



BRAZILIAN CENTER FOR  
INTERNATIONAL RELATIONS

**ASIA WORKING GROUP**, REPORT VII, YEAR I

# ASIA WORKING GROUP

## **VII CHINA REVIEW GROUP MEETING**

MAY 30, 2018

Connections: Rio de Janeiro, Beijing,  
Brasília, São Paulo and Washington, DC

Speakers: Jeroen Groenewegen, Mariano  
Laplane, Margaret Myers and Yan Li

Coordinator: Tatiana Rosito

## THEME

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Beyond the trade war:  
Made in China 2025,  
innovation and the 4.0  
industrial revolution

# About CEBRI

Independent, nonpartisan, and multidisciplinary, the Brazilian Center for International Relations (CEBRI) is a non-profit institution that acts to positively influence the construction of the country's international agenda. Founded 20 years ago by a group of business leaders, diplomats, and academics, CEBRI has the ability to engage the public and private sectors, academia, and civil society in its work plan. In addition, it counts on an active Board of Trustees formed by prominent figures and on a diverse network of sponsors, constituted by institutions from multiple sectors.

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and the 4.0 industrial  
revolution

SUPPORT:



# ASIA

## WORKING GROUP

The Permanent China Review Group promotes a structured reflection on selected themes, with the participation of specialists from the private and public sectors and other think tanks, contributing to public policy formulation and business strategies. During each meeting, one or two speakers will give a brief evaluation of the current situation, followed by a debate with the other participants. The set of evaluations and possible recommendations will be part of a final report for each meeting, which will be later forwarded to group members and guest experts.

### PREVIOUS EDITIONS:



REPORT I, YEAR I  
SEPTEMBER 22, 2017



REPORT II, YEAR I  
OCTOBER 17, 2017



REPORT III, YEAR I  
NOVEMBER 22, 2017



REPORT IV, YEAR I  
JANUARY 24, 2018



REPORT V, YEAR I  
MARCH 14, 2018



REPORT VI YEAR I  
APRIL 25, 2018



### TRUSTEE

**Anna Jaguaribe**

Member of CEBRI's Board of Trustees and Director of the Institute for Brazil-China Studies (IBRACH). She is currently Visiting Professor of the Public Policies, Strategy and Development Program at the Federal University of Rio de Janeiro (UFRJ). She has previously worked at the United Nations, in New York, and as a consultant for the United Nations Conference on Trade and Development (UNCTAD), in Geneva.



### SENIOR FELLOW

**Tatiana Rosito**

Diplomat and economist, having served over eight years in Asia, five of which in the Brazilian Embassy in Beijing, as Minister-Counsellor. She is currently Chief-Representative of Petrobras in China and General Manager for Business Development in Asia. She was Executive Secretary at the Brazilian Foreign Trade Board (CAMEX) and Special Advisor to the Ministers of Finance and Planning, among other roles in the public service.



### EXECUTIVE DIRECTOR

**Julia Dias Leite**

Executive Director at CEBRI since 2015. She previously worked for ten years in the China-Brazil Business Council (CEBC), occupying the position of Executive Secretary. She was recently chosen by the US State Department for the Global Young Leaders program.

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## QUESTIONS

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Made in China 2025, the digital economy, artificial intelligence and the fourth industrial revolution: what is at stake for China and the world? How does China formulate and implement industrial policies?

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From the standpoint of Latin America and Brazil what are the main impacts and trends to be tracked? What are promising areas for cooperation with Chinese companies? Towards where should government support be directed?

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## VII CHINA REVIEW GROUP MEETING KEYNOTE SPEAKERS AND COMMENTATORS

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### **Jeroen Groenewegen**

Research Manager at China Policy since 2016, Jeroen holds a PhD in The Performance of Identity in Chinese Popular Music and a master's degree in Languages and Cultures of China from Leiden University. Previously, he worked as Asia Assistant for the Leiden University Institute for Area Studies.

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### **Mariano Laplane**

Chairman of the Center of Management and Strategic Studies, Dr. Mariano Laplane works as a Professor at Universidade Estadual de Campinas (UNICAMP) since 1985. He holds a PhD in Economic Science from the University of California at Berkeley.

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### **Margaret Myers**

Director of the Latin America and the World Program at the Inter-American Dialogue, she established the Dialogue's China and Latin America Working Group in 2011. Myers also developed the China-Latin America Finance Database, in cooperation with Boston University's Global Economic Governance Initiative.

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### **Yan Li**

Dr. Yan Li joined CASTED in 2013 after graduating from Renmin University of China with a doctor's degree in national economics. His current research interests are NGOs or civil society's role in the national innovation system and reform of China's S&T system.

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## VII CHINA REVIEW GROUP MEETING REPORT:

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### Made in China 2025, the digital economy, artificial intelligence and the fourth industrial revolution: what is at stake for China and the world? How does China formulate and implement industrial policies?

At its seventh meeting, CEBRI's Permanent Working Group on China promoted insightful discussions on the characteristics of Chinese policymaking in science and technology, with particular emphasis on the formulation, implementation and global implications of the Made in China 2025 Plan. As such, in the context of the Fourth Industrial Revolution, discussions encompassed the global trend towards digitalization and informatization in manufacturing, as reflected in Chinese efforts towards upgrading its industry. Ultimately, this would respond to the Chinese goal of advancing to higher stages in global technological value chains and ensuring self-sufficiency in high-tech sectors.

Participants highlighted the longstanding Chinese policy tradition in science and technology, dating back to pre-reform periods – and, in recent years, expressed in the 2006 National Medium- and Long-term Program for Science and Technology Development, or the following 11th and 12th five-year plans. Notably, such documents emphasize that technology transfer alone had proven insufficient to ensure Chinese advance to higher stages in technological manufacturing value chains in past decades. As such, instead of focusing on catching-up with technological innovation, China would increasingly engage in the development of endogenous technologies and aim to institute an effective domestic innovation economy. Furthermore, Chinese tradition in science and technology policymaking would feature very particular traits: besides being essentially state-led, participants defined it as mostly company-oriented – while the central government provides guidelines and funding, Chinese firms are the ones that mostly engage in research and development. Also, Chinese policy tradition typically features a global perspective – mapping gaps and trends through technological foresight – and high levels of synchronization between industrial, trade and investment policies.

As an expression of this overall tradition, participants highlighted the strategic relevance of the Made in China 2025 Plan, geared towards integrating manufacturing and digital technologies, as well as ensuring Chinese self-sufficiency in core components and leadership in tech-intensive sectors. Considering the recent adoption of similar agendas worldwide, such as Germany's Industry 4.0 Strategy, China 2025 would reflect the perception that upgrading

domestic industry would be a prerequisite for China to sustain its status as a global manufacturing superpower. Additionally, the Plan's drive to modernize its manufacturing sector would respond to growing environmental pressures towards sustainable waste and resource management, as well as domestic demographics transformations – with the closing of the “demographic bonus” generated by rural-urban migration in past years.

Additionally, participants offered insights on the formulation process of Made in China 2025, highlighting the role played by different domestic actors in this process. As early as 2014, scholars from institutions such as the Chinese Academy of Social Sciences and the Chinese Academy of Engineering warned the Chinese government, through direct communication routes to central authorities, about the pressing need to upgrade Chinese industry. Based on such inputs, central government ordered the creation of a drafting group composed by prominent figures from the industrial sector, government and big business. After around a year and a half of extensive consultations among such actors, a first draft of Made in China 2025 was finally released in April 2015. However, as a general characteristic of policymaking in China, participants highlighted the usual adoption of accompanying plans aimed at implementing general guidelines at the local level – as observed in the case of China 2025 and other correlated strategies, such as Internet Plus, aimed at the application of internet and information technology to conventional industries.

As an example of accompanying implementation policy to Internet Plus and Made in China 2025, participants highlighted a recently released plan by the Ministry of Industry and Information Technology in the area of industrial internet applications – which provides concrete directives on incentives and implementation mechanisms, including subsidies, timetables and lists of priorities. As a key trend underlying the adoption of such plans, however, participants noted a fundamental change in Chinese approach to information technology in past years – evolving from a defensive engagement focused on mitigating cybersecurity threats, to an assertive approach based on the notion of informatization as a pathway to modernization. As evidence of the growing emphasis of the Chinese government on informatization, half of the national research priorities announced for the 2020-2030 period are in correlated fields – including megaprojects in sectors such as artificial intelligence, smart grids, big data, smart manufacturing and robotics.

Finally, complementing considerations on the China 2025 formulation and implementation process, participants noted the propagandist dimension of the plan, featuring intensive advertising from state media since its release. This visibility, however, could have contributed to criticism, particularly from the U.S. government and the business community, with regard to the plan's role in promoting unfair practices.

Is recent the brinkmanship between U.S. and China a sign of an emerging new world order? Besides potential short-term gains in some sectors, could we learn lessons for our relations with China, the U.S.? What role for WTO and the multilateral system?

The increasing trade frictions between China and the United States were noted as symptoms of an asymmetric multipolar order, associated to the rapid deterioration of the multilateral trade system. However, despite the rhetoric that the protectionist measures adopted by the U.S. against China would primarily aim to correct trade imbalances, participants indicated the underlying goal of preserving U.S. technological supremacy, particularly in light of Chinese efforts to upgrade its industry through Made in China 2025. In fact, since 2014 China has been consistently described in official U.S. national documents as a strategic economic competitor, reflecting the perception that Chinese ambitions for enhancing competitiveness and self-reliance in high-tech sectors would threaten U.S. primacy in the technological frontier. Additionally, China could pose potential risks for U.S. strategic interests associated to the centrality of the U.S. dollar and securing U.S. military advantage in the Pacific.

On the other hand, participants highlighted the current general perception within Chinese government and academia that U.S. protectionist measures would in fact aim to curtail China's technological advance, with the pretext of reducing trade deficits. As emphasized by recent investigations carried by the USTR under section 301 of the American Trade Act of 1974 – in which China 2025 is mentioned over 100 times – allegations of intellectual property theft and licensing requirements are in the core of the U.S. business community's concerns and accusations against China. However, participants defined as uncertain and controversial the extent to which the practices and instruments associated to Made in China 2025 would actually infringe on multilateral trade rules, as concluded by the U.S. investigations. In this respect, participants noted China's very particular approach to multilateralism and compliance to global norms in general. Rather than rejecting multilateral rule-based systems in principle, China would seek to influence rule setting, often differing on the interpretation of global norms – as exemplified by Chinese disagreement with an international court's verdict concerning territorial disputes in the South China Sea, on the grounds that international law was wrongfully applied to that situation. In the trade dimension, China's consistent engagement with the World Trade Organization would illustrate Chinese overall commitment to multilateralism.

Furthermore, considering domestic political dynamics in both the U.S. and China, some

participants advanced pessimistic prospects concerning a possible resolution of the ongoing bilateral dispute in the short and medium terms. In the short term, despite recent Chinese commitments towards raising imports of U.S. goods – particularly liquefied natural gas – in order to reduce the bilateral trade deficit, Trump’s recent confirmation of the imposition of tariffs on steel and aluminum would increase tensions and fears of a full-fledged trade war. In the medium term, the possibility of reducing trade frictions would be hampered by three main reasons. First, different messaging from the White House would reveal major internal divisions and lack of clarity as to the demands of the U.S. government and private sector towards China. While Trump and certain cabinet members would emphasize the imperative of reducing the bilateral trade deficit, other officials would focus on restricting Chinese access to American technology – making it difficult for Chinese actors to meet expectations and adopt effective solutions. Additionally, deep divides among the U.S. business community, as well as broader concerns with market access, would communicate conflicting demands and further aggravate bilateral tensions. As U.S. companies see their performance slowing in China in recent years, the American business community would falter on its traditional role as a vocal defender of bilateral economic relations.

Second, participants indicated the collapse of consensus on the most effective mechanisms and policies to guide U.S.-China relations. Illustrated by the withdrawal of the U.S. from the Transpacific Partnership (TPP), this disagreement would be reflected on attempts to revise mechanisms such as the U.S.-China Dialogue, with the creation of a new U.S.-China Comprehensive Economic Dialogue by the Trump Administration, featuring limited progress. Additionally, participants noted the potential impacts of new legislation proposed in Congress in order to expand the scope of CFIUS – the Committee on Foreign Investment in the United States – and further restrict Chinese investments in varied industries in the U.S., allegedly for national security reasons. Finally, a reduction in bilateral frictions would be fundamentally obstructed by Chinese firm commitment towards achieving leadership and self-sufficiency in high-tech sectors, as repeatedly vowed by Xi Jinping during the XIX Congress of the Communist Party of China and other occasions. The rhetoric of self-sufficiency, focused on reducing imports of semiconductors and core components, would be particularly harmful for U.S. businesses threatened by Chinese competition. Despite fears that China would aim to override U.S. tech companies, however, participants highlighted that China still lags behind the U.S. in various sectors, leaving room for catching-up.

From the standpoint of Latin America and Brazil what are the main impacts and trends to be tracked? What are promising areas for cooperation with Chinese companies? Towards where should government support be directed?

First, participants stressed the overall negative effects of the deterioration of multilateralism for emerging countries. Within an asymmetric multipolar order, while this deterioration could benefit great powers with capacity to engage in webs of agreements – as well as regional institutions with global reach, such as those within the Belt & Road Initiative – it would be highly detrimental to emerging powers with long traditions in multilateralism, such as Brazil. Furthermore, despite Chinese growing presence in Latin America – through trade, foreign direct investment and financing – participants indicated that, in the context of the current trade and technological dispute between China and the U.S., Latin American countries would not represent relevant actors.

Nonetheless, it would be possible to extract certain lessons from Chinese policy tradition in science and technology, as well as to identify opportunities for the region in the context of China 2025. First, while Chinese policymaking in science and technology traditionally features high degrees of coordination between academia, public and private sectors, participants stressed the longstanding challenges in the organization of the Brazilian innovation system – in which only recently private research institutes would begin to play relevant roles. As such, Made in China 2025 could offer useful insights on processes of flexible multi-stakeholder coordination during policy formulation and implementation. Additionally, the list of strategic emerging industries named by China in 2017 would indicate vast opportunities for bilateral collaboration with Brazil in the context of China 2025 – including sectors such as new generation IT, new materials, new energy vehicles, bio-industry and high-end equipment manufacturing, among others.

Finally, participants stressed the opportunities established by Chinese growing interest in the region for academic and technical cooperation, noting the increasingly frequent visits by delegations from Chinese universities and research centers, as well as student exchanges between universities. As such, there would be space for joint research with Brazilian institutions in areas of mutual interest, such as solar energy and biofuels. In this respect, participants highlighted previous agreements signed between Brazil and China during the 2012 United Nations Conference on Sustainable Development (Rio+20), for the construction of joint biotechnology research centers.

# ATTACHMENT I: JEROEN GROENEWEGEN PRESENTATION



China's efforts to become a manufacturing and internet powerhouse

May 2018

## centre: internet+ manufacturing

State Council issued 'Guiding opinions on promoting Internet+ and advanced manufacturing' on 31 October 2017. It is crucial to boost Internet+ and Made in China 2025 to promote innovation and entrepreneurship, accelerate industrial internet, and make China a powerhouse of manufacturing and innovation, said premier Li Keqiang 李克强 at the State Council meeting. The plan calls for

fostering a favourable environment for development of industrial internet	promoting the construction of internal and external company networks	reinforcing government support for basic internet construction	promoting the integration of primary, secondary, and tertiary industries
<ul style="list-style-type: none"> <li>- administrative streamlining</li> <li>- expand market access</li> <li>- promote bond and equity financing</li> </ul>	<ul style="list-style-type: none"> <li>- develop large-scale cloud platforms</li> <li>- interconnect all industrial chains</li> <li>- share industrial resources and data</li> </ul>	<ul style="list-style-type: none"> <li>- upgrade to the next generation network</li> <li>- reduce burdens for SMEs</li> <li>- improve cybersecurity</li> <li>- develop big data, AI, and other key generic industrial technologies</li> </ul>	<ul style="list-style-type: none"> <li>- form multi-layered public platforms</li> <li>- coordinate across sectors and industrial chains</li> <li>- promote smart and advanced manufacturing</li> </ul>



## ministry: plan for industrial applications

Ministry of Industry and IT (MIT) issued '2018–20 plan for promoting industrial internet applications (industrial APPs)' on 14 May 2018. The plan facilitates implementation with pilot projects, quality standards, tax deductions, funds and fiscal and institutional support.

### priorities

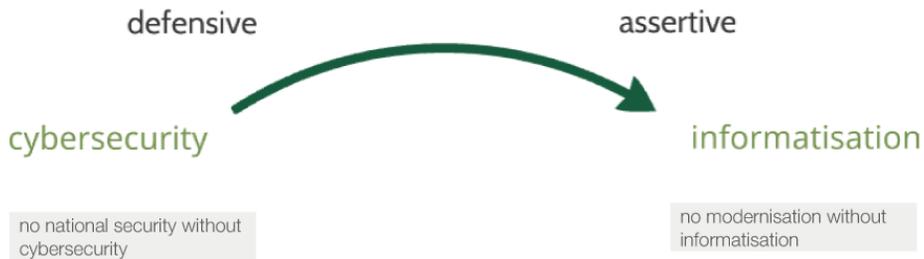
- reliable applications for
  - manufacturing projects
  - engineering facilities
  - equipment development
- basic, general applications for
  - basic materials
  - core components
  - advanced techniques
  - technological foundations
- commonly used applications for
  - automobiles
  - aviation and aerospace
  - petrochemicals
  - machinery
  - light industry
  - home appliances
  - information technology
  - electronics
- specialised applications

### timeline

- by end 2018
  - release white papers and guidelines
  - set up a standardisation committee
  - launch one or two provincial-level innovation centres for industrial software and applications
- by end 2019
  - adoption rate of APPs to reach 30 percent
  - release 100,000 industrial APPs
- by 2020
  - release 300,000 industrial APPs tailored to industries and production environments
  - standardise technical specifications and protocols
  - launch a batch of globally competitive industrial APPs
  - ensure 50 percent of sci-tech enterprises adopt industrial software
  - develop a prosperous market for industrial APPs and mobile software



#



#

## increasing emphasis on informatisation



27 february 2014

first meeting of the central leading group for cybersecurity and informatisation (now a commission)

14 june 2014

social credit system outline (2014-20)  
leading group for comprehensively deepening reforms

19 november 2014

first world internet conference held in Wuzhen  
organised by CAC

8 may 2015

Made in China 2025  
state leading group becoming an industrial powerhouse



5

## increasing emphasis on informatisation



4 july 2015

State Council 'guiding opinions on Internet+'

7 november 2016

cybersecurity law  
collecting data under the guise of security

27 december 2016

national informatisation 13th 5-year plan



6

## Cybersecurity Law: easy for data to get into China, hard to get out

### Article 37

Personal information and important data collected and generated by critical information infrastructure operators in the PRC must be stored domestically. For information and data that is transferred overseas due to business requirements, a security assessment will be conducted in accordance with measures jointly defined by China's cyberspace administration bodies and the relevant departments under the State Council.

### CAC

Measures on security assessments of cross-border personal information and important data (draft)

11 apr 2017

### Article 17

Personal information refers to various types of information recorded by electronic or other means capable of identifying a person's personal identity alone or in combination with other information, including but not limited to the name of the natural person, date of birth, identity document number, personal biometric information, telephone number and so on.

Important data refers to data closely related to national security, economic development, and social and public interests. For the specific scope see national standards and important data identification guidelines.

### CAC

Cross-border security assessment guidelines of information security technology and data (second draft) (appendix A 'important data identification guidelines')

25 aug 2017

not public

Chinese law firm

'... including nuclear installations, biochemicals, national defense industry and population health data, large-scale engineering projects, marine environment and sensitive geographical information data, as well as other important data.'



## 1+7 national big data demonstration zones

comprehensive pilot zone

Guizhou



cross-regional pilot zones (regional integration)

Jingjinji

Pearl River Delta

regional pilot zones (industrial transformation)

Shanghai

Henan

Chongqing

Shenyang

infrastructure coordinated development pilot zone (green development)

Inner Mongolia



## half of top research priorities are in informatisation

Megaprojects are the top national research priorities. After 2020, a new round of 16 '2030 megaprojects' will take over from the current 16, which were launched in 2006. Reforms starting in 2014 consolidated scattered funding into the new category of National Key R&D Programs (NKPs). NKP tenders are public and foreign institutions are encouraged to participate.



## guidance funds

Most of the major central funds on the right were set up during the previous 5-year plan (2011-15). Since 2016 the state invested C¥320 bn in Made in China 2025, calculates Economy Information Daily on 12 October 2017. This includes

- C¥10 bn by the central state
- C¥10 bn by provincial governments
- C¥300 bn pledged by CDB in 2016

NDRC, MoF and CBRC each said they are preparing additional funds.

major central state funds			
industrial transformation and upgrading fund	advanced manufacturing industry investment fund	national emerging industries investment guiding fund	IC investment fund
	C¥ 20 bn	C¥ 40 bn	C¥ 140 bn (raising another C¥ 200 bn)
major technology equipment insurance compensation	Made in China 2025 strategic cooperation agreement	the special constructive fund	strategic emerging industries fund
	C¥ 300 bn	C¥ 1.8 tn	C¥ 1 tn (to be launched)

## opportunities for collaboration where China wants to improve



## overheating market



### Foxconn Industrial Internet

C¥271 bn (US\$4.25 bn) IPO on Shanghai Stock Exchange

fast-lane approval (China still registration-based but wants more tech giants to be listed domestically)

30 percent of stock to 20 strategic investors including state-owned entities and BAT (Baidu, Alibaba, Tencent)



## formulating industrial policy

The park needs to be attuned to China's needs to be successful. Since 2015 the Chinese state is discussing its vision for industrial development under the rubrics of Made in China 2025. The implementation of this framework is led by the Leading Group for Building a Manufacturing Powerhouse, with most policy documents drafted by ministries like NDRC, MIIT, MoST and government-affiliated think tanks like CCID, ETIRI and CAICT.



## who we are

Beijing-based Australian research and advisory set up in 2009 by a former Australian diplomat – Philippa Jones and well known China expert – David Kelly

- powered by 30 analysts
- predicting emerging patterns
  - identifying driving interests in trends
  - delivering answers

2009  
year founded  
30  
employees



portfolio teams

finance	industry and energy	agriculture and fisheries	science and innovation
trade policy	geopolitics	governance and law	social policy



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for new policy announcements

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for local expert commentaries



)%

## portfolios

finance

trade

industry, energy,  
environment

governance and law

agriculture and fisheries

health, education, housing

science and innovation

geopolitics



)%

## publications

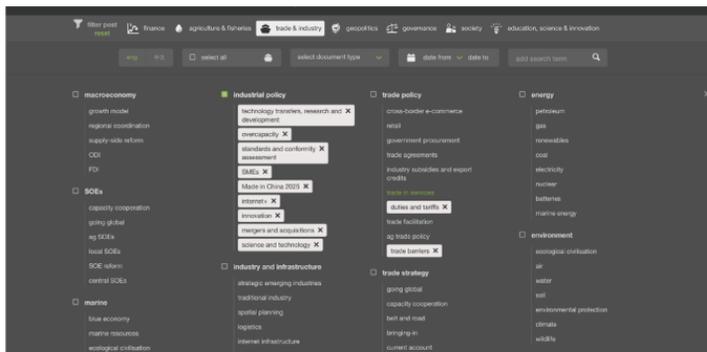
delivered by email and accessible online

policy ticker      biweekly feed of new policy and opinion

cp.position      weekly update across sectors

cp.signal      in depth analysis of domestic policy movement

cp.observer      monthly roundup of major events and trends



systematic coverage and comprehensive tagging system allows users to search for information by using relevant keywords



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## ATTACHMENT II: FACT SHEET

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The VII Meeting of CEBRI's Permanent Working Group of Analysis on China will discuss innovation and industrial policies in China, in particular the Made in 2025 strategy, and its significance for China, Brazil and the world. Unveiled by Prime Minister Li Keqiang in 2015, the new industrial strategy aims at ensuring innovation at home on key manufacturing sectors to allow China to overcome the so-called middle-income trap and move ahead in the construction of a modern socialist economy by 2035 on the road to global leadership by 2050. Those sectors include robotics, next generation IT (Internet of things, semiconductors, 5G, driverless vehicles), new energy vehicles, advanced high-speed rail, aviation equipment, high tech maritime vessel manufacturing, agricultural machinery, electrical equipment, medical devices, biomedicine, new materials. Artificial intelligence has been the object of a specific policy launched in 2017 and highlighted as crucial to ensure Chinese technology supremacy in the 21st century.

Just as other countries that moved from middle to high-income economy status before, China wants to build its own capacity to innovate and compete at the technology frontier, not only by innovating incrementally in production and costs but also by breaking technological and scientific paradigms - from Made in China to Created in China. If one hundred years ago breaking paradigms involved mass production, oil and electricity, today it is all about the digital economy and the Internet. Being the largest trading and manufacturing nation in the world, China's aspiration to ensure technological competitiveness in the long run is to be expected. Despite the challenges ahead, China is already a global leader in areas such as digital innovation and e-commerce. Companies like the big three BAT (Baidu, Alibaba and Tencent) are giants in the world by any parameter (Alibaba's e-commerce platforms such as Taobao and Tmall handles more transactions than Ebay and Amazon combined). The fact that China has a big population to feed the design and improvement of artificial intelligence technology has been hailed as one particular advantage. Another one is the relatively lax concerns with privacy in China. Overall, the lack of infrastructure or a very clear path in many areas has meant that Chinese companies leapfrogged as they grew domestically by applying digital technologies. One example are electronic payments via WeChat, since the use of credit cards had never spread across the country. Bringing together e-commerce and financial platforms, as in the case of Alibaba's Ant Financial, has been another development. Express delivery (kuaidi) are ubiquitous and have dislodged real markets or make up for them. If Shanghai was the symbol of China's embrace of globalization in the 2000s, Shenzhen – China's Silicon Valley – is the new tech hub.

The Chinese e-commerce and digital market are not only about giants. Chinese unicorns (start-ups with a valuation of over USD 1 billion) toppled US unicorns in numbers and had a total valuation of over USD 628 billion according to a study issue last March by the Ministry of Science and Technology. Actually, Alibaba, Baidu, Tencent, Xiaomi and others

have been the major supporters of those start-ups, together with the government. There is an effort now of financial regulators to bring most of those start-ups listed abroad to the Chinese stock exchange market.

According to China Policy, “since 2016 China is the world’s largest market for industrial robots. The country has a low robot density, with only 49 robots for every 10,000 workers, compared to the global average of 69 and 531 in South Korea, 305 in Japan and 301 in Germany 301. As this gap shrinks connecting all these machines to software platforms becomes increasingly important”.

China still lags behind the main Western innovators in terms of the capacity to continuously innovate. Education and the creation of the right environment and skills to spur creativity are a case in point. Another one is the demographics and the need to support rural children and domestic mobility. How far could Chinese companies go without major government support? Those issues have been addressed by Chinese policymakers and the new industrial policy has been considered a step further to the previous “indigenous innovation” and emerging strategic industries policies of the Hu-Wen period.

Also, as China Policy points out (see attached ppt “China’s efforts to become a manufacturing and Internet powerhouse”), the increasing informatization efforts are also related to national defense and cybersecurity. The governmental efforts that led to a new industrial policy involve a network of initiatives and players (universities, think tanks, research institutes, specialized committees) that are connected to the highest levels of government through the “leading group for building a manufacturing powerhouse”.

The Made in China 2025 should not be viewed as an isolated strategy as it is part of a long and ongoing process of science and technology planning which dates from the early reform period and has guided industrial strategy from the beginning. The plans have emphasized knowledge acquisition and industrial application. In the 11th Planning exercise 13 major areas of knowledge were selected as priority areas for the science and technology progress of China. Strategic industries naturally evolving from these areas were given emphasis on the 12th planning exercise. The China 2025 initiative tackles the applications of digital technologies and robotics to industries. It is the unfolding of a strategy which was first geared to catching up exercises and now purports to give solid basis to an innovation economy. It is a policy which extends the application of technologies already mastered by China to the entire industrial and service sectors. The policy is in line with similar strategies adopted by several OECD countries and in particular Germany (industry 4.0) a country which as China has a large exporting manufacturing base. The Brazilian initiatives of FINEP, the Inova programs have also been inspired by the same models. Presently the National Council of Industries of Brazil and the BNDES are also engaged in studies on the applicability of such policies to redress the laggardness of Brazilian industry.

The policy Made in China 2025 tackles industrial transformation but also improvement in China's position in the global technology value chain. Improving the capacities of the semiconductor industry, where China lags behind Korea and Taiwan is a key objective of the plan. While China has been an important exporter+ of technology goods its position its economic returns in the value chain have been low given its high dependence on imports of semiconductors. China 2025 is an industry and market oriented strategy which aims to redress this balance by increasing self sufficiency in the production of integrated circuits by 40% in 2020 and 70% by 2025. The National Integrated Circuit Industry Investment Fund was created by a government guideline in 2014 to support the initiative. It was endowed with \$19.5 billion to be invested in IC and related industries. Amongst the initial investors of the Fund are China Mobile, China Development Banks and China electronics technology Group (Poon 2018).

The policy has raised concerns among many of the incumbent innovators, competitors and high-tech manufacturers, especially the US, but also Germany, Japan, South Korea and Taiwan. In particular, in view of Beijing's decision to target local suppliers to provide 70% of "basic core components and important basic materials" in the priority industries. Semi-official and internal documents have laid out other quotas for local production, such as 40% of mobile phone chips, 70% of parts in industrial robots and 80% of those in renewable energy equipment.

Other area of concern is the huge amount of domestic investments (subsidies) to be channeled to so-called strategic sectors. As recently pointed out in a report by Gavekal Dragonomics (see suggested readings) "By the end of 2016, central- and local-government "venture funds" (essentially vehicles for subsidies) had been authorized to the tune of US\$330bn. These funds, if they actually materialize, are greater than total national spending on research and development (US\$292bn in 2016). About US\$120bn of this venture-fund cash has been earmarked for semiconductors, and about US\$35bn of this has already been put to use in three new memory-chip fabs in central China."

The fact that Made in China 2025 has been mentioned over 100 times in a recent US Investigation by USTR based under Section 301 has also attracted much attention to the Chinese strategy. Paradoxically, most of the ensuing discussion about trade war and specific tariff measures has focused on the trade deficit, while the real issue at stake is the technological supremacy in the 21st century, which is one of the main pillars of a new world order. As Kroeber interestingly argues "The rivalry between the US and China is not principally about trade, and is only marginally about Donald Trump. It is really about China's emergence over the last five years as a formidable bidder for economic and political influence, an aspirant to technological leadership, and a major global investor...." After controlling the major political and economic risks for Chinese stability since 2013, Xi Jinping has been strengthening long-term strategic objectives, "...including Made in China 2025 industrial policy; a program of "civil-military fusion" that aims to upgrade China's defense-industrial complex; and the Belt and Road Initiative, which is a grand strategy for

increasing China's global influence through improved economic connectivity.” Another point of concern with regard to Chinese industrial policies is intellectual property. The accusations against China for distorted or illegal actions in this area have perhaps been the object of the broadest consensus in different countries and according to trade analysts, national trade commissions and media reports. Stephen Roach (see suggested readings) brings a different perspective to the table as he argues that one has to take a more impartial and long-term historical stance in assessing those alleged distorted practices.

The specific tit-for-tat discussions and brinkmanship between US and China in the last weeks, combined with high level visits and negotiations that have resulted in specific commitments from China, have impacted markets around the world and spurred debates about the possible consequences of a trade war. They have also anticipated discussions on long-term and strategic aspects of a possible new world order. Some authors such as Brahma Chellaney provocatively argues (see suggested readings), there is a sense that the world has been watching the unfolding of a G-2 order where “Trump’s “America First” strategy and Xi’s “Chinese dream” are founded on a common premise: that the world’s two biggest powers can act in their own interest with impunity. The G2 world order that they are creating is hardly an order at all; for everyone else, it’s a trap.”

Other observers such as Zaki Laidi see the current US trade policy as evidence of the demise of multilateralism and the liberal trade order which has guided the international economy since the end of WWII. Although China has maintained moderate arguments always in favor of supporting the multilateral system, the last weeks have also raised the need for a serious reassessment of the current situation of the WTO, which has been undermined by unilateral actions. For Brazil and other developing and emerging nations the current trends are very unsettling and a clear setback to the aspirations prevailing only a few years ago. Volatilities in international markets may bring short-term gains to the country in a few areas – such as soybeans – but they are risky bets in the long-term, where stable rules are a precondition for an orderly growth of international trade.

If one considers the strategic sectors selected by Made in China 2025, there are areas in which Brazil could bring important complementarities. Being an important or potential market in rails systems, maritime vessels, IT technologies, new energy vehicles, agricultural machinery, electrical equipment etc. could give the country the opportunity to explore partnerships with China, even if restricted to certain specific areas in those sectors. As discussed in the 6th session of the group, new and alternative sources of energy, an area in which Brazil is an important player, are also crucial for the advancing qualitative economic growth in China. Bilaterally, the China-Brazil High-Level Coordination and Cooperation Committee has one of its subcommittees dedicated to Information Technology and Industrial Cooperation, which could be an important forum for discussing and implementing new partnerships.

Given the large flows of Chinese investment to Brazil in recent years and the vast potential yet to be explored, there is a need of also thinking in strategic terms about the technological

content of those investments and how to attract leading- and cost- and energy-saving technologies. One example is the ultra-high voltage technology applied by State Grid in the transmission lines in construction. Other technologies are in use in solar and wind farms. Possible areas to benefit from advanced technologies from China are rail systems, high tech maritime vessels manufacturing, agricultural machinery, biomedicine, supercomputers and digital services and e-commerce. Chinese investments are gradually diversifying from energy and mining resources to services areas, including investment in the financial sectors and digital services (Ali Express, 99 Taxi). Chinese telecommunication giants Huawei and ZTE are important players in Brazil.

Brazil could also leverage on comparative advantages in applied technology in its banking and financial system, tropical agriculture and tropical disease. It would also be important to foster Brazilian investments in China, which could combine Brazilian comparative advantages to Chinese needs and market innovations (food products and distribution, cosmetics, fashion products etc.).

- Made in China 2025, the digital economy, artificial intelligence and the fourth industrial revolution: what is at stake for China and the world? How does China formulate and implement industrial policies?
- Is recent brinkmanship between US and China a signal of an emerging new world order? Besides potential short-term gains in some sectors, could we take lessons for our relations with China, the US? What role for WTO and the multilateral system?
- From the standpoint of Latin America and Brazil what are the main impacts and trends to be tracked? What are promising areas for cooperation with Chinese companies? Where does government support should be directed to?

## Suggested Readings

Arthur Kroeber. **“What is really at stake in the US-China rivalry”**. Gavekal Dragonomics research. May 9, 2018.

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The Guardian. **“Made in China Policy at the Centre of tariff war with the US”**. <https://www.theguardian.com/world/2018/apr/04/made-in-china-policy-at-centre-of-tariff-war-with-us>. April 4, 2018.

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Zaki Laidi. **“Is multilateralism Finished?”** Project Syndicate, May 18, 2018.

## ATTACHMENT III: VII China Review Group Meeting Participants

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