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China's dominance of the rare earths supply chain is extraordinary, but countries are beginning to seek alternatives

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 - Management education is changing in the AI era
- International businesses are having to try harder to keep up in China

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Cover Story

Rare Earth Resources 9

China's dominance of the rare earths supply chain is extraordinary, but countries are now seeking alternatives



9

Economy and Policy

A New Blue Ocean 5

China is helping guide development in the Global South, which is set to be the world's next innovation and development powerhouse

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RMB Internationalization 16

The US Dollar's presence in global markets has weakened somewhat, but can the RMB internationalize enough to replace it?

AI+ 19

China's AI+ policy has the potential to move the country forward apace, but there needs to be a growth in AI native thinking and talents to reach that point



29

Management Education Reform 29

The global business environment is changing and management education institutions are undergoing a period of reform as a result

Business Trends

Does a \$1bn valuation equal success 37

The global unicorn ecosystem has entered a new era where success needs to be redefined and paths re-navigated



43

International Businesses in China 43

Growing competition and a discerning consumer base mean international firms need to change to succeed in China

AI Boom, Dot-com Bubble 48

There are a number of similarities between AI company valuations now and those of tech firms before the dot-com bubble burst

OPPO 60

Globalization has become a major trend in the development of Chinese enterprises and OPPO is at the forefront



66

China's Biotech Rise 66

Supported by national policies and growing market demand, China's biotech sector is surging

Q&A

Robotics in Industry 13

Li Mingyang, Founder and Chairman of JAKA Robotics, discusses the benefits to robotics development provided by China's advanced EV sector

Luxury Brand Strategies 54

Olivier Nicolay, former President of UK, Canada and LATAM for Chanel, discusses the need for major luxury brands to maintain a feeling of scarcity of their products

Expert Column

Building Tomorrow's Cities 25

Columbia University's Professor Ibrahim Odeh on digital twins, AI and the future of urban development

The EV Revolution 34

John Paul MacDuffie, Professor of Management at the Wharton School of the University of Pennsylvania, discusses the paths forward for China's EV makers

The Healthcare Industry 57

Miguel Martins da Silva, Group Supply Chain Officer at Dr. Max, discusses the rapid modernization of a key global pillar

A Year in Review

As inevitably as the world's tectonic plates shift, this year we have also seen the shifting of the plates of globalization, creating new connections across the world as well as change to old ones. Geopolitical tensions have characterized 2025 on the international stage, with the importance of rare earths in particular taking center stage, find out more in our cover story "**Rare Earth Resources: China's domination of a key global market**" on page 9.

The year should also be viewed as one of major progress, with a vast number of opportunities seized and technologies developed. China's development over the past few decades has been spectacular, and in a bid to widen its global influence, the country is increasingly playing a role in helping guide development in the Global South. We discuss the topic in greater detail on page 5, in "**A New Blue Ocean of 6.3 Billion People**," where Professor Li Haitao, Dean of CKGSB, looks at why the Global South is set to be the world's next innovation and development powerhouse, and how China can look to shift its position away from being the world's factory, towards becoming the brain behind this new blue ocean.

Technological development, both physical and digital, has also been a key hallmark of 2025, both in China and around the world. Robotics is becoming a key part of industrial upgrading allowing for greater precision and production scale at a reduced cost, and we have been lucky to have Li Mingyang, Founder and Chairman of JAKA Robotics join us to discuss the benefits to robotics development provided by China's advanced EV sector and how robots will impact a host of new industries in on page 13. At the same time, while advances in robotics present many opportunities, there are also going to be impacts, such as that on employment, that require us to view digital progress through different lenses depending on industry and level of development. China's new AI+ policy, which requires the integration of AI across six key areas by 2027, is an excellent example of an opportunity to shift the way we view AI and its potential impacts. Professor Sun Tianshu goes into detail on the need for a growth in AI native thinking and talents to help move the country and AI+ forward in "**AI+: A New era for business reconfiguration**" on page 19.

Elsewhere in the issue, we look at the need for reform in management education in the era of AI (page 29), the potential for greater internationalization of China's RMB (page 16), the



similarities and differences between today's AI boom and the dot-com bubble of the past (page 48), and how the global unicorn ecosystem is entering a new era (page 37).

Our hope is that you find these insights and reflections on the changing nature of Chinese businesses and the country's economy useful. If you have any comments or opinions to contribute, please feel free to contact us at (ckgsb.knowledge@ckgsb.edu.cn).

Yours Sincerely,

Patrick Body
Managing Editor, *CKGSB Knowledge*

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

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The Global South: A new blue ocean of 6.3 billion people

China is helping guide development in the Global South, which is set to be the world's next innovation and development powerhouse



by Li Haitao, Dean of Cheung Kong Graduate School of Business,
Professor of Finance and Distinguished Dean's Chair Professor

As the geopolitical pendulum swings violently in 2025, the world is accelerating into a period of unprecedented transformation. The Russia-Ukraine conflict continues, while technological rivalries have expanded from semiconductors to artificial intelligence (AI). The global trade system is being shaken by tariff barriers and supply chain restructuring, and the traditional order of globalization is gradually being rebuilt.

In this clash between old and new orders, a new force cluster representing 70% of the global population and a combined GDP exceeding \$23 trillion is emerging. The Global South is reshaping the world

economic landscape with irreversible momentum. From the African savannahs to the Southeast Asian archipelagos, from the Latin American rainforests to the Middle Eastern deserts, this vast market of 6.3 billion people is unleashing unprecedented growth momentum.

Driven by multiple factors including demographic dividends, resource endowments, policy openness and globalization, the Global South is rapidly emerging as a new engine for global economic growth and a key growth point for trade. As the largest economy in the Global South, China is transitioning from the world's factory to the "brain of

the South" through its comprehensive industrial system, leading technological innovation and invaluable experience in industrial transformation. This shift is reflected not only in the upgrading of its export structure to Latin America and ASEAN but also in its role as an enabler and leader in shaping a new paradigm for South-South cooperation.

How is the Global South reshaping trade rules?

The formation of a new order is accompanied by a profound restructuring of the global trade landscape. The traditional globalization paradigm established after

World War II—dominated by the United States and jointly advanced by Western developed nations—is giving way to a new balance of power, as a new globalization paradigm emerges. A notable manifestation is the structural shift in the direction of international trade flows.

In global trade, the share of South-South trade continues to rise. Data indicates that the share of global GDP accounted for by emerging economies and developing countries (primarily comprising the Global South) has risen from 21.02% in 2000 to 41.23% in 2024, and is projected to reach 43.71% by 2029. Their economic growth rate continues to significantly outpace that of developed economies.

Specifically in terms of trade, China's exports to Global South countries and Belt and Road Initiative (BRI) partner nations saw particularly strong growth in 2024. Latin America and ASEAN recorded the largest increases, while Brazil, Vietnam and Indonesia were among the fastest-growing countries. New growth drivers are emerging in export products: In 2024, export growth primarily stemmed from the electromechanical products category, with the fastest-growing segments including ships, semiconductors and automobiles. Developing countries have diversified their trade partnerships through enhanced regional cooperation, thereby reducing reliance on external markets.

Since the trade war began in 2018, China's trade surplus has increased rather than decreased. In 2024, China's annual trade surplus reached a record high of \$992.16 billion, nearing the trillion-dollar threshold. This figure is 2.7 times larger than the surplus recorded prior to 2018 and far exceeds any level achieved by major exporting nations—including Germany, Japan and the United States—over the past century.

This makes up part of a polarized landscape in global trade characterized by China's trillion-dollar surplus and a trillion-dollar US deficit. It also reflects the remarkable resilience and international competitiveness of China's export products amid the backdrop of the trade war.

The competition between China and the United States in the global technology arena has also intensified. Particularly in the field of AI, where China has now joined the US in the same tier. The development of cutting-edge technologies such as DeepSeek and humanoid robots has positioned China as a key player in global technological innovation.

Meanwhile, China is actively expanding South-South cooperation, which not only enhances the international influence of Chinese enterprises but also brings advanced technology and capital empowerment to local communities. Among these, sports, as one of the most

universal humanistic bonds, has become an effective vehicle for fostering mutual understanding and deepening strategic trust through its unique appeal that transcends national borders. China has actively supported the development of sports infrastructure across a number of countries, including assisting Belarus, Mongolia, Comoros, Tonga, Tunisia and Barbados in building and renovating nearly 20 venues for various sports. This has helped build a more multidimensional and sustainable collaborative ecosystem for all parties.

The enormous demographic dividend, economic potential and urgent need for accelerated industrialization and openness in the Global South markets position them as the core force driving future global growth. China's invaluable experience gained from the first three industrial revolutions over the past two decades, coupled with its unique capability to lead the ongoing Fourth Industrial Revolution, will unlock immense potential to empower the “tomorrow” of Global South markets. The Global South will soon become the next China.

Who is unleashing the next wave of growth dividends?

As a geographical benchmark for dividing nations into North and South, the Brandt Line was originally proposed by the United Nations North-South Commission led by former German Chancellor Willy Brandt.

Following the end of the Cold War, the term Third World gradually lost its political significance. The more neutral concept of the Global South has since been increasingly used to describe emerging markets and developing nations, including those in Africa, Latin America, the Middle East and Southeast Asia. These countries and regions account for 70% of the world's population and approximately 40% to 50% of global GDP, and are seeing very rapid economic growth.

The rise of the Global South is no accident; it stems from the comprehensive realization of multiple dividends:

1. Policy-driven dividends: Countries are actively implementing open policies



The enormous demographic dividend, economic potential and urgent need for accelerated industrialization and openness in the Global South markets position them as the core force driving future global growth

and development strategies (such as Saudi Arabia's Vision 2030) to attract foreign investment and technology;

2. Demographic dividends: A large population base, rapid growth and a youthful demographic structure provide ample labor resources and a vast potential consumer market;
3. Resource endowment dividends: Abundant reserves and supply capabilities of fossil fuels (oil, natural gas, coal) and critical minerals (nickel, lithium, cobalt, rare earth elements, etc.) not only provide a foundation for its own development but also create favorable conditions for international cooperation.
4. Globalization dividends: Deeply engaging in and benefiting from the globalization process, accelerating regional economic integration (e.g., ASEAN's promotion of the ASEAN Digital Economy Framework Agreement).

On the other hand, the current distribution of global value chains exhibits a clear gradient: the US excels in innovation activities but faces deindustrialization. Europe combines innovation activities, advanced manufacturing and services, but lags in innovation within emerging fields such as the internet and AI. China, leveraging its strengths as both a major manufacturing nation and a major consumer market, has evolved over more than two decades into a comprehensive provider of advanced manufacturing and services, while also emerging as a prominent player in innovative fields such as the internet and AI. Markets in the Global South outside of China exhibit greater complexity, ranging from limited primary products to abundance and varying stages of primary manufacturing. They urgently require accelerated industrialization and greater openness.

This gradient distribution has created a high degree of complementarity between China and countries in the Global South along the industrial chain. Global South nations possess abundant energy resources, critical minerals, primary commodities



and manufacturing capabilities, alongside vast consumer market potential. However, they urgently require cost-effective industrialization capabilities and expertise to swiftly embrace the Fourth Industrial Revolution.

China possesses comprehensive industrial manufacturing capabilities that are mid-to-high-end and cost-effective, the capacity to serve a large-scale, multi-tiered consumer market and innovation capabilities in the internet and AI sectors. It requires a vast external demand market to absorb its production capacity, along with sufficient energy and key mineral supplies.

Beyond traditional industrial sectors, South-South investment cooperation is expanding into emerging fields such as the digital economy, green energy and AI.

Leaping from “World’s Factory” to “Brain of the South”

Within this new landscape, China has gradually emerged as a central hub for trade and investment among countries in the Global South. Over decades of development, China has become the largest trading partner for numerous countries in the Global South: maintaining its position as ASEAN's top trading partner for 16 consecutive years and Africa's largest trading partner for 15 consecutive years. It is also the primary trading partner for multiple Latin American nations, including Brazil, Chile, Peru and Uruguay.

In the realm of investment, China's investments in Global South countries are substantial in scale and extensive in scope. China's outbound direct investment has

The success of corporate globalization ultimately depends on building systematic global operational capabilities





Beyond traditional industrial sectors, South-South investment cooperation is expanding into emerging fields such as the digital economy, green energy and AI

consistently ranked third globally since 2012. In 2024, China's non-financial outbound direct investment reached \$143.85 billion, marking a 10.5% year-on-year increase. Through establishing industrial development funds and participating in multilateral development financial institutions, China has provided significant financing support for infrastructure development and industrial transformation in Global South countries.

Moreover, as a major manufacturing hub for the Global South, China's exports to developing countries in 2023 significantly increased its share of intra-developing country trade. Its share in labor-intensive and low-technology-intensive products remained stable, while its share in medium-technology-intensive products rose notably, and its share in high-technology-intensive products stayed steady.

More importantly, China's integration into global value chains is shifting from merely receiving international industrial transfers to advancing toward the upstream segments of these chains. In sectors such as AI, China has emerged as the foremost innovator among Global South nations.

Chinese enterprises' global breakthrough

Collaboration and cooperation among Global South nations is of paramount importance in this new paradigm.

In May 2025, the inaugural ASEAN-China-GCC Summit was held, representing

a combined population exceeding 2.1 billion and an economic output nearing \$25 trillion (each accounting for approximately one-quarter of the global total). This landmark initiative in regional economic cooperation, emerging against the backdrop of the Global South's rise, has been hailed as a "tripartite alliance whose collective strength has the potential to reshape the global economic landscape."

For Chinese enterprises actively engaging in global competition, adopting proven models in collaborative overseas expansion is a key strategy for seizing opportunities. Observing the experience of Japanese enterprises, their "group-based overseas expansion" model—centered around general trading companies to form a community of shared interests characterized by industrial synergy, information sharing and risk pooling—effectively amplifies returns and mitigates risks through resource aggregation effects.

This model is underpinned both by the rigid interlocking interests of conglomerates through circular shareholding structures and by the soft foundation of a harmonious culture characterized by unity, mutual assistance, collaboration and tolerance. Chinese enterprises across the industrial chain, local chambers of commerce and other entities can draw inspiration from this model. With the support of collaborative overseas expansion platforms, they can achieve either horizontal (among enterprises within the same segment)

or vertical (across the industrial chain) grouped overseas expansion. This approach effectively mitigates risks, enhances overall competitiveness and enables better positioning within the wave of globalization.

Huawei is a successful model of a global enterprise. Huawei has built its overseas capabilities through a long-term strategic approach, gradually establishing a global network spanning R&D, production and sales. In its early stages, Huawei had already dispatched personnel to Russia, India and Africa, but the results were limited. Subsequently, the company successfully completed its globalization transformation through a series of initiatives, including Integrated Product Development (IPD), Integrated Financial Services (IFS) and an Integrated Supply Chain (ISC). Today, Huawei has become a global leader in the telecommunications industry, and its experience holds significant lessons for Chinese enterprises.

The success of corporate globalization ultimately depends on building systematic global operational capabilities. This requires enterprises to adopt a long-term perspective and undertake a comprehensive process of reengineering and capability building across product development, supply chain management, financial services, customer relationship management and other areas, to cultivate genuine global competitiveness.

In the middle of a transformation, entrepreneurs must embrace cross-disciplinary learning to gain a profound understanding of technological innovation, business models, financial innovation, humanistic values, social innovation and global trends. Only then can they lead their enterprises to better seize opportunities and navigate challenges within the new order.

The Cheung Kong Graduate School of Business will continue to build a global cross border platform which empowers entrepreneurs to seize the historic opportunity that the next China is the Global South, and guiding Chinese entrepreneurs to learn globally and win globally. 

RARE EARTH RESOURCES

China's dominance of the rare earths supply chain is extraordinary, but countries are now seeking alternatives

By Patrick Body



Rare earths are a key part of technological advancement, and China controls the vast majority of supply

A December ban on Chinese critical mineral exports to the US was another escalation of the tit-for-tat trade tariffs and controls between the two countries. The US is attempting to control China's access to the semiconductor chips that fuel today's cutting-edge technologies, while China is leveraging its control over the supply and refinement of the 17 chemical elements known as rare earths.

Rare earths are used in the manufacture of many things we use or rely on every day, from smartphones to wind turbines, and China is home to over half of the world's rare earth reserves and accounts for almost all of global rare earth refining capacity. Other countries are increasingly looking to wean themselves off dependence on China, but it is not an easy process.

"Rare earths keep a lot of the world in motion," says Guillaume Pitron, author of *The Rare Metals War: The Dark Side of Clean Energy and Digital Technologies*. "Without them, so many of our technologies would cease to function and China is at the heart of the whole industry."

Rare earths by numbers

China's foray into rare earths meaningfully began during the 1980s, and at the time, then-leader Deng Xiaoping was clear about the importance of the commodities to the country's economy, remarking that

while "the Middle East has oil, China has rare earths." Since then, China has grown to lead the world both as a commodity source and a destination for refining, with market leader China Northern Rare Earth High-Tech Co. around seventeen-times larger than its next biggest international competitor by market cap.

According to CSIS, China extracts around 60% of the world's rare earths, and although that is down from around 90% in 2008, the country remains firmly ahead of anywhere else, with very few signs that that will change in the near future.

"China is blessed with the largest proven reserves in the world," says Philip Andrews-Speed, Senior Research Fellow at the Oxford Institute for Energy Studies. "The core of the volume is in the North of the country, and that produces mainly light rare earths, while smaller reserves in the South have clays that contain heavy rare earths, which are rare in their occurrence. They have made good use of both of these advantages."

After acquiring a number of processing technologies from France during the 1980s, China also began to work on becoming a processing superpower. Almost 90% of global rare earths processing is now done in China, with the country producing 70 kilotons of refined rare earths in 2023.

"Processing rare earths is fairly complicated and China has been working on improving its ability to do this for two

Processing rare earths is fairly complicated and China has been working on improving its ability to do this for two decades



Philip Andrews-Speed
Senior Research Fellow
Oxford Institute for Energy Studies

decades,” says Andrews-Speed. “The country now easily leads the world in processing technology and in terms of volume. But unlike in critical mineral processing [such as cobalt] where they import most of the volume, for rare earths China’s refining ability is also backed by its massive reserves, giving them a huge advantage.”

Controlling the market

There are three key areas through which China is leveraging its control in the market: financial dominance, technological expertise and export controls.

In terms of financial viability, rare earths actually hold an interestingly contradictory position in global manufacturing. Their inherent value to technology is enormous, with items such as neodymium magnets unrivalled in their efficiency and used in everything from smart toothbrushes to computer hard drives to EVs. However, the total financial value of the market is relatively small when compared to the mining and refining of other minerals and metals.

“The metals are rare by name, and you can’t really replace them with equivalently efficient alternatives, but they are not quite as precious as other things,” says Pitron. “The total rare earth market only accounts for between \$5-7 billion per year.” The global iron ore market, on the other hand, was worth \$289.72 billion in 2023.

To maintain its leading position, China often operates at a loss across the rare earths supply chain to keep prices low. For example, the cost of neodymium-praseodymium (NdPr) dropped by 20% between January and July 2024, according to the Institute for Energy Research. But, given the ability of the country’s centralized system to absorb these losses, this appears to be a choice that China’s leadership is willing to make to maintain the country’s control over the critical elements.

While new discoveries of deposits across the world are relatively commonplace, actually developing functioning mines can take years due to legal and environmental compliance

There has been a policy push from the EU and US to increase domestic production capacity

Edoardo Righetti
Researcher
Center for European Policy Studies



requirements, on top of the practical difficulties of opening a mine. The costs of dealing with all of these hurdles can often be prohibitive for newcomers when compared to potential income, and finding investors who are willing to wait for well over a decade to see any return on investment is difficult.

“What we’ve seen so far is that every time a non-Chinese firm starts to build rare earth mining capacity, China will increase its exports rendering the new mine uncommercial,” says Andrews-Speed. “To what degree they will continue to do this is unclear, and what impact US subsidies on new mines will help offset this is also unclear, but China’s dominance means that they can use this tool often.”

And this has led to accusations of dumping levied against China. “They are happy to lose money,” says Pitron. “As long as they produce rare earths at such a cheap price, it makes it impossible for others to produce resources with a decent business model.”

Technologically, especially for rare earths processing, China also far outperforms the competition. Between 1950 and 2019, China applied for almost 26,000 rare earth-related patents, compared to Japan’s 13,920 and 9,810

in the US. And while the technologies themselves are incredibly advanced, regulations in China are also less strict in terms of environmental impacts.

“China is ready to pay a high cost, socially and environmentally, for having so much of the refinery process in the country,” says Pitron. “They have created a bottleneck in the international supply chain, and have publicly stated that they were willing to limit others’ access to rare earth technologies.”

The third lever China has been utilizing is export controls on many of the rare earth products produced in China. The current geopolitical environment is far more fraught than it used to be, and the US’ attempts to control China’s access to the technologies and resources it needs to produce semiconductors has led to China increasingly controlling rare earths supply and associated tech.

In December 2023, the country announced a ban on sharing rare earth extraction and separation technologies and a year later announced a ban on the exports of gallium and germanium to the US.

“The macroeconomic impact of the controls will not be huge, but certain sectors may well face difficulties,” says Andrews-Speed. “The energy and renewables sectors are probably the

most visible example. There will also be military implications, but the extent of that impact is much harder to judge from the outside.”

In terms of comparing the impact of the two sets of controls, Pitron would lean towards having access to semiconductors. “It is obviously a nuanced discussion,” he says “But having complete access to and mastery of the semiconductor chain, including lithography machines, is probably a greater advantage than having rare earths leverage.”

Alternative sources

With export controls in mind and current geopolitical trends, many countries are pursuing alternatives to China for their rare earth supplies. In terms of functioning alternatives there is the Mountain Pass Mine in California, which is the only rare earths mining and processing facility in the US, and in 2022 it produced 42,499 metric tons of rare earths, 14% of the global total.

Last year, the Saskatchewan Research Council in Canada opened a \$74 million rare earth processing plant, which, once fully operational, will be able to produce 400 tonnes of NdPr metals per year, enough for 500,000 electric vehicles. There is also the Lynas Mt Weld mine in Western Australia, which exports to the company’s Malaysia processing plant for refining.

Another option is to explore alternative processes, such as developing products that can do more with less resources and recycling rare earths goods. An example of the latter is the attempts within the EU to recycle neodymium magnets by pulverizing the magnets into a powder and reforming them.

“Technology-wise, we are pretty much there,” says Edoardo Righetti, a researcher at the Center for European Policy Studies. “There are startups that have been testing their processes for a few years and are now working on scaling up. But it isn’t just technological readiness that is required, there are a number of economic, supply chain and regulatory barriers that need to be solved to make it work.”

Recycling is an attractive option given



its economic security benefits, as well as cutting out the emissions produced through the mining process. The time horizon for recycling is also a lot shorter given the difficulty of locating rare earths reserves, financing projects and passing regulatory barriers. But how much of the supply recycling can actually replace, particularly in the short term, is not clear yet.

“With several caveats, even the optimistic scenario would say not to expect much before 2030,” says Righetti. “There needs to be more infrastructure in place and there isn’t yet sufficient feedstock. The current applications for the magnets have a certain lifespan and given the recency of the development of these markets it will take a while for items such as EVs or wind turbines, for example, to reach their end of life.”

“In a very optimistic scenario, we might be able to reach up to 50% of demand by 2050,” he adds.

Refining the supply

China’s rare earth dominance will be hard to shake. It has such control over the market and has several cards to play to

maintain it, but the current trend towards decoupling we have seen across different sectors of the global economy is also present in rare earths.

“There has been a policy push from the EU and US to increase domestic production capacity,” says Righetti. “There are also some options, particularly for Europe, for limiting the impacts of potential export bans. Stockpiling, joint purchasing and international partnerships are just some of the avenues to be explored to reduce short-term risk.”

The long-term goal is to diversify away from a reliance on China for rare earths and while the process is slow, things are changing. “China had a much larger monopoly on extraction 10 years ago, but that is now down to 60%, and many countries and companies are contemplating the idea of opening up their own rare earth mines,” says Pitron.

But it will not be an easy process. “It is too early to tell how well diversification will go,” says Andrews-Speed. “If someone controls 90% of a market, weaning yourself off could take 10 years or more.”

Robotics in industry and the application of embodied intelligence

Li Mingyang, Founder and Chairman of JAKA Robotics, discusses the benefits to robotics development provided by China's advanced EV sector and how robots will impact a host of new industries

Robotics, in particular robots equipped with artificial intelligence (AI), is key to industrial development as it drives efficiency, precision and scalability across manufacturing processes. By automating repetitive and complex tasks, robotics reduces labor costs, minimizes errors and accelerates production timelines—enabling industries to meet rising global demand while maintaining high quality standards.

As technologies like AI and IoT converge with robotics, they unlock new levels of adaptability and data-driven decision-making, making robotics a tool for productivity and a strategic asset for industrial competitiveness and innovation.

In this interview, Li Mingyang, Founder and Chairman of JAKA Robotics, discusses China's positioning in the AI-driven robotics market, the industries that will be most affected by embodied intelligence and how the global geopolitical situation may actually accelerate the need for industrial robotics.

Q. What are China's strengths and challenges in becoming a global leader in AI-driven robotics?

A. Companies are already manufacturing intelligent robots with mature joint technology, leading performance and high market

share. Looking at collaborative robots, JAKA Robotics' self-developed lightweight and integrated joint technology enables modular robot design, meaning the company can produce industry-leading integrated joints that are quiet, highly precise and low cost, and this gives them technological and market advantages worldwide.

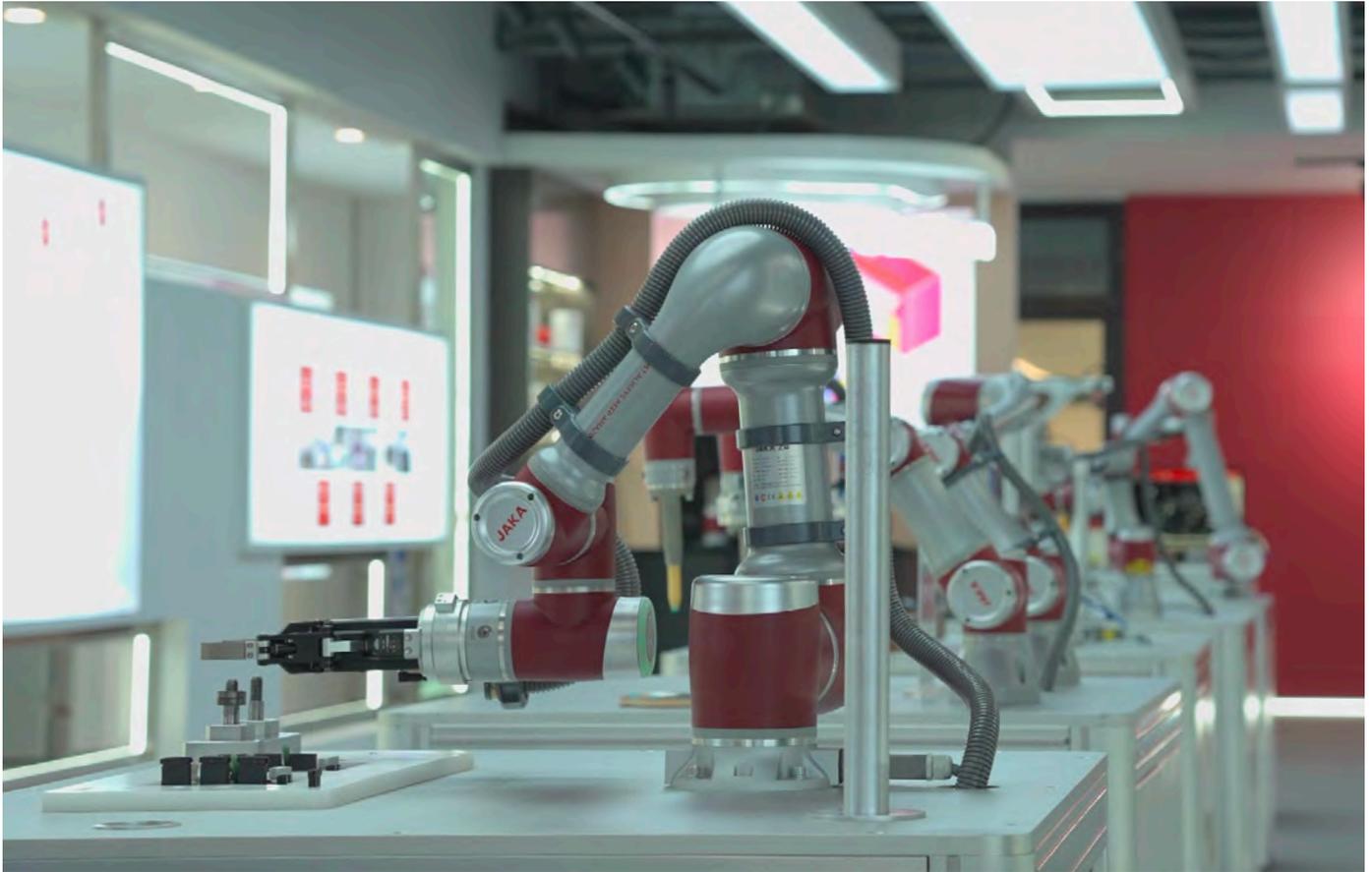
MIR DATABANK's database shows that in 2024, Chinese-branded collaborative robots, which include JAKA Robotics, accounted for over 50% of global sales, and with that, the accumulation of associated industry-specific scenario data will help accelerate the iteration of AI algorithms.

In terms of talent advantages, in 2024, scientists with Chinese backgrounds accounted for 46% of the world's top AI talent, compared to just 20% in the US, according to a New York Times survey. Domestic universities such as Tsinghua University and Shanghai Jiaotong University, which are in the upper echelon

of international research in generalized robot operation skills, and are home to a number of global leaders in the field of embodied intelligence technology, including machine learning. These talents can help the development of AI and other new productive forces in China, as well as help the global AI push.

There are also the benefits of the intelligent automobile





supply chain. The size of China's existing intelligent automobile industry has led to the mass production of core components such as LiDAR and high-calculation chips, as well as encouraging the embodiment of intelligent algorithms. Additionally, there is a huge opportunity to translate the manufacturing lessons accrued from reaching an annual production of 10 million NEV units to the field of robotics.

China's flourishing AI models are also of use. China is lucky to have many large AI model developers pushing developmental boundaries. For example, DeepSeek's multimodal large model MoE-16, has an energy efficiency ratio 2.7 times that of GPT-4 under the same computational load, and this energy efficiency is particularly important in the edge computing scenarios deployed in mobile robot platforms. Huawei's PanGu Model 5.0 also shows greatly enhanced capabilities in mathematics, complex

Li Mingyang is the Founder and Chairman of JAKA Robotics. Prior to founding the company in 2014, he had been involved in the automation equipment industry for more than a decade, holding key technical and management positions in well-known multinational companies such as Tetra Pak in Sweden. He is also an alumnus of CKGSB's EMBA program.

task planning and tool invocation [a mechanism for extending the capabilities of Large-Language Models (LLMs)].

There are also two key challenges. The first is morphological standardization. So far, there is no standardization of form for intelligent robot hardware, and this affects algorithm iteration and their application. A good analogy is the automotive industry, where, over the years, we have developed a global standard for what is considered a traditional automobile: four wheels plus a chassis. As a result, it has been comparatively quite easy to add intelligence and electrification to automobiles as the form has remained the same. Without a common understanding for robots, other related processes become more difficult.

The second challenge is meeting the high demands for operational intelligence. Basic operations for humanoid robots are significantly more demanding when compared to, say, smart cars, in terms of dexterity and manipulation. While some requirements are the same for both, humanoid robots also need highly generalized and reliable manipulation capabilities, such as grasping, lifting and tool use, which require human-like flexibility and adaptability, something that is difficult to achieve. In addition, the fact that humanoid robots may be required to work across multiple operational scenarios or with various tools or components means that there are significantly higher requirements for applicability.

Q. To what degree will different industries benefit from AI-powered robotics and what notable advances have been made so far?

A. Today, Tesla is leading the way as a benchmark in embracing AI, where it has significantly improved productivity, product quality and product intelligence. Intelligent automobiles as an industry has seen a lot of technology and investment already, and provides good lessons for the wider field of robotics.

Looking further forward, AI-powered robotics will drive growth across a wide range of industries. Firstly, we can look at the intelligent reconfiguration of manufacturing. Industrial robots offer breakthroughs in the rigid limitations of traditional production lines through dynamic path planning and multimodal perception, allowing for increasingly flexible production. The end goal is intelligent creation rather than simple mechanical substitution and the development of robotics assets should help with the shift away from requiring as much human experience.

Logistics is another sector in which robotics will play a role in development, particularly when it comes to efficiency. Intelligent warehouses that utilize real-time environment modeling and multi-robot collaboration will see improvements in space utilization and operational efficiency. On a much more macro scale, this will eventually lead to more efficient allocation of global resources.

Thirdly, the healthcare industry will benefit from AI-powered robotics, with surgical robots able to be significantly more precise than humans, and the use of data mapping will allow for improvements in diagnosis and precision treatments.

There will also be beneficial outcomes in agriculture, whereby AI-driven robotics will help with finding the right balance between natural variables and product standardization. On top of this, we can expect a service industry experience upgrade, where AI-driven human-machine interaction will upgrade the service industry value chain, establish a new balance between standardized replication and personalized experiences and, through task layering, make the most of the synergy between human creativity and machine execution.

Q. To what degree is the current geopolitical environment impacting the international robotics market?

A. Looking at the longer term, the globalization and development of industrial robotics could actually be accelerated as a result of the US-China trade war and the economic uncertainty that it is creating. There has been an increase in factory relocation to various countries around the world, in part due to the geopolitical situation, as well as rising labor costs and recruitment issues in China.

As a company, we see the continued need for robotics in the manufacture of NEVs, 3C miniaturization [the process of producing ever-smaller mechanical, optical and electronic products/devices] as well as other manufacturing needs. There is also the opportunity to expand into new energy, biomedicine and other less-traditional fields. At the same time, there is a need to grow an in-depth global supply chain and make sure that it is

There is a huge opportunity to translate the manufacturing lessons accrued from reaching an annual production of 10 million NEV units to the field of robotics



properly localized and resilient to hedge against geopolitical risks.

To do this in large-scale markets there is a need to establish localized scenarios, services and even independent supply chain systems, forming a comprehensive production cycle, producing high-quality and competitive products that can ensure positive brand recognition in each area. For example, if we look at our development in the European market, taking this approach has meant that we are now competitive with local giants such as Schneider in terms of research and development, product performance, production management and green logistics.

Q. How do you see the industrial robotics industry developing over the next five to ten years?

A. Firstly, we will see a popularization of the application of ‘intelligence,’ greater software-hardware integration and more embodied intelligence. Second, we can expect some sort of breakthrough in the combination of advanced AI models and lightweight technologies.

Industrial robots themselves will see greater integration of multimodal perception (3D vision, force perception), cognitive reasoning (large AI models) and dynamic execution capabilities to form a closed-loop intelligent system that can address a wide array of tasks across settings and industries. 

Interview by Patrick Body

The US Dollar and the Internationalization of the RMB

The US Dollar's presence in global markets has weakened somewhat, but can the RMB internationalize enough to replace it?



by Li Wei, Professor of Economics at CKGSB

Smoke from the US-initiated tariff war has not yet settled, but the battle for global currency hegemony has quietly moved on. China's currency, the renminbi (RMB), soared in value earlier this year, as the US blew hot and cold over trade. The RMB-dollar exchange rate hit a record high on May 5. Global capital players are increasingly seeking out the RMB as a safe haven for its "low volatility and high returns." The resilience of the Chinese economy adds support to their case.

Has China's currency demonstrated sufficient weight to challenge the hegemony of the US dollar as the world's anchor currency?

Li Wei, Professor of Economics at CKGSB, writes about the logic

behind the rise and fall of US dollar hegemony and analyzed three barriers to internationalization that the RMB must cross.

The US dollar trust crisis caused by President Trump's economic policies has provided a strategic window for the rise of the RMB, but can China seize the opportunity, or will monetary power remain in the hands of the current class of powermongers?

Background

Donald Trump's economic policies have taken another victim—the world status of the US dollar.

The US gains from its dollar being the world's main currency, as it can collect seigniorage. But more importantly, the

status of its currency reduces the country's financing costs, as it buoys demand for US assets. Foreign investors hold about 30% of US treasury bonds, which means they can be financed at a low cost. Thirdly, financial weaponization. The US gains enormous power in the international financial market and can sanction other countries at any time. Just look at the examples of Russia, Iran and North Korea.

As of March 2025, China has about \$3.2 trillion in foreign exchange reserves, of which US Treasury bonds comprise at least \$784.3 billion (as of February 2025). In other words, the US dollar has already lost its "anchor" status, but it is still widely recognized by all parties. The role of the US dollar as an international currency is the result of long-term historical evolution

and recognition by all parties. The stability of US policies is an important part of that recognition.

US President Trump's tariff policy and erratic attitude towards international economic machinations have left traders and investors at a loss. Trump is now questioning the independence of the Federal Reserve, adding yet more uncertainty. The ensuing selloff of the US dollar has sent the currency into a continuous fall.

Ironically, in attempting to lure manufacturing jobs back to the US and reduce the dollar trade deficit, Trump's tariff plan is attempting to address issues that are in part a byproduct of the US dollar being the world's anchor currency. The dollar's status has resulted in an inflated dollar exchange rate, adding to US manufacturing woes by driving down competitiveness.

The history of how the dollar became the world's currency informs the current situation. The US dollar did not become world currency on the back of a strong American economy alone. In 1880, US GDP per capita exceeded that of the UK. However, the UK had colonies the world over, and London was the financial capital of the world. The US dollar was in no way ready to take over from the British pound, as becoming a world currency required both a powerful economy and support from the rest of the world. It took until after World War II for the US dollar to finally displace the British pound.

So, in the short-term, prospects of the RMB replacing the US dollar are unlikely. The US dollar remains the chief global currency because there is no serious alternative. Are the euro, yen, or pound strong enough to replace it? The sharp depreciation of the yen last year is still fresh in investors' minds. Long term, the case for the currency of the world's second biggest economy has improved, as the US's reputation takes a hit from Trump's unpredictable policies.

The RMB has demonstrated its potential to step up. With the rise of the Chinese economy, the RMB breached its shores years ago. Now its scope of use is expanding, but it is still far from the status of international currency. As long



as China's economy does not stagnate, China's industries continue to upgrade, and reforms do not come to a complete halt, the RMB will continue to strengthen, and world currency status will only get closer. But for the RMB to truly become an international currency, China must do three things.

1. Abolish capital controls

It is difficult to imagine a currency becoming an international reserve currency without free convertibility and circulation. To earn global confidence and widespread adoption, others must be able to trade freely with that currency. Removing capital controls requires tax reform. Currently, corporate income tax remains a significant source of government revenue, accounting for as much as 19% of the budget. Tax

brought in as much as RMB 4 trillion to the public purse last year. Once capital controls are lifted, tax will be an arena of contention as companies seek to relocate to low tax jurisdictions. Therefore, China needs to reform its tax system by reducing reliance on corporate income tax and upping the share of value-added tax and personal income tax—similar to the fiscal structure used by many European countries.

2. Develop financial markets and strengthen effective supervision

When the RMB becomes an international central currency, other countries will have strong demand for RMB assets, and an open and dynamic financial market will be particularly important. Imagine, if there is

To achieve the goal of turning into a trade deficit country, China needs to take measures to accelerate the transformation of local governments





The history of how the dollar became the world's currency informs the current situation

no developed US financial market, what should people who hold US dollars do?

But it is easier said than done. Financial products are one of the most complex products invented by humans, and behind each financial product is a large number of contracts. Various rights and obligations are intertwined on those pages of documents. Investors, especially small and medium-sized investors, generally have neither the ability nor the energy to understand the details of these products, which means that there is serious information asymmetry in the financial market.

Given the financial market's involvement with large sums of money and potential for misconduct, effective

regulation is essential to prevent it from becoming a “sewage pond” of undesirable practices. The key is to enhance supervisory measures to protect investors' interests, allowing them to participate confidently and share in economic growth.

A suggested approach is to adopt a dual-track supervisory system, inspired by the US experience. For small and medium investors, regulators should enforce strict controls—focusing on cracking down on insider trading, stock price manipulation, and other illegal activities, and maintaining a cautious stance on financial innovations. Conversely, for well-capitalized institutional investors, regulators can adopt a more relaxed approach, encouraging

bargaining and financial innovation through greater market freedom.

3. Turn China from a trade surplus to a trade deficit country

At the current stage of economic development, China's best choice is to become a trade deficit country rather than a trade surplus country. At the same time, from the perspective of the balance of payments, China needs to use the trade deficit method to provide RMB to global investors.

In order to achieve the goal of turning into a trade deficit country, China needs to take measures to accelerate the transformation of local governments. The reason for this is that under the current system, local governments are keen on economic construction and neglect public services, which increases output and suppresses consumption. In the end, they have to use external demand to absorb excess capacity, which drives the expansion of trade surplus. Although the behavior of local governments is not the only reason for the trade surplus, its role in this process cannot be ignored.

If local governments still act according to the current rules and do not shift the focus of their work to the provision of public services, it will be difficult for China to become a country with a trade deficit, let alone a consumer power like the United States.

The RMB is the strongest candidate to challenge US dollar dominance in the future. China should embrace this potential gradually and take measured steps toward RMB internationalization. Historically, the US led a post-World War II globalization enterprise that elevated the dollar's role; however, recent US political shifts, especially under Trump's administration, present China with a rare opportunity to advance RMB internationalization, transforming crises into opportunities—and reshaping the future international order. 

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AI+: A new era for business reconfiguration

China's AI+ policy has the potential to move the country forward apace, but there needs to be a growth in AI native thinking and talents to reach that point



By Sun Tianshu, Dean's Distinguished Chair Professor of Information Systems at CKGSB

The Chinese State Council recently issued an opinion on the in-depth implementation of the new policy goal, Artificial Intelligence+ (AI+), which requires the integration of AI across six key areas by 2027, and a penetration rate of more than 70% for smart terminals and AI agents.

In this interview, Sun Tianshu, Dean's Distinguished Chair Professor of Information Systems at CKGSB, discusses the development of AI+, the cognitive gap in industry caused by a lack of AI architecture thinking and the need for businesses to choose the right scenario when integrating AI into their operations.

The deeper logic of the "AI+" policy

Q. At this point in time, what do you see as the key considerations of the government in launching the AI+ strategy?

A. I think launching AI+ in August 2025 was timely, and it is relevant to all

businesses on three levels.

Firstly, AI marks an intelligent revolution, and as we enter the "second half of AI," the technology is beginning to reconfigure thousands of industries. With open-sourced models, rapidly rising model numbers and falling costs, intelligence is no longer scarce. The bottleneck has shifted from technology to application—how to use ubiquitous AI to reshape industrial scenarios and create real value. The policy aligns with this shift, guiding attention from digital industrialization—models, compute, chips—to industrial digitization, the application of AI across verticals.

Secondly, AI+ is an inevitable process in which industry and AI advance together. Traditional industries urgently need new growth engines, and AI is the most promising driver. At the same time, AI cannot advance without real business scenarios that generate value and resources. China's strength lies not in capital, like the US, but in its vast industrial base. Only by

deploying AI across thousands of industries can value be created and a positive cycle of AI input and output emerge.

Third, top-down policy plays a crucial role in education and adoption. My recent research shows many entrepreneurs still underestimate the depth of the coming restructuring. Most focus on solving today's problems rather than designing tomorrow's scenarios. Many still use habitual industry logic or Internet+ thinking, pursuing small, quick applications rather than adopting an AI-native mindset for business design. A policy-driven push—akin to KPIs—is needed to encourage deeper strategic planning.

Unlike the intuitive Internet+ era, AI+ is more abstract, involving shifts in architecture and requiring companies to use AI recursively to redesign how they create value. While perceptions are starting to change, an even bigger transformation in business models, processes and ecosystems is coming.

Q. How much progress towards AI+ has China made so far and what are the bottlenecks and opportunities for enterprises to invest in AI?

A. AI+ has just begun, and all companies are on the same starting line in this second half of AI.

From an industry perspective, we are at a turning point. In the past, people paid more attention to digital industrialization, such as the development of basic models, arithmetic power and chips. Now, the focus is shifting to the vertical scenarios and business applications. It's a fresh start, allowing all businesses the opportunity to rethink, plan and lay out.

The development of AI is happening much faster than industry can absorb, and the future possibilities for industry that stem from AI will have a significantly larger impact than any value gained thus far. Even if all AI tech development stops today, just using existing smart technology will be enough to bring about a massive change and reconfiguration to all industries for many years to come. There is a huge gap in the perception of AI between those in industry and the technology itself.

The root of this cognitive gap lies in the presence, or lack, of an AI architectural mindset in core decision makers.

Intelligence is no longer scarce; what's missing is the ability to architect it. This AI architectural capability is not about detailed knowledge of specific technologies, but a way of thinking about using intelligence to reconfigure business scenarios.

In order to imagine the future and how AI can change their own business scenarios and industry chain, a top entrepreneur must be able to go beyond the application of a single piece of technology. Rather they need to combine it with their knowledge of industry and insights into the nature of demand. If this change in perception does not happen, companies and perhaps even industries as a whole could come to a standstill in the second half of AI.

The core variable in this AI+ wave is ultimately people. Every industry needs a new generation of AI business architects. These people may be traditional entrepreneurs who have had their own cognitive breakthroughs, or they may be young people with an understanding of the industry and native knowledge and habits related to AI.

Q. The new policy sets three key time frames for AI+, namely 2027, 2030 and 2035, using penetration rate as a quantitative measurement. How should

companies view each of these goals and measurements to guide and assess their AI progress?

A. I have a different view on how the AI+ revolution should be measured. It cannot be evaluated the same way as previous digital waves like IT or cloud computing. The core difference is that this revolution centers on intelligence itself, not just digital tools.

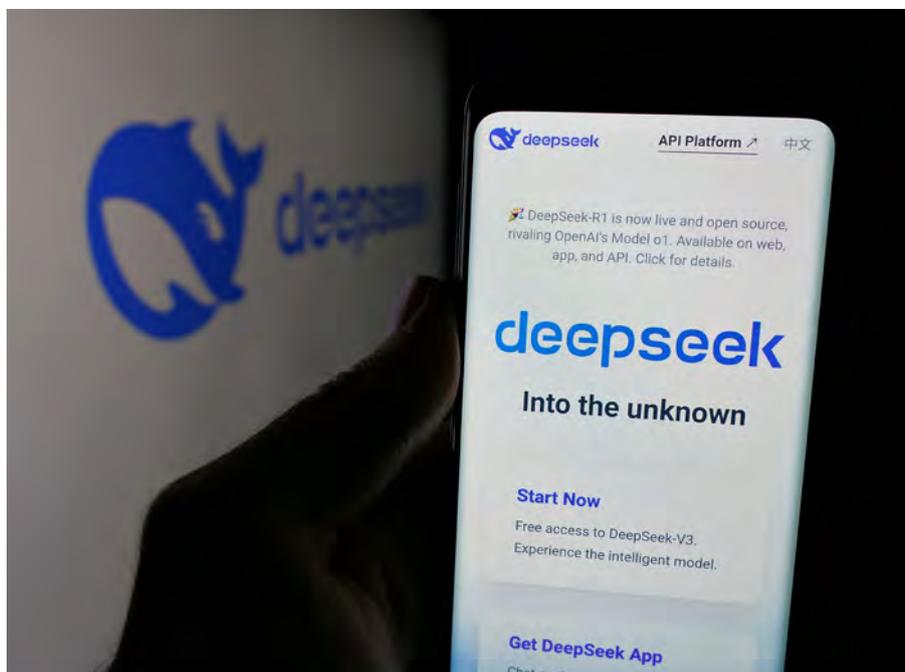
In past IT systems, users were always the final decision-makers; intelligence existed only with humans. But in the AI revolution, the AIs themselves are intelligent, capable of autonomous decision-making within a closed loop of execution and feedback. AI is no longer a discrete tool that can be quantified by whether a particular system is used. Instead, intelligence will permeate all business decision-making, much like electricity permeates a house, enabling innovations as transformative as Ford's assembly line.

Therefore, AI adoption should be measured by scenario and value: how many scenarios in an enterprise or industry have been reshaped by AI's decision-making capabilities, thereby changing business models and creating value.

Traditional indicators like application penetration will be less meaningful because future intelligence will be deeply integrated. On a smart production line, for example, humanoid robots, robotic arms and software systems work as a unified whole; outputs may look the same even if the underlying system is entirely reconfigured by AI. Measuring penetration in such cases becomes a new challenge for academia and industry.

In digital-industrialization fields, model iteration and Token consumption can indicate AI usage. But across wider industries, AI+ must be measured by the number of scenarios transformed.

Key questions include: How many core business scenarios now operate in a closed value loop—from demand insight to product provision? As more companies identify such benchmark scenarios, new standards will emerge. Short-video content is a typical AI-driven scenario meeting personalized needs with minimal business input. Enterprises must find similarly AI-



native scenarios.

B. The policy's 70% penetration target by 2027 is meant to accelerate this shift. But it is only a process indicator. The real goal is for enterprises to use AI to build next-generation scenarios, create new demand and products, reshape organizations and ultimately transform the industrial model.

“Develop AI, then let AI develop you”

Q. The MIT NANDA report found that 95% of organizations are not yet getting value from their AI investments. In your view, what are the root causes of this phenomenon?

A. The root issue is that most enterprises have not yet clarified which core business scenarios are best suited for AI reconfiguration, how to integrate AI properly, or how to use it to design next-generation business models and organizational structures.

An educational example helps illustrate this. Whether a student or an entrepreneur comes to class, the goal is to solve personal problems and grow. Historically, education has been supply-constrained because good teachers were scarce, so we accepted the classroom model with groups of students.

Now, with intelligence no longer scarce, the service model can be fully reconfigured. AI can understand each learner's needs and combine them with a teacher's knowledge and best practices to deliver personalized, high-frequency guidance. In the future, students may still listen to the same teacher, but each will hear a version tailored to their industry and challenges. This magnifies the value of the teacher's time and better meets students' needs.

The key is not that a teacher uses a specific AI tool, but that AI reshapes the entire supply-demand model of the scenario. This requires someone who understands the underlying needs, can imagine future workflows, and can redesign them with AI.

For enterprises, this means identifying one or two core, high-value scenarios and turning them into AI-driven closed-loop benchmarks. In essence: “develop AI, then let AI develop you.” First, give AI the data,

tools and workflows it needs to grow in a scenario; then allow it to drive efficiency and value. Choosing and architecting the right scenarios matters far more than launching projects blindly.

Q. Given that not all scenarios are suitable for all enterprises, how should enterprises determine whether they are the right fit for AI+? How can we find the native scenarios that are actually suitable to be reconfigured by AI?

A. To determine whether an enterprise is suitable, or to determine whether a business scenario is suitable for AI reconfiguration, I have a very simple but direct “million employee problem” litmus test.

If you suddenly had a million more intelligent employees in your organization or in a specific scenario that were tireless, had superior memories and were still learning, would you be able to satisfy your users better, faster and more completely? If the answer is yes, then there is a huge opportunity for AI reconfiguration in this scenario. If the answer is no, it means that the scenario is not suitable enough for the application of intelligence, and any investment is unlikely to bring about a significant increase in revenue.

So, not all businesses are suitable for AI reconfiguration, and many scenarios are not necessarily suitable for AI investment. Choice is greater than effort, and finding the scenario suitable for intelligent reconfiguration is the most important factor for an enterprise in the AI+ era.

The technological revolution is never

fair; you can think of it as a mysterious force coming from an alien planet, and not everyone will be lucky enough to feel its impact. Similarly, if the current area of focus lacks opportunities, a top entrepreneur should realize that it is time to shift to another area. Having the courage and determination to adapt and embrace AI is more important than clinging to historical baggage and sunk costs.

As for how to identify these scenarios, I have a more specific methodology, summarized as “Three Mores, One Higher and One More Complex:”

- Three mores: More employees (or more repetitive human labor); More users/customers; and More expenses.
- One high: High-frequency interaction.
- One complexity: Requires complex knowledge and judgment.

Scenarios that fulfill these three characteristics are usually where AI can be of great value. The hardest part, however, is to understand the nature of an industry's needs, and to go beyond today's needs to imagine and create the needs of the next generation. This needs to be co-architected by people who understand the future, the industry and intelligence.

Intelligence is the greatest lever of the age

Q. Which companies or organizations stand to make the most of the major opportunities available in AI+?

Until now, most AI value has been captured by large players. But in the AI+

AI+ has just begun, and all companies are on the same starting line in this second half of AI





Most enterprises have not yet clarified which core business scenarios are best suited for AI reconfiguration

era, smaller and individual entrepreneurs will have far greater opportunity. AI+ is not consumer-facing scale expansion—it is the reconfiguration of scenarios across industries.

In consumer markets, startups struggle to compete with giant platforms that already control data and entrenched user scenarios. Competition remains a battle among the super-rich. But on the industrial side, where scale, network and cost effects are weaker, AI+ opens space for new entrants to reshape workflows and create new value.

Two trends define today's consumer battle: Super Portals + Super AI. Super portals consolidate most user activity—eating, shopping, transportation, socializing—into a few closed-loop applications. Their rich, concentrated scenarios amplify Super AI, allowing it to be embedded and iterated quickly. While unmet vertical or emotional needs remain, competition in consumer services will still be dominated by large incumbents.

For AI-native startups, two advantages stand out:

1. Native thinking—free from legacy rules and structures, they can design AI-native workflows and business models from day one, directly aligned with customer needs.
2. No legacy burdens—they lack large historical assets that risk turning into liabilities in the AI era. As Kodak's film and retail network became obsolete, many dominant companies face the same problem.

AI's ubiquity allows industries to

be rebuilt around dynamic, iterative intelligence. The core opportunity for AI-native entrepreneurs is to turn incumbents' core assets into liabilities and leapfrog them. AI agents create unprecedented leverage: instead of scaling through talent, product or capital, individuals can orchestrate AI agents to meet demand and reconfigure scenarios. This enables entrepreneurship with 100x or even 1,000x leverage—something most people have not yet learned to harness.

Industry leaders still retain major advantages: long-built scenario assets and vast data—both structured and unstructured, as well as the accumulated tacit knowledge of employees. These allow AI to be integrated seamlessly without building scenarios from scratch and provide the data needed to strengthen AIs. By combining these assets with AI-native thinking, incumbents can still lead in the second half of AI, turning potential liabilities into new moats and sources of value.

There is only one way for organizations to measure AI investment

Q. After choosing a scenario, enterprises need to invest real money to carry out AI reconfiguration. How should they measure the Return on Investment (ROI) when they may not see business value in the short term?

A. The ultimate and only way to measure AI investment is business value. Until

this value appears, businesses will have to rely on faith. This may sound esoteric, but like entrepreneurship, it is essentially a judgment-based commitment.

However, faith is not the same as hope. One of the core competencies of an AI architect is the ability to accurately design intermediate metrics and business milestones that lead to business value. After selecting the right scenario, the most critical thing for an AI architect to do is to define these intermediate goals, and by doing so they will already be halfway to success, as it helps bring together the whole organization to work in a specific direction.

To give an example in pharmaceutical retailing, the ultimate goal of the business is to increase GMV and profit. But what is the entry point for AI transformation? Is it to enhance the full lifecycle value of individual customers or to empower pharmacies to open more locations? And if, for example, you were to choose the former, your intermediate metrics might break down into: improving customer visit frequency, improving in-store conversion rates, improving affiliate sales and customer unit prices, etc.

A good intermediate indicator must fulfill two conditions: first, it is a business indicator with clear and measurable value; second, it can become an indicator for the dynamic iteration of AI.

One example is TikTok's user hours, which is a metric that serves both a business goal and can also be broken down into different quantitative elements, such as single-video stays, watch completion rates, and so on. These in turn can be used to guide iterations of the recommendation algorithm, e.g. when the algorithm realizes that it's pushed content that a user only watched for a second before swiping away, it knows that the recommendation was a failure and that it needs to adjust its strategy.

This ability to translate business goals into data metrics and use them to push AI to iterate and form flywheels is at the heart of the AI architecture mindset. Once you have this iterative mechanism in place, you can leave the rest to the AI and trust the speed and potential of its iterations.

Q. Can you explain the concept of ‘AI native’ as mentioned in the AI+ initiative? How can we cultivate AI native thinking?

A. The idea of being AI native is to approach building businesses and organizations with AI at their core. These AI native enterprises can fully utilize the capabilities of AI agents across scenarios through cleverly structured business models and organizational synergies.

For example, TikTok and Didi—China’s Uber equivalent—are both mobile-native products and it is hard to imagine swiping through TikTok and using Didi during the PC era. It is almost impossible to consume and produce short video content without using cell phones as they provide both the camera for recording content and the ability to swipe up and down on the screen. It is also impossible to efficiently match users and drivers on ride-hailing apps without the sharing of real-time GPS locations.

To be properly AI native, the key is to think about how you can help the AI agent succeed in each scenario by coaching and guiding it until it can work on its own. As an example, we can imagine an AI agent as a new ‘geeky’ employee in an organization. That employee has an infinite memory, can quickly absorb and integrate massive amounts of knowledge, can invoke a variety of tools and interfaces, works 24/7, and has dynamic feedback and iterative ability to continuously learn and even expand. But at the same time they do not have some of the common abilities that ordinary people have, such as recognizing people’s intentions.

The AI native way of thinking is to understand and believe in this new “colleague’s” abilities and to think about how to maximize its potential through teaching knowledge, supplying data, equipping it with the correct tools and permissions and providing ongoing feedback and companionship. You need to genuinely want to see it succeed and want it to be at the center of the organization, rather than seeing it as a threat, worrying that it will steal your thunder, or wanting it to be completely accommodating and help you get things done within your existing work habits and organizational processes.



As emphasized above, we need to learn to “develop AI, then let AI develop you.”

This AI native architecture thinking is exemplified in several ways:

- Experiment with the AI agents first, to gain an understanding of the boundaries of the AI agent’s abilities and understand its basic principles.

In the second half of AI, good entrepreneurs need to continuously develop their intuition through usage to understand the boundaries of the capabilities of AI agents, while great entrepreneurs also need to grasp the principles and essence of AI, how they operate and other technical principles. This way, we can also make more informed predictions as to where breakthroughs and innovations in AI will appear, allowing us to continuously define new business models, discover new scenarios and lay out paths to innovation using the evolution of AI.

- Designing processes that are human-machine collaborative

You need to think about how to equip this AI agent with human partners, or even as a supervisor to some human employees. You need to understand how to provide them with what they need to better integrate into the organization and perform their role effectively.

- Supporting mechanisms to help AI Agents continue to iterate

You need to understand the importance of a reward function and know how to design clear assessment goals and feedback iterations for AI employees so that the intelligence can continue to grow.

In today’s world, a lot of people understand business, but very few understand AI business. This is the ability to perfectly integrate the design of AI with the design of the business, and to do business in a way that is AI native. The ultimate goal is not to use AI for the sake of AI, but to use AI to creatively architect the next generation of business. That’s the essence of AI architectural thinking.

Industry calls for AI business architects

Q. You have repeatedly emphasized the importance of AI architects. Does that mean that talent is the biggest sticking point in promoting AI+? How should we cultivate such talents?

A. Yes, I think the biggest challenge and opportunity for AI+ today lies in talent, especially the next generation of AI architects who really understand industry, intelligence and the future. A true AI



The biggest challenge and opportunity for AI+ today lies in talent

architect is worth an army of thousands.

I think there is a big problem with a systematic mismatch between traditional enterprises with scenarios and data, and external talents with AI architecture capabilities. People who own scenarios don't have AI architectural capabilities, while people who have AI architectural capabilities don't own scenarios, and they can't find each other. So how can we go about creating a mechanism for cooperation, incubation, synergy and co-creation?

Regarding how to cultivate talent, my view is that AI architects must be developed through the reconfiguration of various industries rather than being a skill learned in school. Experience and trial and error is key to their development, and we need to create the conditions for those candidates to emerge.

I believe there are three core qualities that AI architects need to possess:

- Understand AI and have an AI architectural mindset. This doesn't necessarily require programming, but it does require an intuitive understanding of what AI can and can't do, as well as a qualitative understanding of how it works, and an interest in the evolution of AI. They also need the ability to determine how business scenarios are going to change and how they might be architected when your organization has a million more AI employees.
- Understand the industry and have in-depth insights. This requires a real deep dive into industry scenarios to

understand the true nature of demand and the way in which industries such as energy, healthcare and manufacturing are organized. For young people, this is the most needed exercise and opportunity.

- Understand the future and have the courage to be original. Be bold enough to think outside the box and the logic inherent in the industry, think in terms of first principles, and imagine and architect the next generation of business. At the same time, it is important to have the ability to manage the pace of transformation and build new ways of working with people and machines.

The first two knowledge of intelligence and knowledge of industry can be nurtured. Developing an AI architect is much like developing an AI model; you have to provide them with scenarios, data and feedback mechanisms. What we want to do is to create an environment where young people with potential can train in industry, to complete the pre-training and fine-tuning of the parameters of the neural network in their brains.

Q. *“People who own scenarios don't own AI architectural capabilities, while people who own AI architectural capabilities don't own scenarios, and they can't find each other.” What can be done to improve this situation?*

A. This is quite a profound but common problem, and also a big difference between AI+ and Internet+. To resolve

this mismatch, we cannot rely solely on policy guidance but ultimately on market mechanics.

At the core, organizations, and especially CEOs, need to be good AI architects. This person not only architects the business, but also the organization and the talent. They need to have the ability and the intelligence to identify, discover and cultivate those who truly have the ability to architect intelligently and are willing to open up the scenarios, the data, the knowledge and the opportunities to practice to them. This talent is likely to come from outside the organization, and this is because there is not a lot of talent within traditional industries that directly possesses algorithmic thinking and the courage to be original.

This raises several practical questions: what is the salary structure and why would a top AI talent want to join an industry with relatively traditional pay and pace? Companies will be required to make bold innovations in organizational design and incentives, and to use a market-based approach so that top talent is willing and able to quickly enter various industries.

I think the current talent overflow in the Internet industry is a huge opportunity. I always say that the Internet is a small hill with millions of practitioners, while AI+ is a mountain that needs hundreds of millions of practitioners. There is a massive opportunity in working out how we can transfer those from the Internet to the AI+ era.

Summary

The essence of AI+ is not the replacement of existing tools, but in AI becoming the new core of industry. It is no longer the technology stack that determines success or failure, but the ability to architect intelligence across a thousand different scenarios. Whoever can take the lead in AI architecture thinking, find AI native scenarios, set up indicators and iterations, cultivate AI architects within those scenarios, and reconstruct the business model and organizational design with the leverage of AI agents, will truly be able to lead in the second half of the AI game and define the next generation of industry. ■

Building tomorrow's cities

In an exclusive interview, Columbia University's Professor Ibrahim Odeh discusses how cutting-edge technologies are reshaping urban planning and what it takes to build truly smart, equitable cities

As cities worldwide grapple with unprecedented challenges—from climate change and aging infrastructure to housing shortages and social inequality—a new generation of urban leaders is turning to transformative technologies for solutions. At the forefront of this movement is Professor Ibrahim Odeh, Founding Director of the Global Leaders in Construction Management (GLCM) program at Columbia University and a key faculty member in the upcoming CKGSB Smart Cities, Fintech, and Alternative Energy program based in Dubai.

Professor Odeh brings a unique perspective to smart city development, combining deep academic expertise with extensive industry experience. His collaborations span from the World Economic Forum and G20's Global Infrastructure Hub to major construction firms and emerging technology companies. Through his work with Central Japan Railway on AI and IoT optimization across 3,000 buildings, his development of the innovative City Adaptability Index, and his advisory roles on smart city initiatives worldwide, Odeh has emerged as a leading voice in urban innovation.

"What I think we are witnessing is a transformative period," Odeh explains. "Technologies like digital twins, AI, Building Information Modeling (BIM), and IoT are not just tools—

they are reshaping the very foundation of everything." This perspective reflects a fundamental shift in how urban planners and engineers approach city development. Rather than viewing technology as an add-on to traditional planning processes, Odeh advocates for a holistic integration where digital capabilities become the operating system of 21st-century cities.



Digital twins, in particular, represent what Odeh calls a paradigm shift from static, linear planning to interactive and predictive urban management. "These systems allow planners to create real-time, data-rich replicas of their physical assets—transportation, utilities, public spaces—and simulate a range of urban scenarios before anything is built," he explains.

The implications are profound. City leaders can now test how policy changes might impact traffic patterns, energy consumption, or climate resilience over time, making decisions that are data-driven and proactive rather than reactive.

Real-world impact: From Tokyo to smart grid solutions

Odeh's research extends beyond theoretical frameworks to tangible results. His recent collaboration with Central Japan Railway demonstrates the concrete benefits of AI and IoT integration at

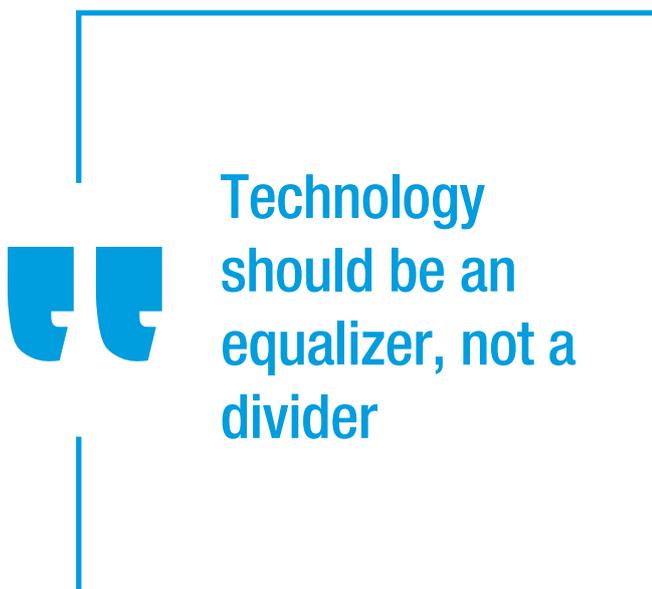
Professor Ibrahim Odeh will be teaching in CKGSB Smart Cities, Fintech, and Alternative Energy for the Global Future program, a collaborative initiative with Columbia Engineering based in Dubai. The program is designed to empower civil leaders and businesses with cutting-edge knowledge in smart city development, sustainable technologies, and innovative financing models.

scale. Working across 3,000 buildings over nine months, the project focused on optimizing space usage while reducing carbon emissions.

“The impact of being able to optimize space usage is outstanding from an operational cost and revenue-generating perspective,” Odeh notes. “Imagine all the areas across these 3,000 buildings that we wanted to optimize—if they are not used productively and efficiently, that represents massive missed opportunities.”

The applications extend across multiple urban systems, from intelligent traffic management using real-time sensor data to reduce congestion and lower emissions, to smart energy grids that optimize power distribution and consumption. Perhaps most significantly, predictive maintenance of infrastructure helps cities anticipate repairs in HVAC, lighting, and other critical systems before failures occur, while enhanced emergency response capabilities emerge through integrated monitoring systems that provide unprecedented situational awareness.

Despite the promise of smart city technologies, Odeh emphasizes that successful implementation requires much more than technological sophistication. “One major issue we always discuss is data governance,” he explains. “Making sure that data is collected, stored, and used in a secure and transparent way is critical.”



Technology should be an equalizer, not a divider

Additional challenges include aging infrastructure in many developed countries that must be integrated with new digital systems, skills gaps in municipal governments that lack in-house expertise to process and act on IoT-generated data, standardization needs across different urban systems and departments, and cross-sector training requirements to build institutional capacity.

“The data produced by IoT systems is only valuable if cities have the talent and systems in place to process it,” Odeh emphasizes. “That’s why we often stress the need for standardization, cross-sector training, and strong institutional capacity to succeed.”

Financing the future: Public-private partnerships as the path forward

When it comes to funding smart city initiatives, Odeh advocates for innovative public-private partnerships (PPPs) that go beyond traditional financing models. Through his work with the World Economic Forum and GI Hub, he has observed a shift toward performance-based partnerships where risk sharing and long-term impact are central considerations.

“In many developing markets, we are seeing a shift from traditional funding to more innovative performance-based PPPs, where risk sharing and long-term impact are both central,” Odeh explains. “It’s about integrating digital value—like life cycle analysis and data transparency—into projects designed to make these investments more attractive and bankable.”

Canada emerges in Odeh’s analysis as a leading example of successful PPP implementation across multiple sectors, from infrastructure to energy projects. The key, he argues, is not just funding technology but aligning incentives and outcomes to serve public needs while creating sustainable business models.

Odeh’s expertise in construction management provides unique insights into how emerging technologies are transforming how cities are built. Technologies like drones, 3D printing, robotics, and modular construction are not merely improving efficiency—they are reshaping the entire economy and logistics of urban development.

“These innovations are not just improving efficiency; we are reshaping the economy and logistics of urban development,” he explains. Drones have become essential for surveying, progress tracking, and safety monitoring, providing construction managers with real-time insights that were previously time-consuming and costly to obtain.

More significantly, these technologies offer potential solutions to the global housing crisis. “Through my research and fieldwork, we have examined how these technologies can reduce construction timelines, labor requirements, and material waste while maintaining high quality,” Odeh notes. This has particular implications for affordable housing in regions where traditional construction methods are too slow or costly to meet demand.

However, Odeh cautions that “technology alone isn’t the answer. What matters is how it’s embedded into a larger ecosystem of planning, financing, and regulation. When these elements align, construction technology becomes a strategic lever for solving

urban challenges at scale.”

One of the most critical challenges facing smart city development is ensuring that technological solutions don't exacerbate existing inequalities. Odeh has worked extensively on this issue, contributing to courses on Inclusive Infrastructure and social equity through the G20's Global Infrastructure Hub.

“Technology should be an equalizer, not a divider, but achieving that requires deliberate action,” he emphasizes. His team has developed a City Adaptability Index that measures not just how smart a city is, but how adaptive and inclusive it is across areas like diversity, mobility, and access to services.

“Our approach is that equity must be built into the digital and physical layers of a city, not layered on top after the fact,” Odeh explains. This requires engaging underrepresented communities from the beginning of planning processes and embedding adaptive governance that evolves with the needs of all citizens.

Success in smart cities, according to Odeh, should not only be measured by connectivity or carbon savings, but by whether every resident feels seen, heard, and served.

Global lessons: Learning from Dubai's visionary approach

Having studied Dubai's transformation from empty land to a global smart city hub, Odeh offers insights into what other cities can learn from this remarkable urban development story. “Dubai offers powerful lessons in visionary leadership, strategic risk-taking, and infrastructure-led development,” he notes.

Key takeaways from Dubai's approach include the importance of long-term vision with laser focus on economic diversification, bold and integrated planning that considers multiple urban systems simultaneously, world-class infrastructure development that supports broader economic goals, and maximizing strategic location advantages through thoughtful planning.

However, Odeh emphasizes the importance of adaptation rather than replication: “Dubai's model worked very well because it fit its context—centralized governance, resource wealth, and strategic location. Other cities must adapt the principles, not just copy the playbook.” This is why his City Adaptability Index emphasizes building smart cities that are locally grounded, inclusive, and resilient rather than following a one-size-fits-all approach.

Odeh's global perspective reveals fascinating regional differences in smart city development approaches. “Smart city strategies vary widely across regions, and that's what makes this space so dynamic,” he observes.

In China, development tends to be rapid and large-scale with strong government coordination, enabling cities to pilot and implement technologies quickly. The focus is often on scale and integration, supported by significant public investment and tech sector partnerships. The Middle East, particularly the Gulf region, emphasizes innovation and long-term vision, with projects like NEOM in Saudi Arabia designed as flagship models of sustainable, high-tech, globally connected future cities. North America takes

Making sure that data is collected, stored, and used in a secure and transparent way is critical



a more incremental approach, with greater emphasis on privacy considerations and adapting smart technologies to existing infrastructure systems.

“Each region reflects its own priorities,” Odeh notes, “and there is no one-size-fits-all model.”

Climate adaptation has become a core driver of smart city innovation, with cities turning to AI-based flood predictions and digital twins to anticipate and manage climate-related risks. “Cities are using sensor networks to monitor air quality and heat islands, while others deploy adaptive traffic systems to reduce emissions,” Odeh explains.

Digital twin models allow cities to simulate climate scenarios—rising temperatures, sea level changes, extreme weather events—and understand where to invest for long-term resilience. This approach, integrated with green infrastructure like smart irrigation systems and energy-efficient buildings, represents the convergence of technology and nature. “These technologies are moving all of us toward a more climate-smart and adaptive urban future,” Odeh notes.

Looking ahead: The next decade of urban innovation

When asked about the most transformative developments of the next decade, Odeh points to the convergence of several key technologies: “Over the next decade, we'll see generative AI, advanced simulation tools, and integrated digital twins fundamentally reshape how we design and manage cities.”

These technologies will enable planners and policymakers to



model complex urban systems—energy, water, transportation, housing—in real time and make decisions that are data-driven and proactive rather than reactive. AI in policy forecasting will allow governments to test the potential social and environmental impacts of policies before implementation.

However, Odeh emphasizes a crucial caveat: “Technology alone will not be enough. We also need policy innovation to unlock the full potential of smart cities.” This includes updating procurement models, ensuring strong ethical frameworks around data use and privacy, and investing equally in governance, talent, and regulation—not just technology.

The human element: Jobs and skills in the AI era

Addressing widespread concerns about AI’s impact on employment, Odeh offers a nuanced perspective based on historical precedent: “Everyone is worried about losing jobs, but think about accountants when Excel came to life. Everyone thought there wouldn’t be any accountants anymore. Now look at companies—you have lots of accountants, but you won’t hire an accountant without Excel knowledge.”

This pattern, Odeh believes, will repeat with AI: “Someone with AI knowledge and capability will take your job, not an AI itself. And think about how many new jobs will be created in the near future.” The key is adaptation and continuous learning rather than resistance to technological change.

Conclusion: Building cities for all

Prof. Odeh’s vision for smart cities goes far beyond technological prowess to encompass fundamental questions of equity, sustainability, and human flourishing. His work demonstrates that successful smart city development requires not just cutting-edge technology, but also thoughtful governance, inclusive planning processes, and a commitment to serving all residents.

As cities worldwide face unprecedented challenges, the integration of AI, IoT, digital twins, and other emerging technologies offers tremendous promise. However, realizing this potential requires what Odeh calls “human-centered design”—creating places that are not only smart but also equitable, adaptive, and resilient.

The CKGSB Smart Cities, Fintech, and Alternative Energy program, with Professor Odeh as a key faculty member, represents a unique opportunity for urban leaders to gain these integrated insights. Based in Dubai—itself a testament to visionary urban development—the program combines Eastern and Western perspectives on innovation while providing practical tools for implementation.

“The cities that succeed will be those that align tech innovation with human-centered design, creating places that are not only smart but also equitable, adaptive, and resilient,” Odeh notes. In an era of rapid urban growth and mounting environmental challenges, this holistic approach to smart city development may well determine the future of human habitation on our planet. 



MANAGEMENT EDUCATION REFORM

The global business environment is changing rapidly and management education institutions are undergoing a period of massive reform as a result

By Patrick Body

The world is changing rapidly and management education institutions need to keep up

In mid-2020, when Google announced that its in-house career certificates in fields such as data analytics, project management and UX design would be treated by its recruiters as equivalent to a four-year college degree, the signal was unmistakable: the traditional position of business schools at the heart of management and professional education was being challenged.

Fast forward to 2025, and management education is undergoing a global reform as business schools and universities adapt to technological disruption, changing employer demands and the growing pressure for social responsibility. The shift is not just cosmetic, but required, with 76% of respondents to the 2025 State of Business Education Report by business school association AACSB citing new financial models and strategies as having a high or critical impact on business school future operations, strategy and outcomes.

Looking particularly at post-graduate business education, the nature of MBA courses is changing to meet these new demands, while institutions are also beginning to offer a mosaic of more flexible, modular and increasingly digital pathways designed to prepare leaders for a world in flux.

“There are so many challenges on the horizon, including AI, that mean business schools need to change their approach—and fast,” says Bing Xiang, Founding Dean of CKGSB. “In fact, in my view, the traditional business school approach can already be considered outdated.”

Overall enrollment

Enrolment in post-graduate master’s business courses has been rising over the past five years, with analysis of AACSB’s data showing that it has risen approximately 13% between 2018 and 2024. But MBA enrollment accounted for only around 30% of all business school entrants. Over the same period there has been an increase in alternative offerings, with 62% of business schools now offering some form of non-degree credentials—including micro-credentials, certificates and executive education courses—according

to the Graduate Management Admissions Council (GMAC).

“That’s part of the reason contributing to the downsizing of a lot of the MBA programs—because there are these cheaper, or even free, online courses or online certificate programs available out there,” says Rui Zhu, Professor of Marketing and Director of the Center for ESG and Social Innovation at CKGSB. “Sometimes they do compete for the same pool of applicants but given the current situation, I think the school has no choice but to have these executive programs, because we need to adapt to the changing environment.”

Management education shift

For decades, the appeal of the MBA—often seen as the gold standard of management education—has provided a structured, comprehensive foundation in finance, strategy, operations and leadership, particularly for professionals promoted from technical or shop-floor roles into management. But with the corporate world moving faster than ever, employer demands are changing, and companies are now placing greater value on agility, creativity and emotional intelligence as much as formal qualifications.

As a result, there has been the emergence of several alternative styles of qualification that are gaining in popularity globally, both for their ease of access and their price. Micro-credentials have emerged as one of the most visible innovations. Platforms such as Coursera, edX and LinkedIn Learning have popularized modular certifications often underwritten by traditional business schools, across a range of subject matter, that allow learners to curate their own educational journeys.

“Accessibility requires flexible formats, stackable credentials and stronger partnerships with employers to reduce costs while expanding reach,” says Lily Bi, President and CEO of AACSB International. “AACSB data shows growing enrollment in online and hybrid programs that meet learners where they are, and affordability must not compromise rigor; programs must still demonstrate clear outcomes and assurance of learning.”

At the same time, one of the most dynamic and fast-growing areas within business schools is executive education, programs designed for experienced leaders who wish to sharpen their strategic vision, refresh their perspectives or adapt to new challenges without stepping away from their careers. By focusing on relevance, peer learning and direct application, such courses can preserve the prestige of a top-tier school while offering a more immediate and efficient return on time and investment.

“For the non-degree executive courses, like the CEO program or topic-focused programs, they are great complements to the degree programs,” says Zhu. “They are flexible and adapt to the demand from the market and from the students. The ultimate judge for these programs is always the market response. If we put out a program and the students like it, give it high ratings, and help it spread through word-of-mouth—then we’ve done something right.”

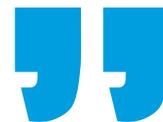
Drivers of change

The changes in management education have been driven by three key phenomena. The first has been a shift in employer requirements, which have encouraged business schools to emphasize experiential learning, interdisciplinary collaboration and direct engagement with industry. Theoretical models remain important, but the classroom has expanded to include live consulting projects, startup incubators and global immersion programs. Students are now expected to work with real organizations, solving genuine strategic problems in real time.

Business schools are also increasingly co-designing programs with companies to ensure greater alignment between what is taught and what is needed in practice. Apprenticeships, corporate academies and tailored executive courses blur the traditional boundary between education and employment. This co-creation with industry is also important given the second key change, the wave of technological disruption of particularly the past five years.

The rise of AI, automation and online learning platforms has transformed both

There are so many challenges on the horizon, including AI, that mean business schools need to change their approach



Bing Xiang
Founding Dean
CKGSB

how organizations operate and how individuals learn.

“A lot of the real advances happening today in management are led by industry, especially the research labs of the large technology companies,” says Yoram (Jerry) Wind, Lauder Professor Emeritus and Professor of Marketing at Wharton. “There are huge advances in AI, especially with the move from generative AI to agentic AI to physical AI. University research is often lagging behind.”

Courses should increasingly focus on how leaders can leverage artificial intelligence, data analytics and automation for smarter decision-making and customer engagement, but with up-to-date industry input at their core. A recent CKGSB course offered in conjunction with ByteDance-backed cloud service platform Volcano Engine, alongside Feishu and Jinqiu Fund and the Nvidia Startup Acceleration Program, exemplifies this. The course offers attendees access to leading academics and entrepreneurs from across industries to learn about and tackle the current material issues in the AI space.

At the same time, technology in pedagogy has become a key focus for modernizing management education institutions. So far, according to GMAC, around 78% of global programs are adopting some sort of AI across their courses.

“The easiest thing to do for any school would just be to add AI-related courses, but the ideal scenario would be integrating AI as a transversal theme across all our courses,” says Nicole Tee, Director, Graduate Studies at NUS Business School in Singapore. “It is similar to the development of globalization, it used to be a standalone course and now it’s part of every course we teach. Additionally, in terms of worries about students doing work with AI, if it is an assignment easily completed with AI, then it was probably the wrong assignment. We need to assess students in a way that uses AI and then critiques that use, something to engage their critical thinking skills and not develop a reliance for the basics.”

Third, as the challenges facing global businesses become increasingly interconnected—from climate risks and resource scarcity to geopolitical tension and technological ethics—management education needs to evolve to prepare more responsible and globally minded leaders. The first issue here is the inclusion of ESG-related teaching as a foundation of all courses, rather than niche electives.

“Unfortunately, it is still typically taught as an elective dropped into the curriculum that remains unchanged,” says Andrew Hoffman, Holcim (US) Professor of Sustainable Enterprise at the Ross Business School, University of Michigan. “While you can say ‘protect the environment’ in



a class, or propose how it is to be ethical, there are still issues when the rest of the curriculum says the purpose of the firm is to make money for the shareholders. I think we need to just approach it as ‘this is how you do business in today’s world.’ This is the coherent moral culture we want to create.”

But ESG isn’t alone in its importance to an augmented, modern business education, and there are also difficulties for many schools in properly including cross-disciplinary teaching.

“Business schools are realizing that many business disciplines rely heavily on

other disciplines, whether it is economics or psychology and the like,” says Wind. “And yet, because of monetary reasons every business school is developing all these functions internally. Students often get a diluted understanding and miss the opportunity to interact with students who focus on other disciplines.”

Regional perspectives

While the transformation of management education is global, its pace and character vary widely across regions. Each market reflects its own mix of economic priorities, cultural values and institutional strengths.

China and Southeast Asia are emerging as centers of innovation in management education. The extraordinary pace of economic development has created intense demand for skilled leaders who can bridge global business principles with local realities. Southeast Asian economies such as Singapore, Malaysia and Vietnam are positioning themselves as regional education hubs, while China’s institutions are scaling up executive education and research programs that reflect the country’s growing influence in global markets.

“At CKGSB, we focus more on executive education and cater to senior business executives. However, their demand and expectation has significantly increased,” says Zhu. “In the past, when the economic situation was bright and business was booming, students didn’t have as much pressure, but now they want to make sure that what they are learning can actually be useful, and the money they paid is worth the dollar.”

In the United States, business schools continue to lead in innovation and entrepreneurship, drawing on close ties to technology hubs such as Silicon Valley. Programs emphasize agility, venture creation and disruption as core themes, reflecting the country’s deep-rooted belief in market-driven problem-solving.

However, the US sector also faces significant challenges: declining enrollment in full-time MBA programs, mounting funding pressures and visa restrictions that complicate the recruitment of international students. In response, many schools are experimenting with flexible delivery models, online MBAs and specialized master’s programs to appeal to a broader and more diverse audience.

“At least here in the United States, there’s growing public discontent with business schools and higher education, because it costs too much money, and people don’t understand the value we provide,” says Hoffman. “As a result, business schools in the US are rushing to offer a diverse set of offerings to appeal to a diverse market. We are a business, and we sell a product called the MBA, but we’re also selling one-year master’s

The ideal scenario would be integrating AI as a transversal theme across all our courses



Nicole Tee
Director, Graduate Studies
NUS Business School

degrees and specialized programs in areas like sustainable innovation or supply chain management. The portfolio is broadening to draw in more students, but also to tailor the education to what students are looking for.”

Across Europe, sustainability and social impact have become defining priorities in management education. Business schools have embedded ethics, green finance and responsible leadership into their core curricula—driven both by EU regulation and deep-rooted cultural commitments to social welfare and environmental stewardship. The Bologna Process—which seeks to bring more coherence to higher education systems across Europe—has strengthened cross-border mobility and academic consistency, though institutions continue to balance quality, affordability and broad access.

Challenges ahead

As the sector diversifies and innovates, issues of access, credibility and quality need to be addressed. While micro-credentials and online programs have helped democratize access to high-quality learning, the world’s top MBA programs continue to carry price tags that place them out of reach for many prospective students. According to the 2024 GMAC survey, while more programs are offering financial aid, the cost of management education remains the top barrier to enrollment worldwide.

This financial barrier risks perpetuating inequality within leadership pipelines, limiting opportunities for talented individuals from underrepresented or lower-income backgrounds. Addressing this challenge will require business schools to rethink funding models, expand scholarships and leverage technology to reach a broader audience.

“Business schools are expensive and people just have less disposable income, so for them to come to school, to get the education can be tough,” says Zhu. “We need to think about what we do to maintain the sustainability of the business school, to keep up with student demand and their changing economic situations.”

Accessibility requires flexible formats, stackable credentials and stronger partnerships with employers

Lily Bi
President and CEO
AACSB International



Another growing concern is fragmentation and credential inflation. As the marketplace becomes saturated with certificates, badges and short courses, the signaling power of each qualification can become diluted. Employers increasingly face the challenge of interpreting what different credentials actually mean in terms of capability and depth.

Without clear standards or frameworks for comparison, there is a risk that the credibility of alternative education pathways could erode. For reform to be sustainable, institutions and accrediting bodies must work together to establish transparency and coherence across this expanding landscape.

“When managed well, certifications feed into degree pipelines and help schools respond to fast-changing demand,” says Bi. “But the risks are many: credential inflation, quality dilution, learner confusion, and inconsistent outcomes across providers. AACSB emphasizes that business schools must hold nondegree programs to clear learning outcomes, assurance of learning, and alignment with mission to guard credibility.”

Finally, maintaining academic rigor is an ongoing priority. The appeal of short, flexible programs lies in their efficiency and relevance—but they must also uphold the depth, critical thinking and analytical training that distinguish serious management education. Business schools are thus challenged to innovate without compromising on substance: ensuring that

the convenience of new formats does not come at the expense of intellectual rigor or transformative learning experiences.

The future

The global reform of management education is reshaping how leaders are trained. The rigid, degree-centered model is giving way to a more fluid ecosystem of micro-credentials, certifications and executive programs, each addressing different career stages and needs. Traditional MBAs will not disappear—they remain valuable for networking, prestige and comprehensive learning—but they will increasingly coexist with faster, more affordable and more targeted alternatives.

The challenge for business schools is to balance academic rigor with practical relevance, while ensuring global accessibility. More broadly, management education must prepare leaders not just to meet employer needs, but to navigate a world of climate urgency, technological disruption and geopolitical complexity.

“I’ve always often said business leaders, and people in general, need to begin to ‘view the earth from the moon,’ rather than from the narrow borders of one’s own country,” says Xiang. “In the age of AI, this will become ever more important, as the emphasis shifts away from what we know, to how we think. The novel ideas we create, and the ethical directions we choose to take, will be of utmost importance in the decades to come.”



The EV revolution's hidden battle

John Paul MacDuffie, Professor of Management at the Wharton School of the University of Pennsylvania, discusses the paths forward for China's EV makers and the need for complete manufacturing ecosystems

When Japanese automakers first entered the US market in the 1980s, they faced quotas and trade barriers similar to those that Chinese EV makers confront today. But according to John Paul MacDuffie, a professor of management at the Wharton School of the University of Pennsylvania, today's situation presents a far more complex technological and geopolitical picture.

"What's shocking to the rest of the world isn't just that China has a lot of electric vehicles—it's how good they are," says MacDuffie. "The Chinese advantage in batteries, for instance, hasn't only been about first-mover advantage or low cost or government subsidies. There's also been impressive innovation."

This innovation extends far beyond batteries. MacDuffie points to a recent analysis that found BYD's structural components are significantly lighter than those used by traditional automakers, offering advantages in range and efficiency. "A lot of focus goes on batteries and electric motors, but EVs actually require rethinking everything in the car," he explains.

The current wave of tariffs—up to 100% in the US and 35% in Europe—presents policymakers with a dilemma: how to balance protecting domestic industries while maintaining the pace of innovation needed to address climate change. "I'm torn,"

MacDuffie admits. "I do think it's sensible for the US to give its own industry time to catch up. But if the US industry were to think they have 20 years of protection from Chinese competition, that would lead to complacency and slower investment."

The challenge extends beyond simple trade policy. MacDuffie points to the extraordinary transformation in China's automotive sector, where companies like BYD evolved from making batteries for mobile phones to producing some of the world's most advanced electric vehicles in just two decades. This rapid evolution challenges conventional wisdom about how automotive expertise develops.

"In the traditional automotive space, China wasn't winning any exports," MacDuffie notes. "Then at some point they decided to leapfrog and focus on electric vehicles. The rest of the world was, for various reasons, not doing much with EVs yet. Well, then, over about a decade, China went from being way behind to being way ahead."

This technological leapfrogging has created an uncomfortable reality for Western automakers. Traditional manufacturers face what MacDuffie calls a "catch-22" situation: they need time and protection to develop competitive electric vehicle capabilities, but too much protection might actually slow their progress.

The situation is further complicated by the integrated nature of



John Paul MacDuffie is a Professor of Management at the Wharton School of the University of Pennsylvania

global supply chains. “You can’t just look at the final assembly,” MacDuffie explains. “The supply chain, of course, is big, complex, with lots of different parts, and some of those are constantly moving based on both cost factors and logistics factors.”

The dilemma becomes particularly acute when considering vertical integration. Both Tesla and BYD have shown that the fastest path to success in electric vehicles involves controlling much of the supply chain—from batteries to motors to key components. Western manufacturers, long accustomed to complex supplier networks, must now decide whether to make similar investments while under tariff protection.

This raises thorny questions about the nature and duration of protection needed. Simply shielding final assembly with tariffs may not be enough if the goal is to develop a complete domestic EV ecosystem. Yet the more comprehensive the protection, the greater the risk of slowing innovation and raising costs for consumers.

The stakes are particularly high given the climate implications. “For many good reasons, including national interest, national defense, avoiding over-dependence, it wouldn’t be a very viable strategy to rely completely on Chinese EVs,” MacDuffie acknowledges. “But we also have to recognize that any delay in EV adoption has real environmental costs.”

The solution, MacDuffie suggests, might lie in more targeted forms of industrial policy. Rather than blanket tariffs, he points to the potential of focused investments in key technologies and capabilities, combined with time-limited protection that includes clear benchmarks for progress. “The question isn’t just whether to protect,” he argues, “but how to protect in a way that accelerates rather than impedes development.”

This approach would require a degree of policy sophistication that has often been lacking in trade disputes. But as MacDuffie points out, the alternative—a prolonged trade war that slows both innovation and EV adoption—serves neither economic nor environmental interests.

Strategic options for Chinese EV makers

For Chinese automakers facing steep Western tariffs, MacDuffie sees several viable paths forward, drawing parallels with how Japanese manufacturers successfully navigated similar barriers in the 1980s. “These Chinese companies are at the early stages of globalizing their operations, not just their sales,” MacDuffie explains. “Even though we’ve seen examples of it from virtually every incumbent automaker, we know it’s not automatically a fast or easy process.”

For Europe, Chinese manufacturers are pursuing a comprehensive continental strategy. BYD’s plant in Hungary, Chery’s joint venture facility in Spain, and BYD’s \$1 billion investment in Turkey demonstrate both the scale and sophistication of this approach. “As part of a global strategy, it would make sense for Chinese manufacturers to find a foothold in Eastern Europe,” MacDuffie notes. “But we’re seeing them move beyond that to establish a presence across the continent.”

The Turkish investment is particularly strategic, as the country’s customs union agreement with the EU means vehicles produced there can enter European markets tariff-free. Similarly, plants in EU member states like Hungary provide both manufacturing advantages and barrier-free access to the European market. “The pattern we’re seeing is similar to how Japanese manufacturers expanded their European production footprint in the 1980s and 1990s,” MacDuffie observes, “but the pace of announcements and investments is much faster.”

One promising approach involves what MacDuffie calls “regionalization” rather than pure globalization. “China has been a low-cost producer for a long time, but what has happened is, in the US, lower-cost vehicles and production come from Mexico. In Europe, they come from Eastern Europe. And in Asia, they come from China, and to some degree, from Thailand and increasingly, Vietnam.”

This suggests a three-pronged regional approach: For Europe, Eastern European countries offer particularly attractive manufacturing locations. For North America, Mexico remains appealing despite Trump’s threats of 200% tariffs on Chinese-owned plants there. “While being in Mexico, they could sell into the Latin American market, which they’ve already started to do,”

Over about a decade, China went from way behind to way ahead



MacDuffie notes. “They could be basically well positioned if the political environment changes for the US.”

Southeast Asia represents a particularly promising frontier. “Thailand became the leading Southeast Asian export hub for Japanese manufacturers,” MacDuffie explains. “But according to recent research, some of those plants have been closed or scaled back because of the rise of both Chinese production and Chinese imports.” Vietnam presents another attractive option, though MacDuffie cautions that electronics manufacturing might take precedence there initially. “Vietnam is the next attractive Southeast Asian production base, but I think it’s probably going to attract electronics first, like Apple’s opening factories there.”

Supply chain considerations

The key to success, MacDuffie notes, lies in developing not just assembly plants but complete manufacturing ecosystems. “The biggest challenge isn’t building the factories—it’s replicating the supply chain advantages these companies enjoy in China,” he notes. This suggests that Chinese manufacturers should focus their investments in regions where they can build or tap into existing supplier networks.

MacDuffie suggests that Chinese manufacturers might need to think beyond simple tariff avoidance. “You can still do cross-shipment of vehicles from Mexico to Africa. You can have a more diversified footprint, which is what most established manufacturers have done.”



These Chinese companies are at the early stages of globalizing their operations, not just their sales

This global production system would allow Chinese companies to optimize production based on market conditions and trade policies while building the kind of international presence that could help reduce political resistance in key markets.

“The question isn’t whether to go global,” as one BYD executive told MacDuffie, “but how to do it sustainably and successfully.” The answer, it seems, lies in patient, strategic investment in key regions while building the political and business relationships needed for long-term success.

Tesla’s position illustrates the complexities of modern automotive trade. The company has pursued what MacDuffie calls “a very savvy” approach to China, becoming the first foreign automaker allowed to operate a wholly-owned factory there. While import barriers might benefit Tesla’s US production, they could also impact its ability to optimize its global manufacturing network.

“Tesla builds cars in China to sell in China. They build cars in the US to sell in the US. They build cars in Europe to sell in Europe,” MacDuffie notes. “They’ve achieved a kind of geopolitical and geographic advantage through past moves that gives them some protection from trade tensions.”

The battery battle

Perhaps nowhere is the tension between protection and innovation more evident than in battery technology. China dominates the battery supply chain, from raw materials to finished cells. But MacDuffie sees opportunities for change.

“The US, I think, has enough lithium, although it needs time to mine it,” he says. “The new battery chemistries, including the one that CATL pioneered, use more abundant materials. So there’s not really a permanent stranglehold based on mineral access—it’s more about catching up in manufacturing capability and scale.”

MacDuffie sees several possible paths forward. One scenario involves Chinese manufacturers following the Japanese playbook of the 1980s by establishing US production facilities. However, he notes that today’s political climate makes this more challenging.

“It would be very interesting if the US were to let BYD come to the US and build—they could require it to be a joint venture, for example. That would be taking a page out of the Chinese playbook and reversing it,” he suggests.

A more likely scenario may be continued regionalization of the auto industry, with different manufacturers dominating different markets. Perhaps the most crucial consideration is how trade barriers might affect the global transition to electric vehicles. “There’s concern about the affordability of electric vehicles, and the Chinese EVs are both very good and considerably cheaper,” MacDuffie notes. “At some point, you have to weigh the costs of protection against the broader goal of accelerating EV adoption.”

The ultimate resolution may depend less on trade policy than on technological advancement. “It’s still a fluid technological space,” MacDuffie notes. “The breakthroughs could come from China, but they could come from somewhere else. That’s another piece of what makes this situation so complex and dynamic.” ■

Does a billion dollar valuation equal success?

The global unicorn ecosystem has entered a new era where success needs to be redefined and paths re-navigated due to both the AI technology revolution and current geopolitical uncertainties



By Teng Bingsheng, Professor of Strategy at CKGSB

The total number of unicorns—a non-listed company with a market value of over \$1 billion—globally continues to grow, albeit more slowly than before, and artificial intelligence (AI) is undoubtedly the biggest sector for opportunity in the unicorn ecosystem at the moment, with the AI wave driving much of the growth. The total number of unicorns worldwide is now, conservatively, approaching 1,300 across 53 countries, with a cumulative valuation of \$4.5 trillion.

The number of companies in China qualifying as unicorns has stabilized after a sharp decline in recent years, but structural adjustments are ongoing. China has been home to the second largest number of unicorns, behind the US, for years, but the number of newly minted unicorns in China in 2024 fell to a near-decade low. It should be noted that the number of Chinese unicorns as estimated by foreign

and domestic data platforms varies greatly due to the differences in information sources. The data discrepancy essentially reflects a “geo-split” in global innovation perceptions, with the trust and standards gap between China and the US, as well as the global capital markets, becoming wider and wider.

Whatever the case, the total number of unicorns in China remains significant, showing resilience and growth potential in certain sectors, including electronics and information, automotive and transportation, advanced manufacturing and healthcare.

Beyond the US and China, India and Southeast Asia, both benefiting from huge demographic dividends, accelerating digitization and a shift in some global capital, are emerging as new unicorn growth hotspots, demonstrating strong market potential and innovation vitality.

China’s newer unicorns have mainly been distributed across science

and technology and strategic emerging industries such as AI, robotics, new energy, semiconductors, biotechnology, etc., reflecting the trend of transitioning from business model innovation to technology-driven transformation, as well as the demand for domestic innovation to cope with external pressures.

State-owned capital and domestic tech giants are continuing to play a major role in financing, characterized by innovation-driven high technology development and deepening industry chain integration. Although the upward trend in valuations has slowed down, headline innovators have continued to acquire capital, signaling that China’s physical technology and digital economy both still have strong growth potential.

Additionally, impact investing, which focuses on social and environmental outcomes, is gaining traction and investor preferences have also shifted from “growth

at all costs” to a greater focus on profitability and sustainable business models.

Further shifts in China’s unicorn ecosystem

China’s venture capital (VC) market has generally been on a downward trend in recent years due to economic uncertainty and changes in the domestic regulatory environment. The amount of foreign VC funds in China has also dropped due to friction with the US. China’s VC/private equity (PE) market did see a year-on-year increase in Q1 2025 compared to the same period the year before, but it was also down from the previous quarter.

In line with these trends, investment in China’s unicorn ecosystem is changing. There has been a growth in domestic capital involvement, with the leading AI and semiconductor chip companies—such as Smart Spectrum AI, Step Star and Cheung Kong Storage—receiving huge financing from industry funds. And with the establishment of the National Venture Capital Guiding Fund (NVC GF) there has been an uptick in both state capital involvement and industrial capital injections, with the state usually taking a larger role than private enterprises.

Unicorn development is becoming one of the main battlefields in China’s new round of industrial upgrading and regional economic transformation. The 2025 government work report, for the first time, proposed to “support the development of unicorn enterprises and gazelle enterprises.” The policy advocates for the idea of “patient capital”—investment with a longer-term focus—as a growth mechanism for investment in future industries such as bio-manufacturing, quantum technology, embodied intelligence and 6G, and also promoted the accelerated incubation of hard technologies.

Another document produced by the State Council in 2025 also provided guidelines for the high-quality development of government investment funds at the national level. Both of these policies will continue to influence the development of China’s unicorns, with the end result being a smaller number of higher quality unicorns.

Although the number of new unicorns in China is not as remarkable as it once was, the number of investment deals in startups has increased for four consecutive quarters, and demonstrates a market trend of “investing early, investing small, investing long-term, and investing in technology” which has become more common over the last year. It also reflects the paradigm shift in the VC market.

The AI wave

In 2024, generative AI was the main area for growth in technology development, while at the same time growth of AI penetration in industries such as drug discovery, robotics and software engineering accelerated. According to Pitchbook and CB Insights, global VC investment in AI reached a record of more than \$100 billion in 2024.

Moving into 2025, AI is no longer just a popular sector in and of itself, but is now the underlying technology behind development across almost every industry. The birth of coming unicorns will be highly dependent on the breadth and depth of each company’s AI strategy.

Nearly half of the new unicorns minted since 2024 have come from the AI space, and in Q1 2025, 58% of total global VC investment went into AI startups, more than double the 28% in Q1 2024. In North America, this concentration is even stronger, at over 70% of investment being applied to AI. The global AI sector drew in \$73.1 billion in investment in Q1, already over half of the total for the entirety of 2024, with OpenAI’s \$40 billion in funding being particularly notable.

The US maintains its AI leadership in large model development (GPT Series, Grok, etc.), artificial general intelligence (AGI) exploration and technology commercialization, thanks to its strong fundamental research, top talents and mature VC ecosystem. As a result, high value AI unicorns frequently emerge in the country, and companies such as OpenAI, Anthropic and xAI continue to attract huge amounts of capital (they are also the unicorns with the largest amount of financing and the fastest valuation increases in recent years). More than half of the top 10 emerging unicorns globally in terms of valuation in Q1 2025 were AI startups.

While catching up quickly, China is focusing more on the application of AI (to serve its huge domestic market), algorithm efficiency optimization (to cope with arithmetic limitations, DeepSeek being a good example) and the construction of an open-source development ecosystem (to accelerate the popularity of the technology).

As a result of the country’s national strategic priorities, AI+ has accelerated its penetration in manufacturing, transportation and other fields, and Chinese startups in the field of AI macromodeling, such as Smart Spectrum AI and Baichuan Intelligence, have rapidly developed into unicorns after just three years of existence. These companies have also been highly attractive for VC/PE activity, as well as state-owned capital, for instance, Smart Spectrum AI has received more than ¥1.8 billion in strategic financing, and filed to start its IPO process in April 2025.



AI has not only become a new high ground for capital accumulation, but cutting-edge AI technology has also empowered downstream industries such as healthcare, finance and new energy to dramatically shorten their innovation cycles. The proliferation of low-cost, high-performance AI models may provide new innovators with the opportunity to develop differently, giving rise to “lean unicorns”—AI-enabled, small-team, high-efficiency innovation companies (e.g., “3-person unicorns”). On the other hand AI companies that rely on high-cost proprietary models may now find it more difficult to grow.

But, despite the already huge financing and ultra-high valuations in the field of AI, investors are still under pressure to accelerate their involvement in the sector, thanks to both expectations of rapid technological development and a general fear of missing out from capital markets. But given the already high costs of entering or expanding the market, a growing concentration of investment could lead to valuation bubbles, particularly because many AI unicorns still have unclear business models, an inability to turn a profit and lack a technology moat.

The AI investment boom has sparked fears of another generation of “zombie unicorns”—companies that were once valued at more than \$1 billion but have now seen their value shrink dramatically. This phenomenon was particularly pronounced during the post-pandemic financing rebound in 2021, when a large number of companies were severely overvalued. Some investors are also concerned that making large bets without a clear path to return on investment could distract startups from building sustainable business models, and the phenomenon of “AI Washing” (pseudo AI concepts) also needs to be guarded against.

AI alone is no longer the key to unicorn development, and the capital market urgently needs to shift from investing in concepts to investing in application and in income. Building robust technical leadership, focusing on core business and realizing commercialization will be the key to future success.

Industry focus

Tech-driven industrial upgrading will dominate the new cycle of global unicorns, with fields such as AI, robotics, semiconductors and new energy among those that will continue to breed these businesses. So far in 2025, the more active areas of entrepreneurship, investment and financing in China have mainly been semiconductors and AI in the electronics industry; new materials development and robotics in advanced manufacturing; medical devices and biomedicine in healthcare; and new energy sources.

Technology will continue to empower and transform traditional industries at a fundamental level, and cross-border integration and innovation will give rise to more new business forms and types. In recent years, throughout the global unicorn ecosystem, the commercialization of large AI models has become a key trend, while in China’s domestic market humanoid robots and embodied intelligence, new energy, semiconductors, commercial aerospace, the low-altitude economy and other fields have also attracted

China’s newer unicorns have mainly been distributed across science and technology and strategic emerging industries



investment. But while market potential is huge, competition is extremely fierce, particularly given the dominance of some firms in the production of foundational models.

Application-level AI innovations are now blossoming, and the birth of new unicorns is mainly coming from startups in programming (e.g. Anysphere), data centers (e.g. Global Switch), basic modeling and search (e.g. Perplexity), as well as in some other vertical application areas, which are more reliant on a deeper understanding of specific industry issues.

This year has also seen AI become one of the biggest trends for SaaS developers, who are integrating AI agents and other related applications into solutions to handle labor-intensive tasks.

AI technology iteration speed also means that the chance of being overtaken by a new startup is quite high, and the birth of future AI unicorns will be more concentrated in a small number of enterprises that have a wider array of comprehensive strengths.

In the future, as AI technologies mature and become increasingly differentiated, AI investment will become more rational, shifting from chasing generic large AI models to focusing on vertical industry applications, AI infrastructure optimization and easily explainable/reliable AI technologies.

The convergence of AI with other technologies (e.g. AI + biomedicine or AI + materials), synthetic data and other areas is also giving rise to new opportunities. The use of AI for enterprise digitalization is also expected to be under huge demand, especially overseas, where the enterprise service sector remains a rich vein for future unicorns to pursue.

Against the backdrop of Sino-Western technological competition as well as the global response to climate change,

physical technologies or ‘hard’ sciences will see greater competition and growth. Semiconductors and autonomous control systems, new energy and energy storage, high-end manufacturing, biotechnology, green technologies (such as carbon capture and sustainable materials) and healthcare, among others, will all have a greater impact on livelihoods and sustainable development, and will therefore continue to be favored in both policy direction and capital application.

China is already a global leader in new energy and autonomous driving, with a huge market backed by a complete industrial chain, and, as a result, a large number of unicorn companies. Intelligent manufacturing has become key to China’s industrial upgrading and self-reliance strategy, with humanoid robots/embodied intelligence the future of industrial and service industries, as well as in other scenarios.

Since the beginning of this year, boosting domestic consumption has also been highly prioritized at the policy level. Relying on the huge domestic market and developed digital economy, new consumption/retail will be characterized by active business model innovation, as seen in the success, last year, of the game Black Myth Wukong, which led to a boost in consumption and the creation of a unicorn in the form of its developer Game Science.

In addition to the above areas, quantum computing, space technology, brain-computer interfaces, synthetic biology and next-generation computing platforms may also become home to the next wave of disruptive unicorns.

Comparing US-China development

The US remains the global leader in unicorns, with over 700, as well as being home to over half of the world’s VCs as of 2025. China, second in the number of global unicorns, is seeing a slowing growth rate, both due to policy impacts and the impact of the changing external environment, as a result valuation structure and market expectations are being adjusted. Although they are the

world’s two largest cultivators of unicorns, the differences in the development of the China and US ecosystems is stark, and this is leading to something of a parallel, rather than joint, development trend.

Increasing global trade barriers, coupled with a rise in geopolitical risk, is not only changing capital flows, but also lowering the available dividends of globalization. As a result, unicorns with a domestic focus on supply chain integration, particularly in China, will likely have easier access to financing and more resilient valuations. On the other hand, unicorns that are highly dependent on older global trade patterns, especially US-China trade, may face difficulties with financing and downward pressure on valuations, forcing them to adjust their market strategies.

International capital tends to be cautious about investing in China, and US dollar VC into the country has retreated rapidly—with some of this capital shifting focus to emerging markets such as India and Southeast Asia. Tightening of national security-related vetting in the US affects cross-border M&A and tech investment, while China’s domestic financing is becoming increasingly dependent on state-owned capital or incumbent tech giants. Overall, global capital flows are showing increased geopolitical sensitivity and regional fragmentation.

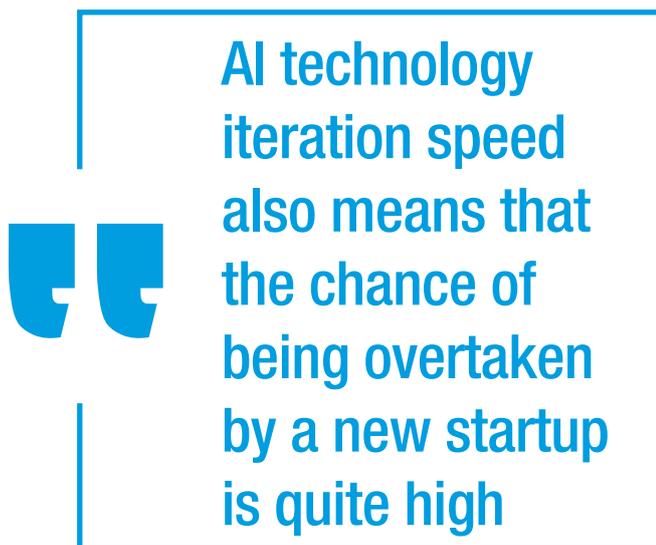
The competition in science and technology between the US and China has pushed the latter to accelerate its own R&D investment and pursue greater domestic substitution, leading to China’s new unicorns being concentrated in tech fields that reflect the country’s policy orientation towards strategic emerging industries and independent control of key technologies.

The US-China rivalry is also directly impacting and reshaping the overseas strategies of Chinese companies, which are facing greater geopolitical and compliance challenges and may choose to refocus more on deepening their domestic market presence. Tariffs are increasing costs, stricter investment reviews are discouraging M&A and investment, data security concerns (as shown by the TikTok case) can lead to potential bans or operation restrictions in the US and some of its allied markets, and a lack of political trust creates an unfriendly business environment.

Influenced by the geopolitical atmosphere, Chinese brands in the European and American markets are facing trust deficits and public opinion challenges, and some of the unicorns have to weaken their Chinese attributes and adopt different packaging or localized team operations to cope with the situation.

Those Chinese unicorns that choose not to refocus on the domestic market are shifting the focus of their overseas strategy from Europe and the United States to emerging markets such as Southeast Asia, the Middle East, Latin America and Africa. These regions have more preferable policies, are undergoing accelerated digitalization and are often more receptive to Chinese technologies and products.

Thanks to the significant US capital investment decline, Chinese unicorns now need to seek capital support in other regions such as the Middle East and Southeast Asia to raise money in



AI technology iteration speed also means that the chance of being overtaken by a new startup is quite high

international markets, or even seek new channels for overseas listings (e.g., London, Hong Kong).

The US-China trade friction is also forcing China's offshore unicorns to improve their compliance, risk management, localization and global supply chain capabilities. In the future, the ability to establish brands in emerging markets, realize technology and model exports and integrate into the global industrial chain will determine the position of Chinese unicorns in the global innovation landscape.

The strengths of China's unicorn ecosystem lie in the country's huge domestic market and opportunities for business model application, rapid commercialization and iterative capabilities. A huge bonus is also the large amounts local local talent, efficient infrastructure, strong government support and industry guidance capabilities.

The main challenges today are the need to break through key core technology bottlenecks, cope with regulatory uncertainty, enhance capital market maturity and deal with external pressures from geopolitics. Compared with the mature multi-level capital market and active M&A ecosystem in the US, the maturity of China's capital market and possible exit mechanisms are yet to be perfected.

Although policy direction is encouraging "patient capital" and optimizing exit channels, the exit paths for unicorns in China are still relatively limited, which in turn may affect the incentives for early-stage investment and the efficiency of unicorn development. This requires further active promotion of capital market reform at the policy level to broaden financing and exit channels for technology-based enterprises.

Value Chain Reconstruction

Compared with the previous consumer Internet revolution, the new generation of unicorns faces a longer R&D cycle, higher capital investment requirements, a more complex industrialization path and a stricter regulatory environment, requiring more patient capital and teams with industrial background knowledge.

The number of founders with scientific or engineering backgrounds has increased in the hard science and technology sectors, but to make up for any business shortcomings many are bringing in professional teams for commercialization, market expansion, organizational management, etc. These companies, more importantly, also need an innovation culture that tolerates failures and institutional safeguards that truly respect intellectual property rights.

As ideas of "regionalized innovation" and "de-globalization" grow, unicorns need to balance global expansion and local cultivation, and adapt to supply chain restructuring and policy divergence.

US-China competition and global geopolitical uncertainty will continue to affect capital flows, technology cooperation and market access, which may lead to further fragmentation of regional innovation ecologies (e.g., the formation of parallel ecologies between China and the US in certain science and technology

Thanks to the significant US capital investment decline, Chinese unicorns now need to seek capital support in other regions such as the Middle East and Southeast Asia



fields), and supply chain security and autonomy have become important considerations for companies and countries.

Enterprises need to incorporate geopolitical risks into day-to-day management and build more resilient global operation strategies and supply chain systems. The importance of regional markets and localization strategies will continue to increase.

US-led trade protectionism will accelerate China's economic integration within Asia. Asian economies will focus more on strengthening intra-regional supply chains, logistics systems and trade governance, as evidenced by the advancement of the trilateral trade agreement between China, Japan and the Republic of Korea, which suggests that economic pragmatism is driving trading partners to seek more reliable and predictable regional linkages.

Accelerated regional integration will also give rise to new business opportunities, particularly in the areas of trade infrastructure and digital trade. Those unicorns that are able to keep up with these changes, quickly adjust their strategies and build their core competencies are expected to occupy a favorable "ecological niche" in the new global landscape and continue to grow.



Clarifying the value and significance of unicorns

If a company's only label is that of a unicorn, rather than one that solves real problems and creates sustainable value, then it is at best just a token in the capital game.

The future of China's unicorn ecosystem will no longer see rapid growth in terms of quantity and valuation, but will focus more on the quality of development, the degree of technological sophistication, the deep integration of the industrial chain and the ability of a company to strategically position itself in the global value chain.

Unicorns that can thrive in the face of adversity are the most resilient and evolutionary part of the ecosystem. The super unicorns of the future will not only disrupt the technology or business model norms, but also help write the "rules of the game" of the industry.

Against the backdrop of the current emphasis on "patient capital" and new productive forces, the development of unicorns (especially in strategic emerging industries) is of critical importance to China's transformation and upgrading of its industrial structure to an innovation-driven one, and is a key reference for measuring and driving the vitality of innovation.

These high-growth enterprises often represent technology-intensive, knowledge-intensive, high-value-added emerging industries, and are a manifestation of the development of new quality productivity. They not only create high-quality jobs, promote a new employment structure and mobility of talents, but also lead the digital transformation of traditional industries and have the potential to become a new growth pole driving the coordinated development of the regional economy.

The strategic transformation of the innovation paradigm also has its own pain points. Advanced manufacturing, medical

technology and other hard science and technology areas that require long-term R&D investment and high technical barriers will play a more central role, as business model innovation alone may not produce unicorns as easily as in the past. Unicorns in the field of hard science and technology are slow to commercialize, and their cultivation requires more patience and deeper knowledge accumulation, making it difficult to achieve explosive growth in quantity in the short term.

At a time when national strategic guidance plays a key role in development, the market-based innovation mechanism and vitality represented by unicorns are still indispensable. The agility and efficiency of great startups, their quick response to market needs, and their flexible innovation model are difficult to fully replace with top-down planning.

Focusing on the unicorn ecosystem is not just about the myth of wealth or the iteration of business models, but also about observing and thinking about how to better realize the organic combination of "active government" and "effective market" under the guidance of the national strategy to ensure the diversity and continuous endogenous impetus of the business innovation ecosystem. It is also to observe and consider how to better realize the organic combination of "effective government" and "effective market" under the guidance of national strategy, so as to ensure the diversity of business innovation ecosystem and sustained endogenous momentum.

The future belongs to innovators who can see trends, remain resilient, and create sustainable value in a complex and changing environment. 

(Note: Unless otherwise indicated, all relevant data in this paper are as of May 2025)

INTERNATIONAL BUSINESSES IN CHINA



With growing competition from local players and an increasingly discerning consumer base, international firms need to make changes in order to succeed in the country

By John Reid

There are still opportunities for international businesses in China, but it is now harder to keep up

Tesla's story in China captures the paradox facing international businesses today. Once celebrated as the country's electric vehicle darling with more than 16% market share, Tesla now finds itself squeezed by nimble local competitors like BYD and NIO—yet it still relies on its Shanghai Gigafactory for much of its global profitability. China has become at once the most vital and the most formidable market for global firms: too important to abandon, yet increasingly difficult to win in.

This tension defines the current landscape for international businesses in China. While traditional sectors are seeing retrenchment, investment in advanced manufacturing, renewable energy and professional services is quietly expanding. A strategic repositioning is taking place in China, as firms recalibrate their roles within the country's evolving industrial and consumer ecosystems. The question is no longer whether or not to be in China, but how to thrive here.

“The competitive landscape in China has transformed dramatically over the past decade. Chinese companies have become faster, more innovative, and far more sophisticated—particularly in areas such as digitalization and AI,” says Eric Zheng, President of the American Chamber of Commerce – Shanghai (AmCham Shanghai). “Where international firms once competed mainly on quality and brand, they now face agile local players who deeply understand the market and move with remarkable speed. Success in China today requires not only global expertise, but also local adaptability and a sharper focus on innovation and execution.”

International firms in China

Over the past 15 years, the nature of foreign investment and business involvement in China has evolved dramatically—from low-cost manufacturing toward services and high-tech industries. In the 2000s, firms such as BASF, Volkswagen and Samsung used China as a global production base, underscoring its role as the world's factory. But since the 2010s, multinational companies have increasingly focused on

China's growing consumer market and technology ecosystem, deepening their presence in areas like R&D, retail and digital services.

Foreign direct investment (FDI) tells a mixed story of international engagement in China, and recent trends point to a significant cooling after years of steady expansion. Official data show that utilized FDI peaked at around \$189 billion in 2022 before falling to \$163 billion in 2023 and \$116 billion in 2024, reversing the momentum of the previous decade. The drop reflects weaker global sentiment, geopolitical tensions and slowing domestic demand, while World Bank figures—showing just \$18 billion in net inflows for 2024—highlight the divergence between China's “utilized FDI” and international accounting standards.

But despite cooling investment, FDI today is concentrated in high-tech manufacturing—such as electronics, renewable energy and medical devices—and in modern services including IT, logistics, finance and professional consulting. A shift that aligns with Beijing's emphasis on high-quality growth and industrial upgrading. Companies like BMW, Siemens and ABB are investing in smart manufacturing; Amazon Web Services and SAP are expanding digital and cloud centers; and healthcare leaders like Johnson & Johnson and GE Healthcare continue to grow their R&D hubs. Together, these trends mark China's move up the value chain toward innovation-driven, service-oriented investment.

“Taking our German companies as an example, the time of China being a mere extended workbench for these firms is long over,” says Oliver Oehms, Executive Director of the German Chamber of Commerce in China – North China. “They are not manufacturing low-quality products here, but very competitive products that meet global standards. Therefore, the role of China has changed big time.”

Changes and challenges

Over the past five years, a number of different factors have made China a more difficult place to operate and succeed for

international firms, both macroeconomic and structural.

“The first challenge has been the economic slowdown, at least in some important sectors where we have seen strong growth in the past,” says Oehms. “The second one is the emergence of very strong and competitive Chinese firms serving their own market, which is fully understood, but obviously this is giving a harder time to international companies than they were used to in the past. And last but not least, a more structural challenge: some regulatory shortcomings.”

Chinese companies that were once seen only as imitators have become powerful competitors across nearly every major industry. In sectors from consumer electronics to electric vehicles, domestic leaders such as Huawei, Xiaomi and BYD now dominate both the Chinese and global markets, while e-commerce giants Alibaba, JD.com and Pinduoduo continue to dominate at home.

Supported by scale, speed and favorable policy conditions, these so-called national champions have transformed China’s business landscape, leaving foreign firms to contend with rivals that enjoy cost advantages, rapid innovation cycles and deep market insight.

For international players, the bar for competitiveness has been raised by competitive pricing by local brands, but at the same time they are increasingly capturing younger consumers through sharper cultural relevance and digital agility. At the same time Chinese biotech firms and luxury labels like Shang Xia—a luxury fashion brand backed by Hermès—and Icicle—a high-end eco-friendly clothing brand—are expanding their global footprint.

“There are always many challenges, but from my experience the biggest challenge today is rising local competition,” says Bowen Han, Senior Consultant at strategy consultancy Sinolytics. “This can be surprising to small- and medium-sized enterprises who often fail to realize how much Chinese companies have leveled up recently. European companies, in sectors traditionally dominated by them, often

The biggest challenge today is rising local competition

Bowen Han
Senior Consultant
Sinolytics



assume that they have a technological advantage. In many areas, Chinese players from SOEs to private companies have nearly closed the tech gap.”

The regulatory environment in China has also been evolving rapidly, reflecting both domestic policy priorities and global geopolitical pressures. Beijing has continued to refine its negative list for foreign investment, expanding access in sectors such as professional services, while tightening scrutiny in strategic areas like AI, semiconductors and dual-use technologies.

Among the new regulations are requirements for foreign players in certain high-tech industries to submit more detailed operational plans, disclose partnerships and IP use and comply with stricter cybersecurity and data localization rules.

“Changes in policies, technological shifts and demand patterns reinforce one another,” says Edward Tse, CKGSB Professor of Managerial Practice of Strategy and founder and CEO of Gaofeng Advisory. “Once this interaction reaches



a certain threshold—triggered by a major policy change or a technological inflection point or a combination—the market and competition undergo a fundamental and often abrupt shift. These inflection points frequently catch non-Chinese companies unawares, forcing them to reevaluate their strategies or risk being displaced.”

Trade tensions and tariff pressures create another layer of complexity. Since 2023, US measures such as the expanded Foreign Direct Product Rule and “AI diffusion” restrictions have limited Chinese access to advanced chips, AI hardware and cloud computing technologies, meaning that companies like Nvidia have had to produce lower-performance chips for the Chinese market, reducing potential revenues by an estimated \$2.5 billion and prompting adjustments to supply chains and product forecasts.

“The greatest challenge today lies in navigating geopolitical uncertainty amid escalating trade tensions,” says Zheng. “To succeed, companies must be prepared to withstand geopolitical volatility and remain committed to a long-term China strategy. Effective localization—combined with sustainable contingency planning—will be essential to ensuring resilience and success in this evolving environment.”

Staying competitive in China

Despite the growing number of challenges

that international firms face in China, China’s push to strengthen domestic innovation and industrial upgrading provides opportunities for foreign companies that understand the multifaceted approach that China’s market now requires.

Companies must localize their products and branding to resonate with Chinese consumers’ preferences and cultural nuances. Success increasingly depends on investing in innovation and R&D within China, allowing firms to tailor offerings to local needs while benefiting from the country’s talent pool and advanced research infrastructure.

“Successful firms do not lean on their existing technology developed outside of China,” says Han. “If you do that, you will be thoroughly surprised by the ‘China speed’ of local competitors. Successful companies constantly adapt and evolve, often with localized R&D.”

Equally important is building partnerships and integrating into local ecosystems, from suppliers to technology platforms, to leverage existing networks and enhance market reach. At the same time, firms must demonstrate regulatory flexibility, staying agile in response to shifting rules and compliance requirements.

“In the last few years, we have been observing a third wave of localization—what we call Localization 3.0,” says Oehms. “German companies now reflect

a fully integrated value chain in the Chinese market, not only buying supplies locally but also conducting research and development—something that typically was done back home. Many are now developing, manufacturing and selling their products locally: purely Chinese-engineered, Chinese-driven and Chinese-powered operations, and while effectively made in China, they still have German DNA and legacy attached to them.”

Finally, digital adoption—from e-commerce channels to AI-driven marketing and operations—remains a critical lever for reaching consumers, optimizing performance and maintaining a competitive edge in one of the world’s most dynamic markets.

“Embracing digital and AI-driven innovation is very important to stay competitive,” says Zheng. “Chinese competitors are setting the pace in technology adoption, so keeping up requires real investment in data, automation and consumer insight.”

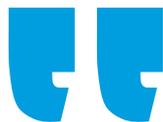
A competitiveness framework

For international executives assessing their future in China, the question is no longer just whether competition is intensifying—it’s whether their own business model can keep pace. Companies can evaluate their China competitiveness across four dimensions: speed of innovation, differentiated technology, brand and market positioning and organizational adaptability.

For example, if a firm’s product cycle exceeds six months while Chinese rivals launch updates every quarter, its innovation speed is likely uncompetitive. If market share has declined by more than 30% in two years and the brand no longer ranks among the top three in its category, it may be time to fundamentally reconsider the local approach. Meanwhile, firms that still command unique technology advantages—typically two to three years ahead of domestic peers—or occupy premium consumer segments can still thrive by emphasizing expertise, trust and long-term value.

This type of structured assessment turns strategic reflection into a practical tool:

The first challenge has been the economic slowdown, at least in some important sectors where we have seen strong growth in the past



Oliver Oehms
Executive Director
German Chamber of Commerce in China—
North China

a way to distinguish between temporary challenges and structural disadvantages, and to decide whether to double down, restructure or pivot within the China market.

Future opportunities

China remains the world's second-largest economy and its largest consumer market in many categories, and as a result there are still opportunities for international firms across a number of existing and several newly growing industries.

China's rapidly aging population is driving strong, long-term demand for healthcare products, services and eldercare solutions, making the sector one of the most promising for foreign firms. With over 22% of citizens already aged 60 or older—a share expected to reach nearly 35% by 2050—rising incomes, broader insurance coverage and initiatives like Healthy China 2030 are fueling healthcare spending and innovation. At the same time, a vibrant silver economy is emerging, as tech-savvy, health-conscious seniors increasingly seek premium lifestyle, wellness and digital services.

“Personally, I believe hospice care is a very promising area,” says Han. “China has a rapidly aging population which will become the largest global market by far. Policy is moving in a favorable direction with hospice care starting to be incorporated into public health insurance. Currently the market is still not crowded, with only one major domestic supplier offering low-cost service.”

China's evolving regulatory landscape and growing focus on a green transition also create fertile ground for specialized professional services. Niche advisory firms—particularly those focused on ESG consulting, regulatory compliance and global expansion strategy—can offer critical expertise to both domestic companies and foreign investors navigating the market. As businesses look to align with regulatory requirements, pursue cross-border growth or implement ESG strategies, demand for high-quality, specialized advisory services is increasing.

“Consulting firms are seeing tailwinds

Changes in policies, technological shifts and demand patterns reinforce one another

Edward Tse
Founder and CEO
Gaofeng Advisory



as global trade tensions drive demand for advisory, compliance and due diligence services from companies trying to navigate China's complex environment,” says Zheng.

In addition, there are also opportunities to learn in the China market and export that expertise elsewhere. Many companies outside China are eager to replicate the efficiency, scalability and customer-centric innovations pioneered in the Chinese market and utilize them elsewhere. Firms that can translate these insights into actionable strategies for global clients stand to benefit from China's dual role as a source of inspiration and a partner in digital transformation.

“We see German companies looking into using China as a hub for the region—Asia, Southeast Asia, the Middle East, Africa—where there are untapped opportunities,” says Oehms. “Don't misjudge China purely as a place for selling products, but as a place to learn from AI, e-commerce and digital platforms. Why not come here to see how we can benefit from these capacities and experiences?”

From China to the world

There is no doubt that, over the last decade, the China market has become a more challenging place for international firms to find success, thanks to growing competition from local companies, global trade

and geopolitical frictions and domestic regulatory changes. But while success in China cannot be taken for granted, there are still opportunities for companies that look to innovate locally, integrate into ecosystems and anticipate shifts in regulation and consumer behavior.

“I believe it is still a good decision to enter the Chinese market, for a very simple reason: if you don't come to China, China will come to you,” says Han. “Chinese companies will come to your home market eventually, so why not come, compete and be prepared.”

Rather than being passive participants, there is a need to co-create with China. In this sense, international competitiveness in China is not about beating domestic rivals at their own game, but about finding complementary niches and leveraging global strengths while embedding deeply in local realities.

“As companies, regardless of where they are headquartered, look for new sources of competitive advantages in the new and evolving world, we would also expect to see a rise in cross-border corporate relationships—spanning partnerships, joint ventures, alliances and acquisitions—aimed at creating more competitive advantages,” says Tse. “The interplay between market development and competition in China is reshaping businesses across the world.”

The AI boom and dot-com bubble

There are a number of similarities between AI company valuations now and those of tech firms before the dot-com bubble burst, but this time around it is possible to avoid another value collapse



by Ouyang Hui, Dean's Distinguished Chair Professor of Finance and Senior Associate Dean at CKGSB;
Zhang Ge

On 27 January 2025, NVIDIA's market capitalization fell by 17%, taking about \$600 billion off its market value and setting a record for the highest single-day loss of market value by a single company in the history of the US stock market. The trigger for this plunge was the release of DeepSeek R1, a low-cost, open-source large language model (LLM) by Chinese company DeepSeek.

In 2023, Nvidia's stock went on a tear, rising 239%, and it rose another 171% in 2024. At the time, the rocketing price of its stock caused some investors to become skeptical as to whether the company's value had peaked. Satya Nadella, CEO of

Microsoft, a major backer of OpenAI, made his concerns clear in a recent interview, "Current AI companies that don't deliver real GDP growth, and that don't have real demand to back up the products they develop, will eventually crumble and die out."

Is the current frenzy in the AI market and soaring share prices based on the true fundamentals of companies, or are they rooted in irrational exuberance?

Whatever the answer, Nvidia's massive one-day plunge is reminiscent of the bubble of the Internet era 25 years ago. When the Nasdaq index climbed to a then all-time high of 5,048 points in March 2000, Wall

Street also did not foresee that the Internet revolution, also known as the dot-com era, would have its bubble burst, cutting its market value by \$6.5 trillion within two years, with Amazon's share price at the time plummeting by 90%.

Now, DeepSeek, as a representative of Chinese companies, has not only intensified global technological competition with its potential for technological breakthroughs and cost control, but has also triggered deeper reflection in the market on the valuation bubble in the AI industry.

Does a technological revolution inevitably come with a capital bubble? Which companies were able to leapfrog

the cycle after the bubble burst and why? Despite a 25-year gap, these two waves present a profound mirror image and division in terms of market size and corporate survival logic.

With the rapid rise of Chinese companies in the global AI race and the continued expansion of global influence, this technology competition is shifting from the monopoly pattern of Silicon Valley unicorns to a diversified competitive ecology that is very different from that of the Internet era.

The dot-com era

On 9 August 1995, Netscape went public through an IPO with an EBITDA margin of -28.11% and a return on equity (ROE) of -26.14%. Throughout that day, its stock price soared from the offering price of \$28 to \$75, and finally closed at \$58.25 per share.

As the first Internet company to bring the “unprofitable but high-growth” model into the mainstream through an IPO, this landmark event is considered to be the beginning of the Internet bubble. It disrupted the traditional earnings-focused valuation system, allowing investors to start focusing on user growth, technology leadership and market potential. This trend led to a massive influx of unprofitable start-ups into the capital markets in the late 1990s, culminating in a bubble.

From 1995 to 2000, the Nasdaq soared 573% in five years, during which time iconic companies such as Amazon, AOL, Netscape, eBay, Yahoo and Google were born. At the same time, more than 1,000 Internet companies emerged in China, including Sina, Tencent and Alibaba.

On 10 March 2000, the Nasdaq reached its then all-time high of 5,048.62 points, but fell to 1,114.11 points by 9 October 2002, a 78% drop from its peak to its trough. Nearly 5,000 Internet companies in the United States went out of business during the more than two years of sustained decline.

The three giants that fell in the bubble

Yahoo’s rise and fall reflects the typical trajectory of the first generation of Internet

DeepSeek has not only intensified global technological competition, but has also triggered deeper reflection in the market on the valuation bubble in the AI industry



enterprises. As the leading portal at the time, Yahoo innovated the advertising business model by pioneering the first cascading directory navigation system—the first to transplant the traditional media advertising model to the Internet—and its advertising revenue accounted for 90% of its revenue in 1999.

However, the company failed to continuously update its business model, had a long-term fixation on a single advertising revenue structure, failed to effectively expand new business sectors (such as e-commerce and social), and due to a lack of investment in the development of key technologies lost to Google in search technology. Strategic conservatism made it unsuccessful in transforming itself in the Web 2.0 era (user-generated content) and Yahoo missed major opportunities such as the acquisition of Google and Facebook. These factors made it difficult for Yahoo to remain competitive after the Internet bubble burst. From a peak market capitalization of \$125 billion in 2000, it plummeted to around \$10 billion in two years, and was eventually acquired by Verizon in 2016 for \$4.8bn in a deal that became its landmark fall from grace.

AOL was the first company to launch a \$19.95 monthly web service in 1996, ushering in the era of the “always-on” web. The company’s “Free Trial CD” marketing strategy implemented in 1993—mailing hundreds of millions of installation CDs to potential users—helped its user base surge from 200,000 in 1993 to a total of 34 million registered users in 2000.

However, the company’s stubborn continuation of the dial-up subscription model and neglect of broadband penetration gains in later years eventually led to a massive loss of subscribers. The merger with Time Warner is considered one of the largest failed mergers in history: AOL was valued at about \$182 billion when it announced its merger with Time Warner in 2000. However, after the merger, the synergies failed to materialize due to increased cultural clashes overlaid on the neglect of product and technology transformation (especially in the broadband area), management chaos, and failure to integrate resources.

These problems led to a loss of core talent, a decline in advertising revenue, and financial pressures following the bursting of the Internet bubble, which saw its market capitalization shrink dramatically. Eventually, in 2015, AOL was acquired by Verizon for about \$4.4 billion.

Netscape launched its first commercial browser, Navigator, in 1994, which at one point held 80% market share and the company’s market capitalization soared to \$2.9 billion on its first day of trading in 1995. However, after Netscape was acquired by AOL in 1998, the company’s technological development came to a standstill as its core team left one after another due to internal management problems and cultural conflicts. Although the open source strategy gave birth to the Mozilla project, the company failed to respond to the competition in the market in time. By bundling Internet Explorer

A lack of profitability made it difficult to effectively evaluate Internet companies based on traditional financial indicators

into its operating system and adopting a free strategy, Microsoft quickly captured market share, making Netscape's business model difficult to support long-term development. Although Netscape no longer exists as a company, it drove the early development of the Internet and laid an important foundation for modern web technology.

Enterprises in the post-bubble era

During the Internet bubble period (1995-2003), although these three firms went through a cycle of rapid rise and fall, each falling into decline for different reasons, in general, it was the capital market's over-optimism towards emerging technologies and the failure of traditional valuation

models that were key factors in how things played out.

A lack of profitability made it difficult to effectively evaluate Internet companies based on traditional financial indicators (e.g. cash flow and price-earnings ratio), and led to a reliance on the "eyeball economy" and user growth. Overlaying weak company culture management, capital market mania and Fear of Missing Out (FOMO) mentality, venture capital and secondary markets are caught up in seemingly irrational expansion. It is difficult for companies to survive the market bubble adjustment phase if they are lagging behind in technology and lack a sustainable business profit model.

There are some businesses that have been among the few examples that have

survived and thrived, such as Amazon. In addition, some emerging companies at the time, such as Google, Facebook, Alibaba and Tencent, not only escaped the bubble, but also took advantage of the reshuffling period brought about by industry adjustments to achieve success.

Amazon's founder Jeff Bezos has always emphasized long-term innovation over short-term profits by diversifying its business layout and investing money in logistics network construction and technology development.

In 2006, Amazon launched its AWS cloud computing service, opening up new growth areas and gradually becoming a global leader in cloud services. During the bursting of the bubble, Amazon built up its capital reserves through multiple financings to ensure that it had sufficient cash flow to sustain its operations, which provided critical support to the company through the industry downturn.

Google didn't go public until 2004 and thus managed to avoid the speculative frenzy of 1999. During this time, the company grew steadily using venture capital, not blindly pursuing short-term expansion goals, but focusing on breakthrough search technologies.

After 2000, using the PageRank algorithm, Google replaced Yahoo at the top of the search field and established a monopoly. At the same time, the company launched AdWords (2000) and AdSense (2003), both advertising model innovations which brought the company a stable and considerable source of revenue. The strategy of developing cloud computing and AI at a later stage has resulted in a complete value chain at Google, from traffic acquisition to technology empowerment.

AI era

Core elements of enterprises across the cycle

Looking back at the evolution of the Internet 25 years ago, from the original heyday to bubble to rebirth, it followed the Gartner curve of "technology germination; expectation inflation; bubble burst; recovery and maturity." This historical cycle reveals the core features of the "survivors" of the



technological revolution: the need for sustained technological breakthroughs and a sustainable profit model, as well as a capital chain that is resistant to capital fluctuations and supported by a mature and robust governance and decision-making system. Enterprises with these characteristics can not only push through the cycle and reach a level of longevity, but the characteristics also help enterprises in the Red Ocean of competition on the Internet to break through and win.

Valuation woes persist for 0-to-1 startups

During the Internet period, a large number of start-ups managed to go from 0 to 1 in terms of technological breakthroughs. However, the exit mechanism for companies during this period was dominated by the IPO.

In 1999, for example, US venture capital investments totaled \$54 billion, 62% of which went to unprofitable companies—a typical example being Sequoia Capital, which saw outsized returns by betting on projects such as Google and PayPal and relying on IPO exits. At that time, corporate IPOs were growing rapidly, with 442 companies completing IPOs on NASDAQ in 2000 alone. However, due to the lack of stable earnings data as a valuation anchor and the difficulty in quantifying enterprise value from technological innovations, the valuation logic of these companies deviated significantly from traditional financial models (e.g., discounted cash flow method).

This contradiction makes it difficult for IPO pricing to truly reflect the core value of the company, laying the groundwork for a bubble. When the bubble burst, not only did Netscape, Yahoo and other benchmark companies fall, but also the second largest long-distance telephone company in the United States at the time WorldCom—due to blind expansion that led to the deterioration of the financial structure and bankruptcy. These cases reveal the systematic deviation of market value from the true value of firms, which is the core mechanism of bubble generation: the decoupling of capital pricing from fundamentals.

The current AI era faces a similar



dilemma. While the technology revolution has spawned the same breakthrough innovations from 0 to 1, the valuation of AI companies still lacks a proven framework to refer to. Unlike the Internet era, which relied on IPO exit paths, the current stage favors private equity financing and M&A integration (e.g. Microsoft's acquisition of Nuance, Google's acquisition of DeepMind).

However, the essential paradox of enterprise valuation has not changed—the cleavage between the far-reaching earnings potential created by technological innovation and short-term financial performance remains the central dilemma of capital pricing. This uncertainty is both driving the AI investment boom and could create a repetition of the historic valuation bubble.

ChatGPT's weekly active user base reached 400 million as of February 2025, up 33% from 300 million users in December last year. OpenAI has gone from a valuation of \$150 billion in 2024 to a valuation of \$340 billion in its latest funding round, but is on track to earn only \$11 billion in

revenue this year. And according to media analysts who have reviewed OpenAI's financial documents, the company could lose \$14 billion in 2025 and is not expected to be profitable until 2029, when revenues will reach \$100 billion. Between 2023 and 2028, the company expects cumulative losses to total \$44 billion.

OpenAI is in the strategic expansion period of exchanging losses for hegemony, and the sustainability of its profit model depends on the ability to maintain the technological generation gap and the speed of commercial closed-loop formation. If it can break through the arithmetic chains through hardware self-research and establish a profit-sharing system in vertical fields such as healthcare and education, it may be able to realize a transformation from loss to trillion-dollar market value; however, OpenAI's valuation is still based on the prediction of future cash flow, and the risk caused by this uncertainty cannot be ignored. Once it is unable to maintain the requisite technology upgrades and commercial profit model, the capital chain breaks, and we cannot rule out that it has



A lack of profitability made it difficult to effectively evaluate Internet companies based on traditional financial indicators

become a specimen of the AI bubble, nor the next Google.

DeepSeek, an industry dark horse that came out of nowhere in early 2025, has had an extremely significant impact on the market. Its disruption stems from algorithmic optimization—pushing down pre-training costs to less than 1/10th of the cost of industry models of equivalent performance, redefining AI economics. The market is sharply divided on DeepSeek’s valuation: forecasts range from \$1 billion to \$20 billion, with some even suggesting it’s worth at least half of OpenAI.

This wide variation confirms the general problem of ambiguity in the valuation system of innovative firms. Currently, DeepSeek’s core strength lies in the backing of its parent company, Phantom Square Quantitative (China’s head quantitative hedge fund). Phantom Square started stockpiling more than 10,000 NVIDIA GPU arithmetic clusters as early as 2021, allowing it to bypass the bottleneck of traditional companies relying on external financing and focus on long-term technological research and development.

The main risk now is not the pressure on the capital chain, but how to maintain the speed of technology iteration, build exclusivity barriers to improve developer retention, and the sustainability of the open source business model. The high level of uncertainty around these variables is becoming a key constraint in suppressing the valuation consensus.

Chinese companies as a historical mirror

Despite the capital frenzy that characterized

both the dot-com era and the AI era, and the commonality of startup valuation woes, there are still differences between the two.

The way Chinese enterprises participate is triggering structural changes: in the dot-com era, Chinese enterprises had a core dependence on the US-led technology ecosystem, resulting in a lack of discourse in technical standards and market rules; while in the AI era, Chinese enterprises, represented by DeepSeek and Tongyi Qianwen, are directly challenging the traditional closed-source model through engineering innovations and breakthroughs in vertical application fields. The business model is centered on “payment for results.”

For example, ChatGPT relies on a subscription system and API fees (e.g. \$20/month for premium services), while DeepSeek uses a free strategy to force competitors to lower prices or adjust their business models. This “price/performance revolution” may compress overall industry margins and trigger short-term valuation shocks.

This “cost-effective revolution” will not only impact the established order, but also give birth to a new ecosystem. The lowering of the technological threshold is attracting more participants to enter the AI vertical, promoting the expansion of the scope of application and causing the commercialization cycle to extend, so that the market adjustment may tend to ease. In the long term, the increased competition triggered by companies such as DeepSeek is essentially a dynamic game of technological democratization versus monopoly interests—injecting long-term momentum into economic development by promoting technological inclusion and productivity progress.

The inevitability of a pullback

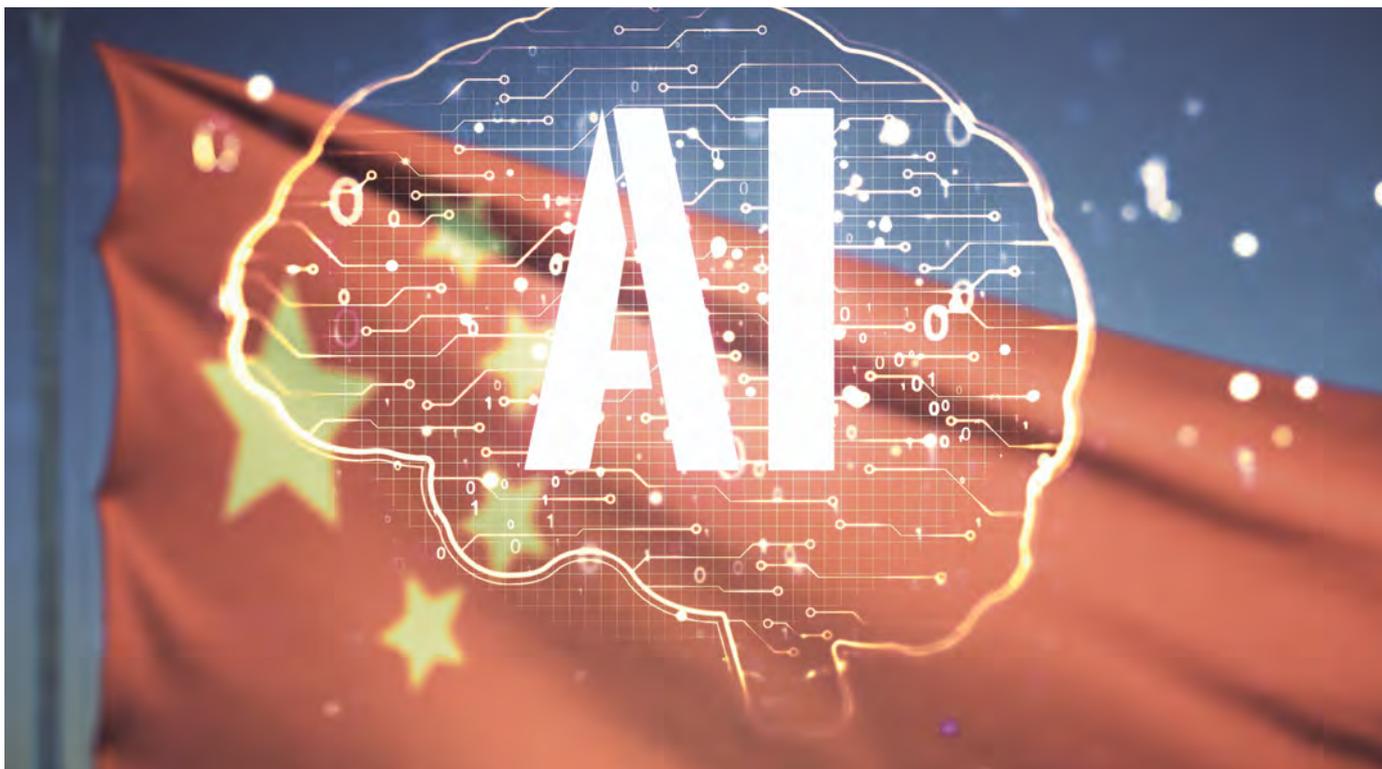
During the dot-com bubble, tightening liquidity and negative profitability models posed major risks. The 89% plunge in the net profits of Nasdaq constituents in 2001 completely exposed the vulnerability of unprofitable companies to the retreat of capital.

The current challenges in the AI market are more complex: arithmetic bottlenecks (e.g. shortage of supply of NVIDIA’s high-end chips), lagging commercialization of applications for profitability (most AI companies have yet to find a sustainable path to cash), and geo-technological decoupling (e.g. chip regulation in the US and China). This is a significant departure from the globalized technological dividend-driven growth environment of the dot-com era. Such risks are compounded by the failure of traditional financial valuation methods for innovative AI companies, and the inevitability of a bubble fueled by capital mania remains.

The fact that 80,000 AI companies have been written off in China (37% of the stock), and that Shangtang Technology’s market value has shrunk by 80% from its peak; and that Waymo’s valuation in the US fell from Morgan Stanley’s 2018 forecast of \$175 billion to the market consensus of \$30 billion by 2023, are all signals that the initial development of a technological revolution is inevitably accompanied by a cycle of valuation bubble squeezes.

However, the adjustment of the AI market will not repeat the dramatic crash at the end of the dot-com bubble, and there is a double buffer mechanism behind it: a high technological threshold and a more rational capital environment (more tech giants directly involved in AI investment). Therefore, despite the inevitable short-term valuation correction pressure, the overall market adjustment will not be as drastic as in the dot-com era.

As the market becomes more rationalized, corporate earnings patterns will stabilize in the medium term—3-5 years—and positive cash flows make valuation assessments more comparable. In the field of LLMs, the effect of market leaders will become more and more



significant, gradually forming an oligopoly pattern. In the medical, financial and other vertical scenarios, enterprises with core competitiveness are expected to take the lead in profitability, and the industry will show a polarization of “profitability at the head and elimination at the tail.”

In the long term—5+ years—AI technology could become the foundational framework for industries, and its super-automation potential (e.g., AGI, robotics) could unlock even more technological productivity dividends.

Bubbles are a by-product of the technological revolution, not the end of it

Historically, despite the devastating blow of the dot-com bubble, which led to the collapse of many .com companies, it also spawned a number of important forces that drove the next round of the tech revolution, such as the rise of companies like Tencent, Alibaba, Amazon and Google.

The technological precipitation of the bubble period laid the foundation for the later development of Web 2.0. The technological revolution has also prompted emerging companies to avoid the money-burning model of the bubble period, shift to

a pragmatic development path and explore new business models.

Netflix, for example, transitioned from DVD rentals to streaming subscriptions and eventually morphed into a global streaming giant. Although Facebook was founded in 2004 after the bursting of the bubble, it benefited from improved post-bubble infrastructure (e.g. falling broadband costs), lessons learned by surviving firms, and an investment environment in which capital tended to be prudent, which allowed it to avoid many potential risks in its early years. As the bubble period had fostered users’ reliance on the Internet (especially habits such as social sharing), this laid the foundation for the development of real-name and social graph models.

Thus, without the baptism of fire of the dot-com bubble, it would have been difficult to create such era-defining technology companies.

Similarly, the AI boom will experience cyclical pullbacks, but it has long-term potential in the area of hyper-automation (e.g., robotics, AGI) far beyond the Internet era. The United States continues its first-

mover advantage from the Internet era to build technological monopoly barriers, while the Chinese DeepSeek phenomenon essentially promotes technological affirmative action. With limited arithmetic and data resources, some developing countries prefer to tap into the Chinese-led open-source ecosystem rather than pay the high cost of US closed-source services. This trend could reshape the global AI value chain, transforming China from a technology follower to a leading co-developer.

In terms of future policy, a balance needs to be found—not only to support the leading enterprises to break through the technological boundaries, but also to cultivate a diversified application industry chain in order to build a benign industrial ecology. The essence of a technological revolution is not to avoid bubbles, but to drive long-term GDP growth and lead generational leapfrogging through sustained technological iteration capabilities and viable business models, supported by stable capital, and transforming phases of capital frenzy into new-quality productivity. ■

Luxury brand strategies

Olivier Nicolay, former President of UK, Canada and LATAM for Chanel, discusses the need for major luxury brands to maintain a feeling of scarcity of their products and how demand is changing towards luxury experiences

Q. How would you describe the trends in the global luxury market over the past five to 10 years?

A. Over the last five to 10 years we have seen a concentration towards mega brands, they could be part of a group such as LVMH, which owns some major names including Luis Vuitton and Dior, or independent like Hermès or Chanel. These have been growing faster than the others. This is perhaps because the market is now so global, and to be able to manage the requirements of a very complicated landscape, including image, distribution and product development, you need to have a lot of available cash. You cannot simply open a small shop today if you want to compete with the big brands. Rents in the right places are extremely high, refitting shops can cost tens of millions of dollars and you have to make sure you have the right stock in case you get a social media strike. It takes a lot of CapEx to open just one shop and you need to re-invest for at least five years if you want to create a successful brand as the amount of money spent by the dominant brands is so significant. This is why, over the last 10 years, the bigger brands have taken up a greater share of the market.



Rich clients are generally better off than they were before, there are now more millionaires and billionaires, and much of this money is moving east to China, Korea, Thailand and even Vietnam now. These people are often discovering and learning about the world of the rich and wealthy. But it isn't that easy to be accepted into that world, and while the next generation will have the benefits of education in good schools, creating relationships early in their lives, the current generation can only really access that world through luxury purchases—whether that be items or experiences. This has also led to a concentration of brands that people recognize and trust.

Q. How have brand strategies shifted to cater to the growing Eastern consumer base?

A. Luxury brands have been curating a very strong presence in Asia for a long time but the recent acceleration has been phenomenal, and in some cases they were perhaps even too fast to do so. If you visit second- or third-tier Chinese cities there is already quite a large luxury brand presence. But the best luxury brands play on the



balance between desire and exclusivity. Desire is a strong force, but sometimes brands forget that to be desired, on top of creativity and high product quality, you need to utilize scarcity. If the brand is too visible or commonplace, desire will drop as people tend to want what they can't easily have. So if the brand is too affordable, too easily accessible, either because they have too many shops in smaller cities, are too readily available online or the second hand market is too prolific, you lose the uniqueness of the brand, and with it the desire. The second-hand or gray market is a particular issue that brands have been trying to manage, because they can't control price or storytelling like they would be able to do in their main stores.

The other thing that is quite a global concern for brands is becoming too commonplace, or too visible, both in public and at home. Many very important clients (VICs) will have multiple properties and if they return to one of their houses in St. Tropez or Aspen and see too many of the same dresses in their cupboard that were there before, they may start to explore alternatives. This means that brands must not only look at maintaining scarcity in the market, but also look to help empty cupboards to keep their brand fresh in the minds of consumers. How they deal with the process of that will differ depending on the brand.

Q. How can brands expand in the face of the contradictory pressures between scarcity and business growth?

A. Keeping product numbers low is important for several reasons. Not only is scarcity a key selling point, until recently, almost all luxury brands had agreed to work towards carbon neutrality by 2040 or 2050, so their volume growth is limited. With this in mind, brands can grow in two ways, and the first has been the quite dramatic price increases to cover the cost of production and distribution but also to make up for the pressure on volume.

The second has been lateral expansion. Many major luxury brands are known for a particular thing, whether that be a women's line, a men's line, bags or jewelry etc., but there has been growth away from these classical examples into options such as children's

wear, tableware and houseware. On top of that, brands have started to move into more activity-related offerings, including restaurant, hotel and retreat experiences. This is also made possible because the brands have a specific consumer base to whom they propose those new services/experiences. Their clients are willing to trust the brand in exchange for recognition.

Q. How do brand strategies differ by region?

A. In terms of where the brands originate, there are a lot of major French brands, obviously, but there are also brands from Italy, the US and elsewhere, and quality and origin wise there can be a big difference. That is a key underlying factor that the brands can build upon.

As for how the brands approach different markets, most of them release a new collection twice a year, but in fact fill the shops with new products every two months or so, which helps customers keep updating their cupboards, but also means that brands can correct any mistakes quite quickly, which is not the case for big series items like watches or perfume. There is always a core collection that is present in all the shops around the world and gives a level of consistency to the brand, complemented by a large offering that can be chosen from, adapting to the needs of

Brands have started to move into more activity-related offerings, including restaurant, hotel and retreat experiences



Olivier Nicolay is the former President of UK, Canada and LATAM for Chanel. He is currently a guest lecturer in luxury management at the ESCP Business School and a Non Executive Director at Harrods

each market.

There are two ways that brands approach deciding on what is included in the new collections. Often, Italian brands have concentrated buying teams that will distribute to other countries, while French brands bring the buyers from the recipient countries to a central showroom and those buyers can make purchases depending on needs—which they better understand.

Q. To what degree is the global luxury market dominated by international legacy brands?

A. I always think of the example of Kodak or Polaroid in relation to this question. They were both sitting on a pile of cash with a huge share of the market, but did not see the transformation to digital coming and largely lost everything in a very short period of time. I don't wish this to happen to the luxury brands, of course, but anything is possible if they rest on their laurels. It is when business is good that reinvention needs to happen...because that is when you are financially free to do so! Not when you are doing damage control. So the large brands need to continue to question themselves and therefore innovate now in order to stay at the front. The question is whether they will do it or not.

Given that luxury goods prices have gone up massively recently, there is arguably a space for some good brands to profit from the situation we are in now. There is quite a big market in say the four to six thousand dollar range where there is a lack of attractive products from the major brands and newer businesses can jump in.

The opportunity will not last long, because these major brands are aware of it and will fill that gap, but it is an opportunity for brands with a good image that are perhaps more discrete to take advantage of. If they come with innovation, strong consumer generated media, strong influencers and they time it right, being



There is arguably a space for some good brands to profit from the situation we are in now

ready to produce in a more significant volume than they do today, they can succeed. It doesn't mean that the big luxury brands will disappear, but it might mean that they have a more difficult time, which is good for them as well. You don't grow when your life is too easy, and it has been quite easy for them in recent years.

Q. How do you see the market and brand strategies developing over the next five to 10 years?

A. At the time we are having this discussion, there is no real clarity on what brands want to do. But my feeling is that brands absolutely need to reclaim relevance with younger clients by launching attractive products like a hit bag at the price point I mentioned earlier, whilst transitioning from selling products to offering unique experiences to their VICs. This is true whatever the product you sell, but for the VICs even more, brands must create experiences that slow time down...You can buy almost anything in life if you have the wealth to do so, but you cannot slow down time, and brands can help simulate that through creating unique experiences that stay in people's memories. It could be inviting friends around the world for a unique trip in the Galapagos for a week, it can be a more spiritual offering, or education...there is no limit as long as you manage to captivate their attention away from their connected world!

These very important customers, which often make up around 10% of clientele but do around 40% of the business, are the core of their profitability, they will need to impose new ways to consume luxury where ownership becomes secondary to usage and pleasure. There are plenty of opportunities that would need another discussion!



There is arguably a space for some good brands to profit from the situation we are in now

Interview by Patrick Body

The healthcare industry

The healthcare industry is tied to the most valuable asset people have: a healthy life, and it is experiencing huge changes as technology develops and standards race to keep up

From digital diagnostics to AI-powered patient management, modernization is reshaping the healthcare industry at every level. The sector now stands at a pivotal moment where innovation is no longer optional but essential to meeting the demands of the modern world.

Healthcare has modernized based upon three structural shifts: integration of care delivery, digital transformation—driven increasingly by AI—and resilience in response to systemic shocks—such as technological and regulatory developments, tariffs and COVID-19. Care is increasingly delivered across hospitals, retail and home settings, creating a continuous patient journey rather than isolated episodes. Digitalization, especially artificial intelligence (AI), is enabling predictive care, faster diagnostics and personalization at scale.

A core challenge for the West is fragmentation and high regulatory complexity, which slows innovation and makes scaling difficult. China, by contrast, benefits from centralized policy frameworks and the ability to scale platforms nationally. This agility not only accelerates domestic adoption but also allows Chinese players to set technical and product standards that may later be adopted globally. Competition in the industry is therefore now not just about care delivery, but about who defines the rules and produces the technologies that others will follow.

Hospitals

Hospitals are evolving from acute-care silos into integrated ecosystems that coordinate prevention, treatment and long-term

management. Their future role lies in becoming orchestrators of care pathways, aligning incentives and building multidisciplinary teams around patient needs.



AI is a powerful enabler of this shift: predictive analytics can anticipate patient risks, while decision-support systems help clinicians tailor interventions. In China, integration is advancing rapidly through digital referral platforms that redirect patients from overcrowded tertiary hospitals to primary and community settings, which can improve speed and quality of care. In Europe and the US, progress is slower due to regulatory and reimbursement fragmentation, which makes aligning providers more complex. This fragmentation creates hurdles for scaling, giving China an advantage in shaping new integrated care standards.

Technology, especially AI, is transforming hospitals in three ways:

- **Clinical outcomes:** AI-powered diagnostics in imaging, pathology and genomics are already matching or surpassing human accuracy.
- **Operational efficiency:** Predictive models optimize patient flow, bed allocation and resource planning.
- **Extended care:** Digital platforms connect hospitals with patients at home, creating continuous monitoring systems.

China has scaled AI and digital health faster because it can deploy solutions across massive datasets under national

Miguel Martins da Silva is the Group Supply Chain Officer at Dr. Max, a leading European pharmacy chain, part of Penta Investments, operating more than 3,200 pharmacies with extended omnichannel operations. He brings more than 15 years of experience in end-to-end supply chain leadership, omnichannel retail operations, digitalization and automation strategy. His expertise includes large-scale transformation projects, robotics integration, demand planning, cross-border logistics and providing advisory services across multiple sectors.

platforms—for example, rolling out AI diagnostic tools such as DeepSeek across tertiary hospitals and using tools like Infervision’s CT-screening during the pandemic. Infervision’s InferRead CT Lung is now deployed in 250+ hospitals worldwide, including 25+ in Europe, and operates in 30+ countries with clearances from regulatory bodies in the US, Europe, Japan and China.

Infervision’s system, which has been used across 34 hospitals and over 32,000 cases, provides quicker and in some cases real-time diagnoses from scans and works across different machines of differing quality, as well as managing further testing needs.

Western systems, constrained by privacy laws and fragmented IT standards, innovate more slowly but with greater emphasis on trust and safety. The result is that Chinese systems often set the pace of AI adoption, while Western frameworks eventually define global standards for safety and interoperability.

In the EU, for example, healthcare varies across countries due to differing regulations, subsidies and pricing systems, making access to innovative medicines uneven. In China, disparities are less about regulation and more about regional development gaps—some areas are advanced while others lag behind. However, China has rapidly expanded access through technology, such as remote doctors and AI diagnostics, creating faster nationwide impact. In contrast, Europe’s fragmented regulations and strict data protection laws slow down the adoption of such technologies.

Finding the right balance of efficiency and quality is an ongoing challenge for hospitals, but the two are not opposites—they reinforce each other when systems are designed correctly.

The most effective approaches include:

- Standardizing clinical pathways to reduce variation.
- Automating administrative and scheduling tasks so clinicians can focus on patients.
- Using AI-driven triage and monitoring to allocate resources where most needed.
- Embedding outcome-based performance measures.

China leverages AI triage tools and remote monitoring to handle patient volumes, achieving scale quickly. AI systems like DeepSeek are already deployed across major hospitals to speed up admissions processes and data collection, while rural clinics use Tencent-backed WeDoctor for 90% accuracy in diagnostics.

Europe and North America ensure quality through strict protocols, though sometimes at the expense of speed. The challenge for the West is to overcome fragmentation across payers, regulators and providers, which makes scaling harder—leaving room for Chinese technologies to gain a first-mover advantage globally.

As a result, globally we are seeing a growth in verticalization in the sector, with major hospital groups and insurers increasingly collaborating and acquiring assets across the healthcare value chain, from private hospitals to pharmacies and long-term care. This vertical integration allows companies to control multiple players in the system, driving efficiencies, lowering drug and treatment costs through scale, and reducing the financial burden on the state. Private equity firms and global healthcare groups are actively fueling this trend, making verticalization one of the sector’s defining developments.

Retail

Healthcare retail is shifting toward digital-first journeys, where consumers expect to research, order and consult online while still valuing trusted physical touchpoints. Omnichannel models now combine e-commerce, apps, telepharmacy and in-store interactions.

In China, integration into super-app ecosystems like WeChat, Alipay and JD Health has made digital healthcare retail mainstream. China is well-known for being better at accepting some trade-offs for convenience and speed of development, and while there are privacy and other related drawbacks to this, the results are generally good.

In the West, stricter regulation on prescriptions and advertising slows expansion but ensures oversight—for example, ongoing delays in allowing prescription drugs to be served through online platforms. This regulatory fragmentation delays scaling, giving China a potential edge in setting global digital retail health standards.

All aspects of healthcare require a great deal of trust between user and provider, and this trust is built on three pillars: the consistency of professional standards across channels, product authenticity and supply chain traceability, and transparency in data use—particularly as AI personalization grows. This forms what I call a strong customer value proposition.

Western consumers rely on regulatory safeguards for trust, while Chinese platforms are advancing rapidly but must continue investing in counterfeit prevention and quality assurance to meet consumer expectations. Globally, the challenge is to sustain trust as healthcare retail becomes increasingly AI-driven and personalized, and fundamentally, much of the system is still backed by people who provide the human connection that is so important to building trust.

Future growth lies in expanding from product sales to service delivery: preventive health (vaccinations, screenings), point-of-care diagnostics in retail settings, chronic disease management supported by AI and digital monitoring, and personalized wellness, including genomics and nutrition.

Pharmacy retail offerings are also broadening, moving beyond medicine into wider health and beauty lifestyle products. Categories such as food supplements, longevity-enhancing treatments and dermo cosmetics are growing rapidly, reflecting a more holistic concept of wellbeing.

Supply Chain

Success in healthcare supply chains hinges on two factors: price and speed. Competitive pricing requires scale and vertical integration to negotiate better value, while speed depends on managing vast assortments across omnichannel systems to meet customer expectations for fast, flexible delivery. In China, advanced last-mile logistics and AI-driven stock forecasting are setting the pace, highlighting how proximity and responsiveness are now as critical as price in capturing market share.

Technology is evolving at a significant pace. Pharmacy automats, robot picking, autonomous mobile robots (AMR) goods-to-person systems, and other solutions are becoming mainstream, with return-on-investment periods getting more attractive every year. This allows wider adoption and accelerates transformation.

In the supply chain—as in any discipline—it is vital not to lose focus on the patient. Patients do not care about technology; they care about proximity, service, affordability, safety and results. But without vertical integration, automation and proximity, it is impossible to remain competitive in the modern retail environment. Regulation is less decisive here, with leading technology providers from the US, Europe and China competing on AI-enabled logistics and robotics.

The decisive factor may be scale: Chinese adoption is faster and project sizes are larger, creating cost advantages similar to those seen in the electric vehicle market. While Western providers remain ahead in quality, Chinese providers are rapidly closing the gap.

The pandemic forced a shift from just-in-time efficiency to resilience-first strategies. In Europe and the US, this has triggered significant discussion of nearshoring and reshoring. As an example, GSK is investing £200 million to boost UK manufacturing, including £67 million for its Montrose site, strengthening supply resilience. Tariffs are also now playing a central role in moving production closer to consumers.

Examples include diversified sourcing across regions, the creation of strategic reserves for critical medicines and closer government-industry collaboration. Globally, however, large-scale relocation of production remains limited, with most changes seen in stock levels rather than in new factories. In healthcare, nearshoring is still more the exception than the rule, but tariffs and geopolitical shifts may accelerate this trend.

Sustainability in healthcare supply chains is increasingly driven by regulation, financing requirements and consumer expectations, but while reputational risks are high, consumers are often unwilling to bear the extra costs—making it harder to build a clear economic case.

That being said, promising initiatives include green warehouses

Success in
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(for instance, BREEAM-certified facilities), optimized logistics routes, and AI-enabled demand forecasting to cut waste and improve inventory accuracy. The main challenge is financing these measures without raising patient costs.

Europe is embedding sustainability into procurement rules, while China pilots low-carbon logistics hubs and pursues strong national policies to reduce emissions. This is one area where convergence between regions is clear, as sustainability becomes both a regulatory requirement and a competitive differentiator.

Conclusion

The next decade will be shaped by AI-driven personalization, omnichannel health hubs and sustainable supply chains. Hospitals, retail and logistics will converge into a seamless, data-driven ecosystem where care is continuous rather than episodic. The power of the individual will grow immensely, providing better insights and choices for both care and related products.

Healthcare is an extremely resilient industry and a critical part of consumer life, so healthcare spending tends to rise as a share of total expenditure. It remains one of the most stable and promising areas for investment, tied to the most valuable asset people have: a healthy life.

The critical question is who will define the standards and platforms for this future. Western systems, while highly regulated and fragmented, ensure trust and safety but struggle with scaling innovation. China's ability to deploy AI, digital platforms and new service models quickly may allow it to set global standards—whether for diagnostics, equipment or supply chain systems. Over time, Western countries may adopt or adapt these standards once regulatory frameworks catch up.

The future of healthcare delivery will therefore be defined not only by technology and patient needs, but by who sets the standards—whether in Shanghai, Brussels or Washington—that will shape the global healthcare ecosystem of tomorrow. 

OPPO: Creating a deeply localized global enterprise

Globalization has become a major trend in the development of Chinese enterprises and OPPO is at the forefront with a presence in more than 70 countries



By Li Wei, Professor of Economics, Director of the Case Centre at CKGSB and Meng Fanyi, Researcher at the CKGSB Case Centre

Founded in 2004, OPPO was originally created within the Chinese multinational electronics conglomerate BBK Electronics' audiovisual electronics business, with its early products including DVDs and MP3s. The brand has been independent since 2023, when BBK was dissolved.

At the end of 2006, OPPO founder and CEO Chen Mingyong decided to make the switch to mobile phones. In 2008, the company launched its first such phone, the OPPO A103, and by 2011, its first smartphone Find was launched, moving into the era of smart terminals together with the rest of the industry.

While its headquarters are in China, OPPO has, over the years, curated an image of a global brand. As early as 2000, Chen Mingyong wanted to bring the then BBK audiovisual electronics business into the

international market, but the BBK brand lacked international communication power when translated into English.

But, with an emphasis on making the brand name easy to pronounce and other semantics in different markets, after hiring an international branding team to sculpt the brand's image to suit countries around the world, the OPPO name began to register on the global stage.

In 2004, OPPO set up OPPO Digital in Silicon Valley to leverage the leading image extraction and restoration technologies there, and specialize in the development of HD DVDs and other products. Successive launches were well-received by US consumers, and in 2008, OPPO introduced these critically acclaimed products back in China.

In 2009, after launching its first mobile phone, OPPO, starting in Thailand, began

a new period of globalization. Initially, OPPO simply exported mobile phones to its DVD distributor in Thailand, who sold both DVDs and mobile phones. The company did not yet have a clear strategy for overseas markets, making low-level investments and taking limited risks.

In 2011, smartphones began to enter the China market, and the following year, OPPO launched Finder, then the world's thinnest smartphone. In 2013, OPPO's ColorOS operating system, which is based on Android and draws from its deep customization qualities, was born, and the company's trinity of "software, hardware and services" was established. It was also at this time, with the accumulation of product capabilities, combined with changes in the external environment, OPPO began to formally consider the idea of overseas expansion for the mobile phone business.

In 2013, OPPO began to expand further into the Southeast Asian market with Indonesia and Vietnam as initial targets, followed by India and other countries the following year. By 2018, OPPO had become the dominant brand in the Southeast Asian market, forming something of a duopoly with Samsung. In Q3 2018, OPPO became the only brand to rank among the top three in terms of shipments in all five of the markets in Indonesia, Philippines, Vietnam, Thailand and Malaysia. In the same year, OPPO released its flagship smartphone OPPO Find X, which combined a number of innovative technologies, at the Louvre in France, and announced that it had officially entered the European market, beginning a new stage of the company's globalization. OPPO entered the Mexican market in 2020.

OPPO's brand has now spread over five continents and as of October 2024, OPPO is present in more than 70 countries and regions, with units for sale in over 300,000 retail shops worldwide, has created more than 3,300 self-operated offline after-sales service shops, and overseas shipments account for about 60% of the total.

Canalys data shows that in Q2 2024, OPPO ranked second in the mainland China market; first in Vietnam, Thailand and Cambodia, and second in Indonesia; fourth in the Mexican market; and fifth in the Western European market, and second, third and fourth in Portugal, Finland, and Spain, respectively. Meanwhile, OPPO ranked in the top three in the higher price segment (above \$500) in 14 countries, including India, Thailand, Vietnam, New Zealand, Belgium and Portugal.

In addition to strong global sales, after years of knowledge accumulation, OPPO has also reached a high level of global production and R&D. It has established seven manufacturing centers, in India, Indonesia, Turkey, Pakistan, Bangladesh, Brazil and Egypt, to guarantee product quality and ensure a flexible supply using its own factories. OPPO has also set out six research institutes around the world, including the Silicon Valley Research Institute in the US and the Yokohama

While its headquarters are in China, OPPO has, over the years, curated an image of a global brand



Research Institute in Japan, to explore future-oriented cutting-edge technologies, and has set up six R&D centers in various locations at home and abroad to improve product quality and experiences.

Globalization has helped OPPO expand its new growth space and diversify away from dependence on a single market, while at the same time acquiring high-quality talent, technology and other resources.

Oppo's globalization strategy

A positive globalization report card is the result of an effective overall strategy, and the key strategic decisions faced by globalized enterprises include the selection of target markets and the choice of entry modes. At the same time, as the breadth and depth of its overseas business increased, it became important to establish an organizational structure that was appropriate to the overall strategy.

Market Selection

Globalization of enterprises is a gradual process of accumulating knowledge, increasing investment and development. From entering Southeast Asia in 2009 to setting foot in Europe in 2018 and landing in Latin America in 2020, OPPO's overseas market expansion adopted a pragmatic and progressive approach, from simple markets to difficult. Simplicity in this case means being close to China on a macro level, and at the same time being similar to the Chinese market on an industrial level, as well as being compatible with the core competencies of the company.

Firstly, choosing simple, or markets "close" to China helps to reduce the uncertainty and risk of globalization. Distance here includes a variety of dimensions, including Cultural, Administrative, Geographic and Economic,

which form a CAGE distance model. Taking these factors into account, Southeast Asia is relatively close to China and has a favourable business environment.

Secondly, specific to the mobile phone industry, the channel structure of the mobile phone market in many Southeast Asian countries is very similar to that of China, which is an open channel market—as opposed to a carrier market.

Finally, e-commerce channels in countries such as Indonesia started late, and most consumers still buy mobile phones from offline shops. This facilitates OPPO to call on its successful offline channel experience in China and leverage its established competitive advantages to penetrate the target country's market quickly and efficiently with low learning costs.

Of course, market potential is also a key factor influencing market selection. Southeast Asia has a large population base—the regional population was over 670 million in 2021; a young demographic—regional median age of less than 30 years in 2021; a fast-growing middle class; and a large consumer market potential. At the same time, consumers in emerging markets have relatively little product knowledge and are easily influenced and guided.

Overall, OPPO's overseas market expansion has evolved through Southeast Asia to Europe to Latin America. The logic behind this was to pick the "low-hanging fruit" first, replicate the successful experience at home in markets that are close to and similar to China's, increase the scale of the business, and then enter high-potential markets with the overseas operating experience accumulated in the earlier stages. Following this expansion of global brand influence, the business can



explore new opportunity markets to open up new growth spaces.

Modes of entry

In addition to target market selection, entry mode decisions—the means by which to enter overseas markets—are another key issue in globalization strategies. The internationalization network theory emphasizes that internationalization depends on the relationships and networks of firms. The internationalization of an enterprise is essentially the process of constructing, maintaining and developing its network of relationships within its international market framework. External relationships are a more significant source of uncertainty than internal ones.

OPPO, in some overseas markets, has adopted a “vendor integration” mode of entry, with OPPO taking on manufacturing responsibilities, and the “vendors” being OPPO’s agents. However, unlike many companies that look for agents locally in the host country, the agents for OPPO’s overseas business actually come from China. In the early days, they were mainly composed of OPPO’s domestic agents, but

in the time that followed there were also OPPO’s old employees, domestic suppliers and others who were given the right to represent the company overseas. For example, it is not uncommon for an OPPO employee to be converted into the general manager of an agent and be responsible for an overseas market. OPPO also allows and even encourages agents to recruit people from OPPO headquarters.

Compared with local partners in the host country, OPPO’s overseas business agents that have a stronger internal relationship have the following three characteristics:

For one thing, they tend to have a great abundance of entrepreneurial spirit. Whether it is business people—domestic agents or suppliers etc.—who are already adventurous and pursuing growth, or veteran employees who have been through the entrepreneurial experience, they all understand how to do business and are bold enough to take the plunge. The man who pioneered OPPO’s Indonesia market entry is an excellent example. When mapping out the Indonesian market, he was not fluent in English nor Indonesian, but after only a few months, he was able to communicate with

customers in Indonesian.

Secondly, these insiders understand OPPO, as most of them are or have been in OPPO’s business development in China, familiar with its channel construction and marketing methods and come with what can be termed “OPPO experience.”

Third, and most importantly, these insiders identify with OPPO, trust OPPO and even have the same sense of mission with OPPO. In particular, some domestic agents and suppliers have formed great trust in OPPO after a long period of co-operation with the company. And trust is the basis for guaranteeing the long-term firm commitment of all parties to the market.

OPPO’s unique “vendor integration” model has been proven in many countries. For example, when OPPO mobile phones were sold on a trade basis through local agents in Thailand in the early days, the market was lukewarm to the brand, mostly because the original agents’ business philosophy was not in line with OPPO’s. In 2013, OPPO’s Thai market changed its management and boosted its monthly sales from 5,000 units to 80,000 units in just over a year. At the end of 2014, OPPO reorganized the agency model in Thailand from the bottom up, retaining some of the interests of the original agents, who withdrew from day-to-day management and business decision-making, and replaced them with people who understood and identified with OPPO. As a result, in 2015, monthly sales in the Thai market climbed to between 250,000 and 300,000 units.

At the same time, OPPO’s experience shows that overseas markets are diverse and there is a need to avoid becoming a one-trick pony. The mutually beneficial agency system has helped OPPO establish a leading market position in China, and the “vendor integration” entry model has worked well in some markets with similar channel structures to China. However, when removed from the appropriate business environment, companies cannot replicate the original model that they have developed, and should reorganize the resources and capabilities they need. For example, in the European market,



Globalization of enterprises is a gradual process of accumulating knowledge

consumers are more likely to buy contract mobile phones through carriers than to buy handsets from channels such as branded e-commerce companies. This consumption pattern required OPPO to adopt a different strategy than in the Southeast Asian market, establishing and maintaining stable, long-term relationships with operators to adapt to local consumption habits and market structures.

Organizational management

In the first decade of its globalization, OPPO's overseas development was quite simplistic, with separate businesses trying to gain a foothold in each market and separated from other international units—sales were the priority. With the growth of the overseas businesses, in addition to the development of markets, the company needed a more thoughtful approach to organizational management.

In 2018, while entering developed markets, OPPO began a new stage of management remediation and global coordination, focusing on establishing a global vision and promoting collaborative management. Compared to focusing only on opportunities in a single market, OPPO shifted to considering global market patterns, emphasizing global unity in brand building, organizing R&D from a global perspective, forming a global ethos for operations management, and perfecting its global talent pool.

A solid organizational structure can help ensure the effective implementation of corporate strategy and enable it to move steadily forward on the road to globalization. Currently, OPPO divides its global business into regions, each covering a number of national/regional markets, and appoints business leaders in different regions to form and lead independent management, operation and product teams to adapt to the localized needs of different regional markets.

When an agent first enters the market, OPPO's regional team will provide its experience to help the agent understand the approach to overseas operations. OPPO's headquarters, on the other hand, grasps the overall strategic direction of the company

The process of becoming a local company cannot be separated from synergising with local industries



and co-ordinates the development among regions. For example, based on the macro environment, OPPO's headquarters has graded more than 70 countries/regions and determined the key markets to invest in and the corresponding resources to support them.

A certain degree of decentralization is conducive to overseas companies giving full play to their initiatives. At the same time, the head office's knowledge of overseas markets is relatively poor and often lags behind the frontline teams. Therefore, granting specific management authority to overseas units is also a necessary condition for localization. OPPO insists on deploying local teams market by market, while ensuring centralized coordination, in order to globalize the brand and localize operations.

Localized operations: The case of Indonesia

Being locally rooted is the secret to OPPO's success in conquering markets such as those in Southeast Asia. Selling products is an end result, but companies that want to truly localize their operations need to answer the fundamental question of what they can bring to the region. In the view of OPPO's managers, doing business overseas is essentially no different from doing business at home—it's all about providing consumers with good products, bringing profits to partners and providing employees with fulfilling jobs. OPPO's operations in Indonesia are a typical example of this mindset.

Good products for consumers

A good product is one that meets the real needs of consumers. Starting with the needs of consumers in the host country,

OPPO takes user insights as a starting point and combines them with its technical capabilities to provide local consumers with customized and differentiated product experiences. The localization of products for the Indonesian market began with OPPO's in-depth market insights. When the management team first arrived in Indonesia, using after-sales repair data, it was found that despite the large amount of rainfall in Indonesia, water-related issues were not the most significant cause of failure for OPPO mobile phones. What was observed was that many Indonesians would put a disposable waterproof bag over their mobile phones on rainy days, but this would affect the effectiveness and quality of calls. OPPO therefore, added a waterproof optimization treatment to its new products for Indonesia. Another example was the common use of a stylus with phones that had a large folding screen, as well as a thick case, as this was seen as more business-like. As a result, OPPO provided both with certain types of phone units.

In March 2023, OPPO launched the Find N2 Flip, a small folding screen phone in Southeast Asia. Based on user experience requirements, this phone differed from Samsung equivalents, with a more practical large vertical external screen, and a self-developed, more innovative hinge mechanism, so that when unfolded, the screen has an almost invisible crease. In Q2 2023, the phone became the top seller in the category in Indonesia with 65% market share. In Q3, OPPO shipments jumped to No. 1 in Southeast Asia, with the folding screen phone credited for its contribution. This provided OPPO with its core competitive difference, a better user experience.

Product differentiation not only

requires the ability to understand the market and products, but also needs to be based on technical strength. In 2023, OPPO ranked fourth in China and ninth in the world in terms of global patent applications, which meant that OPPO has been ranked among the top ten globally for five consecutive years. What is particularly rare is that among all its patent applications, invention patents account for around 91% of the total, higher than many of its competitors.

Service is an extension of the product. Despite excellent product quality and a low repair rate, OPPO still saw the need to open nearly 160 after-sales service centers in Indonesia to provide full-cycle protection for local consumers. Unlike the industry's usual outsourcing practices, OPPO's level of commitment and determination to put down roots in Indonesia is evident.

Provide revenue protection for channel partners

The value that companies create for their partners is in providing the latter with revenue security. OPPO guarantees the long-term profitability of local channel operators in Indonesia by utilizing the principles of mutual benefit, a unified pricing system and operation and personnel support.

When OPPO first entered Indonesia, local mobile phone dealers were making meagre profits. OPPO requires itself to offer local dealers gross margins well above industry levels. In terms of product prices, each dealer is required to sell at standard rate, to maintain long-term profitability. By not "rolling up" prices, individual

dealers may lose small amounts of business in the short term, but they can ensure long-term benefits, as well as the healthy development of the entire distribution system and consumer experience. On the operational side, OPPO provides dealers with shop decoration solutions and covers the corresponding costs. This initiative saves costs for the shops while allowing the OPPO brand logo to appear on the streets of Indonesia, giving the illusion that there are OPPO shops everywhere.

Crucially, OPPO also supports its dealers with sales staff whose salaries and insurance are covered by OPPO. Once again, this saves money for the dealer. For OPPO, this facilitates the introduction of OPPO's products to consumers comprehensively and clearly. Currently, OPPO has a team of more than 13,000 terminal guides in Indonesia, who are located in dealership shops of various sizes across the country.

By doing a good job with the product while providing dealers with benefits, experience and talent, it is natural that more local channel players are joining OPPO's distribution network. OPPO has thus spread rapidly in Indonesia, solving the problem of product accessibility and enabling OPPO shops to penetrate the township-level market like capillaries, so that the first thing consumers are recommended is often the OPPO brand.

The market environment in Indonesia has also been quietly changing in the wake of the pandemic. Smartphone shipments in Indonesia declined for the second consecutive year in 2023, with high-

end smartphones (\$600+) being the only growing market. In terms of purchasing habits, as urbanization advances, street-level shops are beginning to lose ground and more and more consumers are walking into shopping centers. In conjunction with the brand's premium transformation strategy, OPPO has pushed its agents to establish pioneering brand flagship stores in Indonesian shopping centers.

Providing employment opportunities

Another important aspect of being locally rooted is bringing employment opportunities to local laborers. There is a high degree of localization in OPPO Indonesia's staff, with only about 100 Chinese out of 17,000 employees, the vast majority of whom are Indonesian, and there is no shortage of Indonesians in managerial positions, such as OPPO Indonesia's sales director and brand operations executives, all of whom are Indonesians. Local employees know the local market better. In the case of local knowledge, outsiders can only observe, while local employees can understand the inner machinations. Enlisting local managers also helps to resolve barriers and even prejudices in daily communication due to language and cultural barriers. These are also favourable factors for OPPO.

In addition, in order to protect the rights and interests of employees, all employees are directly employed by OPPO and not by a third party. Although outsourcing saves time and effort, the probability is that employee wages and benefits will be undercut due to the existence of intermediate links. OPPO has chosen to cede outsourcing costs to its employees in exchange for employee satisfaction and loyalty. For example, off-season wages for OPPO Indonesia factory employees are about twice the monthly income of a Jakarta nanny, and can be about four times higher in peak season.

Integration into local industry development

The process of becoming a local company cannot be separated from synergising with local industries. OPPO has become a key player in Indonesia's consumer electronics



industry through the localization of production and the localization of industrial workers.

Two years after entering Indonesia, with the rise of local demand, superimposed on the requirements of local industrial policy, OPPO increased investment in 2015 and began local manufacturing by renting a mobile phone factory. In 2020, OPPO invested \$500 million to build its own mobile phone factory around Jakarta. The plant went into production in 2022, and a folding screen production line was added in 2023. Meanwhile, as an end product manufacturer, OPPO has also encouraged seven suppliers to build factories in Indonesia, producing components such as batteries, adapters and data cables.

In the process of localized production, OPPO insists on employing local people and has trained many local skilled workers. When it first began production in Indonesia, the standards of local industry was poor, and OPPO needed to mobilize more than a hundred domestic employees to go to Indonesia and teach them by hand. Today, the plant's manufacturing is Indonesian-led, with fewer than 10 Chinese managers out of the plant's 2,000 employees, and the managers of the material management and other positions are all Indonesian. In 2023, when the folding screen production line was built, OPPO no longer needed to send domestic employees to guide the process. In the long run, the increase of these local skilled workers will also help boost local industry.

By providing customized and differentiated products for local consumers, long-term revenue security for channel operators, employment opportunities for workers and active integration into local industrial development, OPPO has put down roots which have borne fruit in the Indonesian market. Since 2020, OPPO has overtaken Samsung to take the top spot in Indonesia's mobile phone market for the fourth consecutive year. OPPO has accumulated around 65 million active users in Indonesia.

Experiences and challenges

OPPO Globalization experience

Being locally rooted is the secret to OPPO's success in conquering markets such as those in Southeast Asia



The big moment has arrived. Economic globalization is a seemingly irreversible historical trend, and the globalization of Chinese enterprises is also an inevitable outcome. After years of development, Chinese enterprises have been improving their strength in terms of products, technology and capital, and to a certain extent, are now capable of expanding overseas. Additionally, a gradual saturation of domestic demand, also prompted Chinese enterprises to step up to the global market. The 2024 Government Work Report also mentioned the need to “create more ‘Made in China’ brands with international influence” and “build more world-class enterprises.”

Overall, OPPO's success in overseas markets stems in part from its migration of existing capabilities and domestic experience. Objectively, with the high degree of development of social productivity and social division of labour, imbalances have emerged in the economic, technological and industrial development of different countries, which provides opportunities for Chinese enterprises to adaptively transfer best practices from their home market. It should be emphasized that relocating experience is not the same as “downgrading,” especially in terms of mindset. In the process of Globalization, Chinese companies need to avoid a sense of superiority, respect local markets and cultures, and actively bring value and returns to the local ecology. This is a prerequisite for the adaptive landing of domestic experience overseas.

Future challenges

Looking towards the future of its Globalization, OPPO still has some challenges to resolve, and these vary market

by market. For example, in the Southeast Asian market, upgrading the brand in the users' minds to help it break into the high-end market, or in the European market, reorganizing resources to expand sales and regional influence.

At the same time, OPPO is still in the transition phase of integrated global management and needs to drive some changes. For example, the depth of overseas development has allowed OPPO to foresee the importance of building a global brand. Increased product homogenization in the industry has also strengthened OPPO ability to maintain a clear image of OPPO in the minds of consumers around the world. In the past, the marketing was more in the hands of the agents in each country/regional market, with those most successful the ones very localized and good at sales in that particular market. However, their understanding of OPPO's brand connotations may not have been the same, resulting in OPPO having different brand images in different countries. In addition, the agents in may not share the willingness and ability to invest. To this end, OPPO is gradually experimenting with unifying its brand building efforts at the headquarters level. And change often involves a redistribution of power, responsibility and benefits. OPPO plans to jointly promote a series of global management transformations by creating a number of regional prototypes and guiding agents to establish the same strategic goals.

Globalization is a process of identifying new opportunities, overcoming new challenges, adjusting strategic foci and reshaping competitive advantages, and OPPO is “walking forward with a smile.”



UNPACKING CHINA'S BIOTECH RISE

Supported by national policies and growing market demand, China's biotech sector is surging, but industry overcrowding and funding issues could jeopardize progress

By Ni Tao



China's biotech sector is surging, but it is not all smooth sailing

China's biotech scene is buzzing with activity and headline-making developments. Mazdutide, a weight-loss therapy developed by biotech giant Innovent, gained approval from China's medical product watchdog in late June, becoming the world's first dual glucagon-like peptide-1 (GLP-1) and glucagon (GCG) receptor agonist for weight management.

The year 2025 has been an auspicious one for China's biotech sector. A string of major products and regulatory milestones has propelled the industry into the global spotlight, accompanied by a wave of biotech listings.

As of August, 14 Chinese biopharma and medical device companies had listed in Hong Kong, raising HK\$18.2 billion (\$2.33 billion)—already roughly quadruple 2024's total—with 36 more in the queue.

The capital market interest is only part of a bigger transformation. Once overshadowed by industries like AI and semiconductors, biotech has gradually moved to the forefront of public attention in China.

“Since the beginning of this year, Chinese biotech stocks on the Hong Kong Stock Exchange have jumped more than 100%, fueled by strong growth in business development and licensing deals,” says Dai Jialing, founder of PharmaDJ, an industry intelligence provider. “China now leads in the number of clinical trials and accounts for a third of the world's licensing deals.”

A national priority

In 2024, China made up about 4.8% of the global biotech market, whereas the US accounted for 35% and Europe 31%, according to a European think tank. But despite its currently small role, the sector is growing in attention at home and internationally.

It was among the 10 strategic sectors mapped out in Beijing's “Made in China 2025” plan for modernization. And a focus on biotech development also aligns with the government's “Healthy China 2030” blueprint and the 14th Five-Year Plan, which elevates biopharma to the status of a national pillar industry.

In the early 2000s, many overseas-trained scientists returning to China often joined contract research organizations (CROs), helping multinationals cut R&D costs.

“After CROs became mature around 2010, Chinese pharmaceuticals started to explore novel drug research,” says Dai. “Yet, because of the underdeveloped state of basic research, most firms adopted a ‘fast-follow’ strategy, focusing on ‘me-better’ [a drug similar to an existing therapy but modified to offer improvements in efficacy, safety or delivery] drugs rather than working on projects with best-in-class or first-in-class potential.”

Firms like WuXi AppTec later expanded into contract manufacturing, creating a foundation for China's own drug

[In H1 2025] 32% of innovative drug out-licensing came from China

Cui Cui
Head of Asia Healthcare Research
Jefferies



innovation.

Today, Chinese biotech firms are not only producing generics but also among those helping push the frontiers of medicine. From CAR-T cell therapies to gene therapy and antibody-drug conjugates (ADCs), local players are beginning to match, and in some cases, even exceed the pace of global innovation.

While estimates vary, according to Pharmaceutical Technology, innovator drug licensing agreements involving Chinese companies reached a record \$41.5 billion in 2024. China has also become a significant force in the supply of active pharmaceutical ingredients (APIs), the raw materials used in the production of medications. The nation accounts for approximately 20% of global API output.

A shifting financial landscape

Scientific progress has not necessarily translated into ease of fundraising. Biotech is a capital-intensive business, and China's funding outlook has darkened since 2021 amid rising geopolitical tensions and a slowing domestic economy.

Venture investment in the sector peaked in 2021 at \$15.7 billion before plunging to \$4.2 billion in 2024 amid a broader

market downturn. This forces many firms, especially startups, to leverage license-out agreements—where a Chinese firm develops an asset and then licenses it out to an overseas partner—as an alternative financing channel.

“By the first half of 2025, a breakdown of business development deal value showed that 32% of innovative drug out-licensing came from China, versus 21% in 2023/2024 and single-digit percentages previously,” said Cui Cui, Head of Asia Healthcare Research at Jefferies.

The public markets regulator also rolled out schemes to encourage financing of biotech startups. The Hong Kong Stock Exchange's Chapter 18A allows pre-revenue biotech companies to list on the main board. Similarly, Shanghai's Nasdaq-style STAR Market has attracted innovative drug makers seeking domestic investors. But as windows tighten over IPO pipelines, mergers and acquisitions (M&As) may become another exit route.

High-profile deals have reshaped business strategies. AstraZeneca's \$1.2 billion acquisition of Gracell Biotechnologies and BioNTech's \$800 million purchase of Biotheus highlighted multinationals' appetite for Chinese assets.

BioNTech later partnered with Bristol Myers Squibb for a Biotheus-created antibody in a multi-billion-dollar deal.

The significant markup on deals like this led Chinese biotech practitioners to reconsider early asset sales and reshape their business development strategies, according to Dai.

“Mega-deals like these gave companies the funds to continue doing research right up to later phases, acquire more data, and sell at a higher price,” says Dai. “These firms are not so desperate to sell assets on the cheap to sustain their operations anymore.”

Policy catalyst

Government policy has become a steadier force in shaping China's biotech sector than volatile capital markets. The 2019 “volume-based procurement” scheme slashed generic drug prices, in an attempt to encourage companies to pivot away from low-margin copycats toward innovative therapies. However, it can also have negative side effects like forced price cuts and industry consolidation.

Additionally, inclusion in the National Reimbursement Drug List (NRDL) can significantly boost patient uptake and



valuations once new biotherapies are covered by public insurance.

Local governments are also competing to attract biotech firms through cash rewards, subsidies and tax incentives. Shenzhen, for example, offers up to ¥6 million (\$835,400) for clinical drug advances, while “high-tech enterprises” nationwide benefit from a reduced 15% corporate income tax rate alongside additional R&D deductions and VAT credits. Government-affiliated “guidance funds” have also emerged to steer private capital into biotech, reinforcing state support for the industry’s growth.

“Local governments have been very active in trying to figure out how they can support the industry,” says Helen Chen, Global Sector Co-Head for Healthcare and a Greater China Managing Partner of L.E.K. Consulting. “They provide infrastructure support such as land, labs, tax incentives, and even set up biotech parks. It’s a full ecosystem approach.”

Breakthroughs and leading players

The results are visible in a string of breakthroughs for Chinese firms. In September 2024, Chinese biotech Akeso’s Ivonescimab, an immunotherapy, outperformed Merck’s blockbuster Keytruda in a Phase III trial for non-small cell lung cancer, as reported by Stat News—an achievement hailed as a “DeepSeek moment” in biopharma. But while Ivonescimab showed a significant improvement in progression-free survival (PFS) in the initial trial, longer-term results presented in September 2025 show it failed to demonstrate a significant benefit in overall survival (OS).

Other firms are betting on obesity and diabetes drugs, such as GLP-1 receptor agonists, following the global excitement around weight-loss therapies. Oncology remains top of mind among developers, followed by autoimmune and CVM (cardiovascular and metabolism).

AI is also reshaping the industry, promising to accelerate drug discovery. “AI now enables us to rapidly search for vast chemical spaces and literature databases

For multinationals, missing out on a blockbuster Chinese innovation is a mistake they can ill afford to make

Dai Jialing
Founder
PharmaDJ

to identify promising disease hypotheses, targets and leads,” says Alex Zhavoronkov, founder and CEO of Insilico Medicine, a leading startup specializing in AI drug discovery (AIDD). “As data continues to expand, AI’s capabilities are also growing, often generating insights and innovations that would be nearly impossible for humans to anticipate.”

But despite the promise, timelines are still long. “Clearly, novel assets are coming out [of AIDD]. Even more so, the relevancy is that some AI models will help reduce the effort it takes to validate drug targets,” says Chen. “Regardless of whether we can use

AI to come up with brand new first-in-class molecules, there are a lot of steps in this very long drug development process that AI can support.”

Where does China stand globally?

Asked where the Chinese biotech industry is headed next, PharmaDJ’s Dai foresees more collaborations in the form of investment, M&A or licensing deals. According to him, multinationals increasingly scout for assets in China to avoid being blindsided by disruptive pipelines.

“China’s patent filings in areas like



Local governments have been very active in trying to figure out how they can support the industry



Helen Chen
Global Sector Co-Head for Healthcare
L.E.K. Consulting

cardiovascular drugs now represent around 60% of the world's total," says Dai. "For multinationals, missing out on a blockbuster Chinese innovation is a mistake they can ill afford to make."

Despite robust growth, China's biotech industry still lags behind the US and Europe, making up 4.8% of the global market in 2024 versus 35% for the US and 31% for Europe, according to a European think tank. Moreover, although dealmaking is recovering from its nadir, it remains more cautious than the US.

"When it comes to commercialization, US pharma companies are far more likely to pay large amounts for assets they see as promising, reflecting higher risk tolerance and an established culture of M&A and licensing," says Zhavoronkov.

Different risk appetite, however, does not leave Chinese players sidelined. Cui at Jefferies points out that neither China nor the US is likely to resist biotech partnerships, since US pharma keeps the lion's share of the economics. "Chinese partners are usually entitled to a royalty income of 10%-15% of ex-China sales," she says.

China may hold a leading position for now, but other emerging markets are closing in. India, once known as the "pharmacy of the world," making mainly cheap generics, is now pivoting to biotech innovation, with a host of rising stars like Biocon and Serum

Institute of India.

As a major exporter of APIs, China supplies Asia, Europe and North America. India, despite its scale, still depends on Chinese raw materials. This has sparked concerns about supply chain disruptions and comparisons to China's control of rare-earth metals. Yet China's leverage in APIs is nowhere near its domination of rare earth, making fears of a supply chain bottleneck potentially misplaced.

Barriers to growth

For all its promise, Chinese biotech faces a number of challenges. As with fields like EV, solar and industrial equipment, the sector is getting increasingly crowded, with multiple companies chasing the same drug targets. Scenarios like overcapacity and cannibalism could well play out in biotech. Crowded pipelines risk overcapacity, as seen with the glut of PD-1 inhibitors, while constrained funding will hit firms without true innovation hardest.

Intellectual property protection remains a challenge in China's biotech sector, where weak enforcement and concerns over data security deter foreign firms from sharing advanced technologies. At the same time, domestic innovators face difficulties monetizing their discoveries, limiting incentives for long-term R&D investment.

In the long run, rosy expectations for biotech's broader economic benefits may

also fall flat. Reliant on a small pool of highly educated professionals, the sector is never a big employer and the overall impact so far is limited.

Nonetheless, some observers disagree. "From labs and manufacturing to clinical upgrades, distribution and patient opportunity costs, some 10.5 million patients across the world stand to benefit over the next decade from the surge of biotech, with \$200 billion in investment at stake," says Chen, citing a study by L.E.K. Consulting.

China's biotech sector is still nascent, dominated by a few giants while most firms remain small R&D specialists. Many struggle with funding and rely on generics for survival. Commercialization is tough, with fierce competition for NRDL inclusion and high costs to build sales networks, leaving smaller players especially exposed. As Chen notes, the costs are high for them, and the steep learning curve is still underway.

Ethical and regulatory hurdles also abound, scandals have eroded trust and prompted the National Medical Products Administration (NMPA) to step up oversight, but there have still been some issues, including a 2025 scandal regarding large amounts of identical data in generic drug evaluation. Regulatory processes regarding genetic data safeguards and ensuring ethical usage of biotech, while apparently robust, also suffer from biotech's complex and fast-moving environment.

The road ahead

China has used policy and scale to dominate EVs and solar, but biotech demands deeper expertise, global collaboration and patience. While it may not deliver the same broad economic lift for Beijing, its importance is clear: aging demographics will fuel demand, and China's push into new areas, particularly AI-driven biotech, shows it is serious about global leadership.

"As demonstrated by Insilico's achievements, China can discover and validate AI-driven therapies much faster than most global competitors, with the powerful infrastructure and outstanding professional talents," says Zhavoronkov. ■

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