UN World Tourism Organization member and founder of CloudBridge, a tourism consulting firm. "During festivals we see a splurge in tourism spending but in reality, many hotels have had to close due to a lack of visitors."

There is currently still a level of unpredictability brought on by pandemic outbreaks in various parts of the country and the travel restrictions put in place as a result. "The uncertainty in trips being canceled due to lockdowns and Big Data-driven health codes discourages people from booking trips in fear of cancellations and possible further travel restrictions," adds Jansen.

Brian Linden has faced the same problems in Yunnan Province. "It has been a difficult business climate for the last few years because of the constant questions regarding inter-provincial restrictions," he says. "During Chinese New Year, we had many cancellations because of the confusion about potential lockdowns and quarantines. We had no idea how to address these concerns beyond stating clearly our own provincial conditions and requirements."

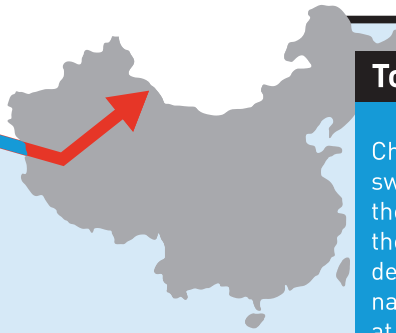
The future

While the last two years have seen local people traveling widely, searching out new experiences and creating traffic jams at tourist resorts throughout the country, it could turn out to be temporary. "Domestic tourism in China will, without a doubt, continue to thrive," says Denise Cheng. "However, a proportion of Chinese people still prefer traveling abroad, for a variety of different reasons."

And it seems simply a matter of time, perhaps a long time, before Chinese tourists return en masse to Paris, Lisbon and Phuket. For travelers like Alice Yi, it is just a waiting game until the borders reopen. "Like everyone else, once the border is open, I will travel outside of China," she says. "A lot."

> **The number of hotels in China has dropped from over 680,000 just two years ago to around 450,000 today**
>
> Yereth Jansen
> Member
> UN World Tourism Organization

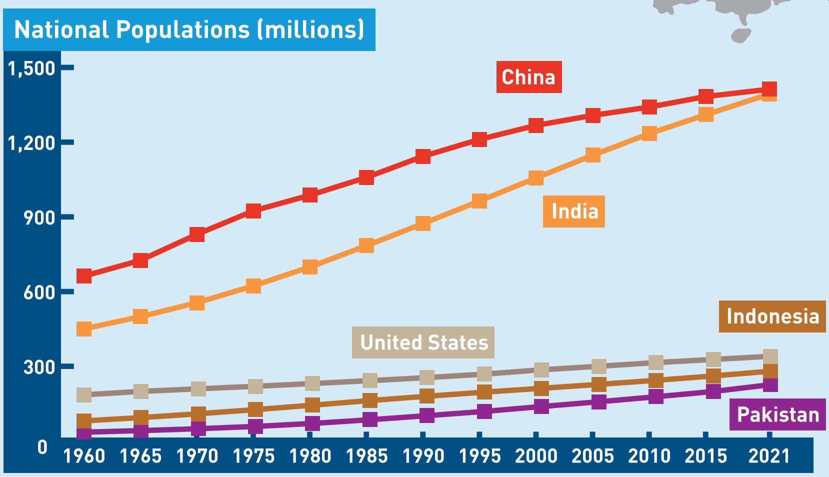
DEVELOPING DEMOGRAPHICS



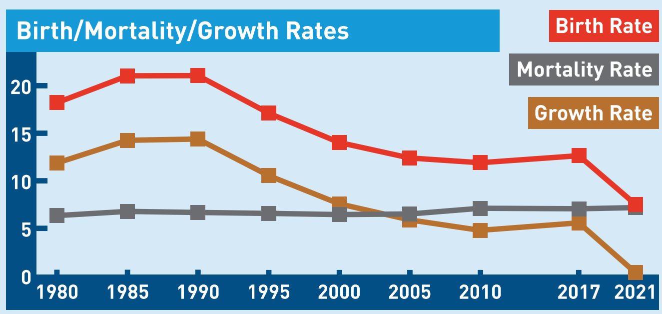
Total Population

China has been, for vast swathes of human history, the most populous country in the world. But now, changing demographics within the nation are putting that title at risk.

China's population growth has slowed significantly over the past few years, and some experts are predicting that 2022 might even be the year it starts to contract. With this in mind, it is unsurprising that India is expected to overtake China in terms of population by 2030.

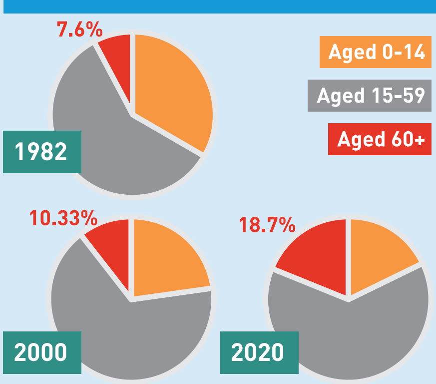


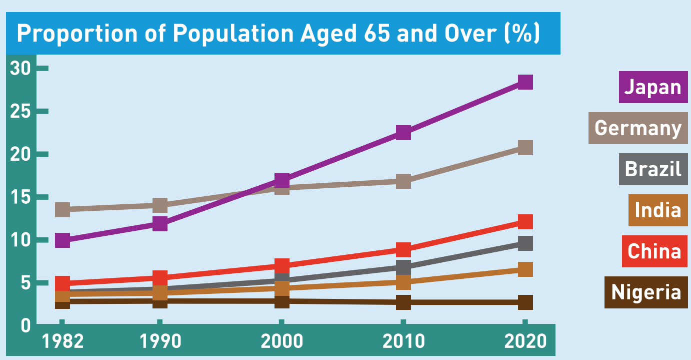
The slowing of population growth is in a large part due to a declining birth rate, which has been caused by two main factors: the continuing decrease in the number of women of childbearing age, and a drop in fertility levels. In 2021, there were roughly five million fewer women of childbearing age (between 15-49) than in 2020.



Aging Population

China's population is also getting older. Although the percentage of the country's population aged over 65 is not yet at the level of nations with a much higher GDP per capita, China's elderly population is growing rapidly.



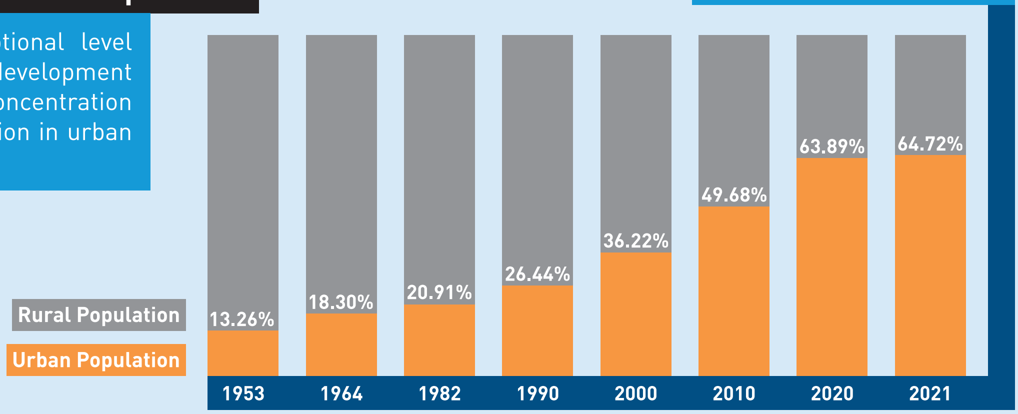


Sources: World Population Review; World Bank; China National Bureau of Statistics

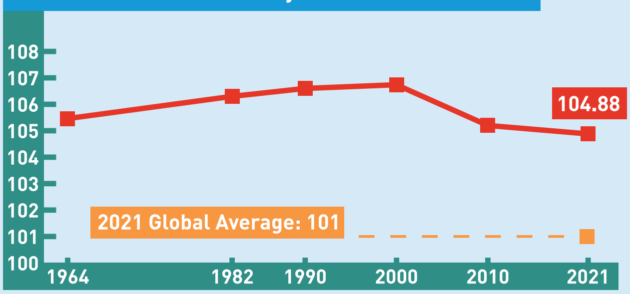
Urban and Rural Population

China's exceptional level of economic development has led to a concentration of the population in urban areas.

Urban Population Rate (%)



Number of men for every 100 women in China



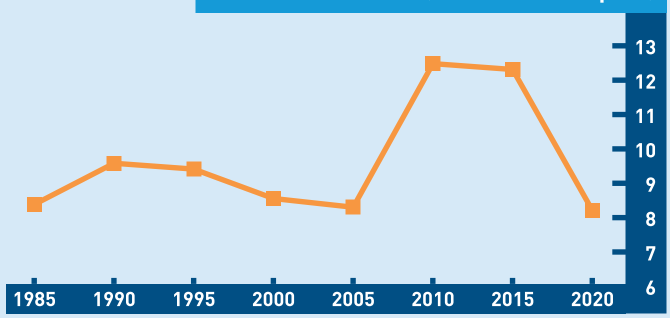
Gender Balance

Particularly in recent history, China has had a gender imbalance in its population. This can mostly be attributed to the country's long-standing one-child policy which indirectly encouraged abortion and infanticide of female children. The ratio has been evening out in recent years, but it is still a way away from the global average.

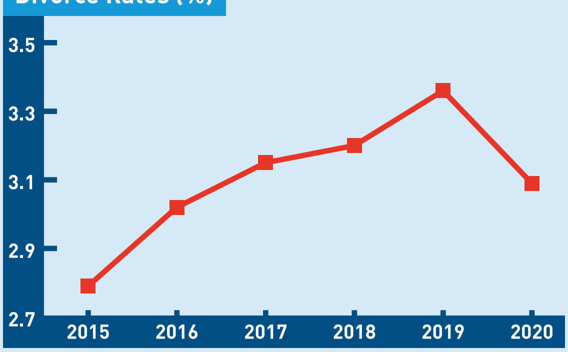
Marriage Statistics

Marriage rates traditionally fall alongside a rise in development, and after a boost from the increased prosperity of the early 2000s, the number of marriages in China peaked in 2013. An outcome of the subsequent drop in the marriage rate has been a fall in the divorce rate. To keep the divorce rate down, a law was introduced in January 2021 requiring couples to wait for 30 days before the divorce process could be finalized.

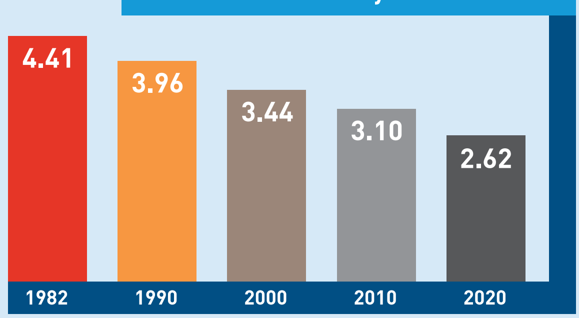
Total Number of Marriage Registrations (millions of couples)



Divorce Rates (%)



Average Number of People per Family Household by the end of 2020



Sources: China National Bureau of Statistics; China Population Census data CHINA data

The stats you need to know

Macro

Number Two

China overtook the United States to become the second-biggest climate funds market in the world last year. Assets in the Chinese market grew by **149%** from 2020 to **$46.7 billion** last year. The US, bumped into third place after Europe and China in market size, saw assets totaling **$31 billion**, achieving **45%** growth since 2020.

Source: *South China Morning Post*

Growth Cuts

The International Monetary Fund cut its global growth outlook by the largest amount since the start of the pandemic. Global expansion will slow to **3.6%** in 2022, down from a forecast of **4.4%** in January, compared to **6.1%** growth in 2021.

Source: *Caixin*

Pension Plan

Employees in China will be able to contribute up to **RMB 12,000** per year (**$1,860**) to the country's first private pension schemes. The project aims to push more of the country's vast household savings into the financial market and buffer the impact of an aging population.

Source: *Financial Times*

Business

Equity Exodus

Overseas investors continued to sell off Chinese shares through Hong Kong's stock-connect program, with **$7.1 billion** of equity changing hands in March and another **$1.01 billion** worth in the first half of April.

Source: *Hong Kong Stock Exchange*

Biting the Apple

Xiaomi, the Chinese smartphone maker, overtook Apple in terms of domestic market share in 2021, breaking the **15%** barrier and putting the company in **third** place behind other Chinese brands Vivo and Oppo.

Source: *Financial Times*

CATL Battle

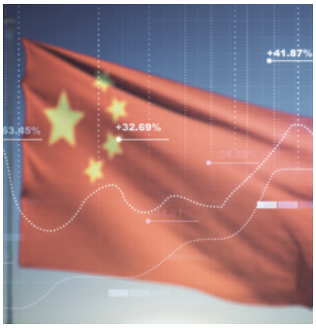
Contemporary Amperex Technology, or CATL, ranked first in the world in automotive batteries for the fifth straight year in 2021. Net profit jumped **2.9 times** last year to RMB **15.9 billion ($2.47 billion)** on a **2.6-time** increase in sales to **RMB 130.3 billion**, both breaking records.

Source: *Nikkei Asia*

Assets Ahoy!

China's asset management industry got back on its feet in 2021 to record its first double-digit growth after nearly three years of industry-wide shakeups. The industry expanded **11%** in 2021 to a record **RMB 134 trillion ($20.5 trillion)**.

Source: Caixin



Technology

G(eely)PS

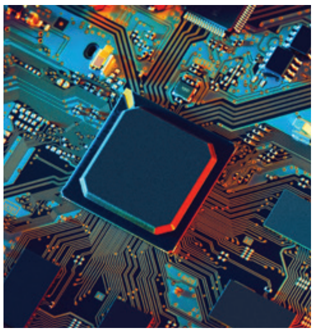
Geely, China's largest private automaker, has launched **nine** satellites into space as part of plans to create a high-precision navigation system for self-driving vehicles. The GeeSAT-1 satellites were sent into low Earth orbit, marking Geely's first successful launch.

Source: *Nikkei Asia*

Integrated Imports

China's integrated circuit (IC) imports dropped in volume by **9.6%** year-on-year in Q1 2022, a marked difference from the **33.6%** increase during the same quarter last year. The values of IC units it bought, however, were rising, with the average unit price up **26%** from a year ago.

Source: *South China Morning Post*



Internet Inflows

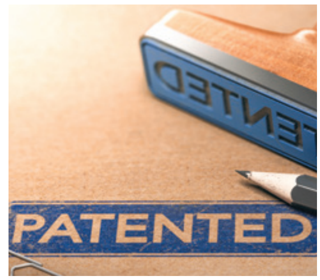
Internet companies are hiring more workers despite reports of large-scale job cuts. From July 2021 to mid-March, a dozen internet companies, including Tencent and Baidu, cut **216,800** workers while hiring **295,900** for a net increase of **79,100** positions.

Source: *Caixin*

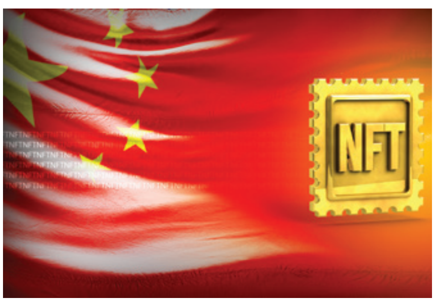
Patents Not Pending

China approved **696,000** patents for inventions last year, a **30%** increase compared to a year earlier. To comapre, the US only granted around **350,000** patents in 2020. There were an average of **7.5** of high-value patents per 10,000, or nearly **double** the ratio for 2017.

Source: *South China Morning Post*



Consumer



NFTs All Round

A new collection of **1,303** non-fungible tokens (NFTs) that feature front pages of Hong Kong's *South China Morning Post* in the second half of 1997—a momentous year in the city's history—sold out in just over two hours in April, as many in Greater China seek to explore the phenomenon.

Source: *South China Morning Post*

Gradual Increase

There are **10.76 million** Chinese students who are expected to leave college campuses this year, the largest group of graduates in China's history and **1.67 million** more than last year.

Source: *Nikkei Asia*

Planting Seeds

Beijing has expanded the number of accredited seed breeders in the hopes of increasing China's national food output. For the first time since 2013, China has enlarged its list of state-sponsored seed breeding and production bases, adding **116** to the existing **100** hubs already operating.

Source: *South China Morning Post*

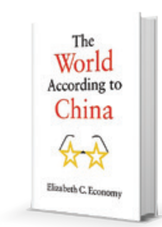
BOOKSHELF

On the Contrary

Dexter Roberts, author of *The Myth of Chinese Capitalism*, recommends books that suggest some contrarian views on China business

Dexter Roberts is an award-winning writer and speaker who serves as a Mansfield Fellow, Senior Fellow in the Atlantic Council's Asia Security Initiative, and teaches Chinese politics at the University of Montana. He was previously China bureau chief and Asia News Editor at *Bloomberg Businessweek*, based in Beijing for over two decades, where he covered China's accession to the World Trade Organization and the rise of private companies. Roberts' first book, *The Myth of Chinese Capitalism*, was an *Economist* "best book of the year" for 2020. He writes a weekly newsletter "Trade War" on China business and politics.

What would be your number one book recommendation for someone looking to learn more about China?



Elizabeth Economy's *The World According to China*. Informed by Economy's unparalleled access to many of China's key players and her years of closely watching the country's rise, the book lays out in detail how Xi Jinping intends to change China and the world, through dominating new global technology standards and using "sharp power" to rein in multinationals while pushing his anti-liberal definition of human rights. Economy persuasively lays out the scale of China's geopolitical ambitions and shows what they mean for all of us.

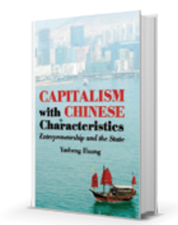
What book on China have you re-read the most?

Carl Crow's *400 Million Customers*. Crow, an American advertising executive based in Shanghai, recognized the lure of the China market for the world's companies, writing in 1937 of "the golden illusion of the sales which may be made to China's industrious millions." Even as some companies have thrived doing business in the China market, others still struggle and may relate to his prescient words: "The work is always interesting, and, in spite of our years of disillusionment, all of us secretly cherish the thought that a reasonable number of the 400 million may buy our goods next year."

What are you reading currently?

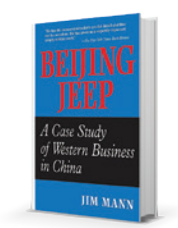
Isaac Stone Fish's *America Second: How America's Elites are Making China Stronger*. Fish takes aim at the once popular argument that economic engagement with China would eventually lead to political reform. Instead, he argues, Beijing is able to use the lure of its vast market to make multinationals self-censor when it comes to sensitive topics, and has become even less willing to adapt its behavior to Western liberal norms. While China has become more integrated with the world, its political system has become less open.

What book totally changed your perspective on a certain topic?



Yasheng Huang's *Capitalism with Chinese Characteristics: Entrepreneurship and the State*. Huang makes a contrarian but convincing argument: China's real source of economic vitality has been its countryside. In the 1980s, rural reforms that produced township and village enterprises unleashed a burst of productivity that lifted incomes and drove growth. In the following decades, as Beijing focused more on a state-driven urban model, growth continued but at the cost of rising inequality and debt, and declining productivity.

Which China book do you think is the most underappreciated?



Jim Mann's *Beijing Jeep: A Case Study of American Business in China*. It is one of the earliest accounts of the challenges investors face when they joint venture in China. Mann, a *Los Angeles Times* bureau chief in Beijing in the mid 1980s, details the travails encountered by American Motors Corp as it works with a state-owned Chinese enterprise to produce Jeeps, many of which still bedevil companies today. "From the outside, China has always seemed malleable," Mann writes. "From inside, it seems intractable, endlessly capable of frustrating change."

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