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BRAZILIAN CENTER FOR INTERNATIONAL RELATIONS

ASIA PROGRAM

XXIV CHINA ANALYSIS GROUP MEETING

REPORT XXIV, YEAR IV

JUNE 14, 2021

Online discussion panel via Zoom

DIRECTIONS OF INNOVATION POLICY: CONTRASTING VIEWS OF CHINA AND THE US

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The Brazilian Center for International Relations (CEBRI) is an independent think tank that contributes to establishing an international agenda for Brazil. For the last twenty three years, the institution has engaged in promoting pluralistic and proposal-oriented debates on the international landscape and Brazilian foreign policy.

CEBRI prioritizes themes with the greatest potential to leverage the international insertion of Brazil into the global economy, proposing pragmatic solutions for the formulation of public policies. CEBRI's work was recognized by the University of Pennsylvania's top global think tank ranking, which considered the institution the 2nd best think tank in South and Central America in 2020.

The Asia Program is one of the twelve regional and thematic programs currently operating at CEBRI. The Program is coordinated by CEBRI's Trustee Anna Jaguaribe, CEBRI's International Advisory Board member Ambassador Marcos Caramuru, and by the Senior Fellow Phillip Yang. External experts can be invited to participate in ad hoc activities, projects, and seminars, according to the Program's agenda.

ASIA PROGRAM

The Program promotes a systematic monitoring of matters relevant to international relations and Brazilian development, particularly those related to China. Special attention has been given to monitoring the ongoing economic reforms and political transformations in China, considering their global effects and impacts in Latin America and Brazil. This continuous examination allows CEBRI to provide information and analysis to its members, partners and to the Brazilian government, contributing to the construction of Brazil's strategic position towards China, as well as helping increase knowledge about China within Brazilian society.

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Anna Jaguaribe

Trustee at the Brazilian Center for International Relations (CEBRI). Director of the Institute for Brazil-China Studies (IBRACH). Sociologist with a PhD from the New York University and post-graduated at the École Pratique des Hautes Études. She lived and researched in China from 1998 to 2003. She worked at the United Nations in New York, was a consultant at UNCTAD in Geneva, and a Professor at the Federal University of Rio de Janeiro (UFRJ).

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Member of the International Advisory Board of the Brazilian Center for International Relations (CEBRI). Brazil's Former Ambassador to the People's Republic of China, Consul General in Shanghai, Ambassador of Brazil to Malaysia, President of the Financial Activities Control Council (Coaf), Secretary of International Affairs at the Ministry of Finance and Executive Director of the World Bank. He was also a partner and manager at KEMU Consultoria. He has a degree from the Rio Branco Institute (IRBr) and a degree in Administration from the Federal University of Rio de Janeiro (UFRJ).

SENIOR FELLOW

Philip Yang

Philip Yang is the founder of Urbem, an institution dedicated to the structuring of urban projects. He holds a Master's degree in Public Administration from Harvard Kennedy School. He was a diplomat in Brazil's foreign service between 1992 and 2002, having served in Geneva, Beijing, and Washington. He is/was a board member in the following institutions: MIT Corporation Visiting Committee of the Department of Urban Planning (2012-2016); Arq.Futuro, one of the main spaces for debate on architecture and urbanism in Brazil; the Symphonic Orchestra of the State of São Paulo (OSESP); the City Council of São Paulo Municipality (2013-2016); the Rio de Janeiro City Council (2013-2016); and the Harvard University Brazil Office Advisory Group.

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DIRECTIONS OF INNOVATION POLICY: CONTRASTING VIEWS OF CHINA AND THE US

Report by: Kamila Aben Athar

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Introduction

Anna Jaguaribe, Trustee at CEBRI

The United States and China have embarked in a powerful program of industrial policy and support of innovation. The US recently voted with bi-partisan support a strong bill approving large scale investments in industrial policy and innovation which many have called a US version of Made in China 2025.

China in turn has placed innovation as a central target of its recently approved 14thfive-year plan. The plan is supplemented by a specific plan targeting innovation. Innovation and industrial policy are different issues but intertwine at many levels. Some industrial policies also look into the future as necessities to give a manufacturing base to innovation and future industrial sectors.

This webinar aimed to discuss innovation and those aspects of industrial policy associated with it. The purpose of the webinar was also to discuss similarities and differences in the innovation policy of each country and what guides these differences.

Until recently, the innovation program of China was closely determined by catching up approaches, which also guided its industrial policy. With the explosion of the Chinese internet and its major industries, advances in artificial intelligence and data gathering, innovation gained an identity of its own with specific design, financing tools and institutional support structures.

In the US, where innovation has always had a functioning apparatus of its own, diversions also began within the system between funding for basic research and financial backing for pre-commercial and commercial innovations. As in China, the big internet companies developed financial arms which commanded its operation and direction of innovation. As Mazzucato and others pointed out, the system began to lose focus and its mission orientated drive. Companies compete for segments of the market losing focus on innovations or the future.

How different have these two systems become, what seems to be the various acting motivations of the firms, what are the links between basic and applied research, and how do the institutional apparatus linking them operate? This was the background for this webinar.

Guiding Questions

To help us analyze these complex and dynamic issues, at its 23nd Meeting, the China Analysis Group proposes three themes and questions to our speakers and audience:

1. How the 14th five-year plan shifted innovation and industry policies in China? What are the main goals and objectives of the Chinese government in the innovation sector? How did innovation gain an identity of its own, leading to new financial tools and institutional support structures in China?

2. What are the similarities and differences in the innovation policy in China and United States? What are the differences between decentralized and centralized systems? What are the main challenges for U.S. industrial policy?

3. What can be expected for Chinese and U.S. innovation and industrial policies in the future, as well as their bilateral relations? Will Biden administration innovation policies reverse the current scenario of lack of focus, mission-oriented drives, and investments? What are the opportunities for other countries, like Brazil?

XXIV Meeting Report

1. How the 14th five-year plan shifted innovation and industry policies in China? What are the main goals and objectives of the Chinese government in the innovation sector? How did innovation gain an identity of its own, leading to new financial tools and institutional support structures in China?

According to participants, the current Chinese industrial policy diverges from the Japanese and South Korean models developed in the 1970s. One of the fundamental differences is that China is trying to move at the technological frontier, having the industrial policies designed to project them beyond the existing global frontier. Thus, the 14th five-year plan shows the Chinese aim to continue intensifying its commitment to the techno-industrial policy. Historically, China has had a value chain-related understanding of industrial policy, which is arguably one of the strengths of its approach. The new plan has only sharpened this focus due to the vulnerability cross-border value chains might present to Chinese ambitions and aspirations. Moreover, the 14th five-year plan presents fundamental changes, especially in industrial policy, now based on a scientific and technological self-reliance approach. On one hand, participants argued that this could have a positive outcome because it could lead to an increase in basic research as a share of total R&D, contributing to world knowledge. On the other hand, the idea of self-reliance could be dangerous when applied to scientific knowledge, even peripherally, creating more tension.

In the mind of Chinese policymakers, especially Liu He, former Chinese vice premier, China's objective is to establish a pioneering market-based system of government steerage and planning. With increasing monitoring and manipulation, the 14th five-year plan states that foreign companies and markets should depend upon China. This would guarantee greater retaliatory capability against the United States in case their relations get worse. More importantly, China believes it is creating a form of the steerage of the economy, in which it can shape the development of more cost-effective policies than any Soviet-based models of central planning. A key part of this is financial instruments and they depend on government industrial guidance funds, which have raised US$ 1.5

trillion for investment in targeted sectors. Thus, participants stressed that financial channels, which are structured to be reasonably efficient and resembles venture capital funds, will drive the Chinese economy to a new level. At the same time, the Chinese government is implementing market-based policies to weed out the excess entry of unqualified entrants since it could lead them into bankruptcy.

Participants highlighted that the 14th five-year plan lays out a macroeconomic vision for China. Distancing from a market-based model that was predominant during the early 2000s, the Chinese government has intensified its presence, focusing on manufacturing. Currently, in every country, including Brazil, the trend has been of manufacturing decline as a share of GDP after a certain middle-income level. Chinese policymakers face a similar decline, but China's manufacturing share is still high in a global context. For this matter, the 14th five-year plan states that China does not only want to avoid decline any longer; rather, become a high-tech manufacturing power and a manufacturing-driven economy.

Another relevant shift is that the 14th five-year plan visualizes infrastructure investment and guided urbanization strategy as fundamental elements of industrial policy. In a way, participants stressed that this can be observed by China's success in developing high-speed rail in the last 15 years and 5G telecom in the last decade. The Chinese government has created innovative smart cities programs that combine laying concrete with having sensors and high-speed communications network, which are unprecedentedly integrated into industrial policy at a high level. The proliferation of plans could have resulted in a mismatch between different plans. However, in the Chinese case, participants highlighted that the multiplication of plans pushes the system towards a greater role for explicit government coordination, making the Chinese system more planned.

This attempt to integrate infrastructure technology policy and urbanization is at a fairly decentralized level, even with central government guidelines playing a bigger role in it. In the case of Shanghai, the 14th five-year plan intensifies the urban transport network, with the construction of new high-speed rail lines. The goal is to double these rail lines in the next 5 years, creating a dense web of high-speed communication with a new vision of industrialization. For this purpose, the Chinese government will build five new independent and comprehensive node cities around Shanghai, all connected by high-speed rail. In addition, Shanghai is going to build 40 specialized technology parks, forming a cluster of related businesses that would subsidize the weak points in the production chain. Most importantly, participants highlighted that this increases government control and coordination since it becomes necessary to create self-sustaining momentum and guarantees that different approaches to planning are consistent and not incumbent.

Lastly, national security is a prominent part of the Chinese industrial policy. According to participants, this is a response to Washington's pressure, but also a profound and

comprehensive commitment to government steerage, slowing down the shift towards a service-based economy, and high investment in infrastructure, especially transportation. China is shifting the focus of development policy back towards developed areas, like Shanghai, because these areas are going to provide the impetus for China's new high-tech policy. As a result, participants argued that China could impede the rebalancing of the economy that otherwise might naturally occur. Although Chinese authorities affirm that the country remains committed to globalization, the vast magnitude of subsidies and other supports is moving China away from efficiency-based redistribution of production and global interdependence, jeopardizing private and small-scale firms. For the last two years, China invested in the weak points of supply chains markets to insulate from disruption and protect against interruptions, becoming more self-reliant.

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2. What are the similarities and differences in the innovation policy in China and United States? What are the differences between decentralized and centralized systems? What are the main challenges for U.S. industrial policy?

Since the 1970s, the United States has made substantial investments to create a developmental network state. The model was based on the Defense Advanced Research Project Agency (DARPA), established in 1958, during the Cold War. Essentially, DARPA's mission was to invest in projects and researches that would lead to military weapons in 20 or 30 years. This resulted in the creation of computer science departments at major universities. Together, their mainframe computers were connected, constituting the earliest form of the internet, the so-called Advanced Research Projects Agency Network (ARPANET).

According to participants, this decentralized model was a product of self-conscious state innovation policy and pioneered in terms of developmental network state, fundamental for producing global dominance for over 50 years. This networked policy consists of dealing with a critical technological bottleneck by empowering people throughout the production chain, opening up the process to different innovations. Participants pinpointed that this is the center of the alternative model the United States developed, which has government-funded centers for innovation as its dominant location of innovation, where industry scientists and engineers work together with publicly funded experts to overcome technological problems. This is often done with big atomic laboratories, such as Lawrence Berkeley Lab, Los Alamos, Oak Ridge, as well as university centers.

Innovation is increasingly a product of these public-private collaborations. At the core of the Endless Frontier Act is the funding of more decentralized innovation centers, which would create an umbrella organization, where publicly funded scientists and engineers would work closely with the private sector, scientists, and engineers. Moreover, participants stressed that many of these institutes and centers are designed to produce research clusters that would spin off new companies and industries. For example, the Obama administration was designed to created 14 advanced manufacturing institutes that would serve as clusters to facilitate the growth of new firms and sectors surrounding them. The Endless Frontier Act includes provisions to expand the funding for these advanced manufacturing institutes, as well as creating other kinds of regional innovation hubs.

At the technological frontier, participants discussed that centralization is not often the best approach because there is no way of knowing what are the right choices. The solutions must emerge organically out of the cooperation and collaboration of multiple different groups of experts. The developmental network state is highly productive because it continues to involve central government, providing various forms of financing for research and development, supporting firms to move technologies, and leaving the solving of technological problems to a decentralized network of firms and institutes. Participants highlighted that when a central government, like the Chinese, invests heavily in a particular technological problem, there is no guarantee of success. This is exemplified by semiconductors production in China, where the government attempted to be competitive but found it difficult within the centralized model.

Therefore, participants discussed that an important difference between the United States and China is that the former has a light-touch industrial policy, which is consisted of being networked and having a limited budget. For example, the DARPA budget is relatively small when compared to some Chinese programs. However, it is well distributed, flexible opportunistic, focused on a particular technology rather than an industry, and it doesn't have any set ideas about how will shape the fundamental economic development that structures the economy. Regarding the COVID pandemic, the vaccine was a product of a developmental network state, which consisted of essentially the U.S. government and other governments providing funds to finance research and development over a long period with different research groups. These laboratories came out with diverse plans and vaccines at a remarkably rapid pace.

Oppositely, China is a developmental bureaucratic state and has a heavy-touch industrial policy. Although it has networked characteristics and accepts the possibility of failure by funding multiple different regions and multiple different countries, the Chinese government commits to industries as a whole, invests, and puts up barriers that distort the market, having many costs and hard budget constraints. For example, when Chinese venture capital fails, local governments need to bail them out, resulting in additional financial problems. Thus, this model is marked by having a central government exercising a high degree of control over the innovation process and trying to direct investments funds to particular industries and firms to overcome technological hurdles and develop new industries. Participants argued that this developmental bureaucratic state is particularly good at catching up, but when it comes to dealing with moving production to the technological frontier to developing new products and processes, like what China is aspiring to do with the 14th five-year plan, the developmental network state is a more effective instrument. Shenzhen is a piece of evidence since Chinese authorities have allowed the region to develop on its own and many innovative products and solutions in China happened there.

Participants identified that another contrast in both models is that China gives focus on three coastal regional centers, while the United States invests in de-centered areas. Rather than just focusing on Silicon Valley, Cambridge, and other places with high-tech clusters, the idea is that other cities, such as Youngstown and Nashville, can become regional technology centers. There's a political consensus to investing federal budget to build up the innovation capacity, allowing the development of industry and employment to spread out across different parts of the country.

Although U.S. developmental network state effectively generated new industries and new technologies, participants pinpointed that three main problems endanger this model. First, the United States has been pursuing a winner-takes-it-all model, making the first firms that go into the marketplace get all profits and then systematically resist paying taxes. For example, Apple is heavily dependent upon publicly funded science and technology and yet is an international tax evader, not paying to sustain the system that benefits from.

Second, there is an increasing level of monopoly power that nurtured the previous generation of technology firms. Companies like Apple, Microsoft, and Google have become monopolists and they're in a position to gobble up the new firms. Since the model of developmental network state is heavily dependent upon the creation of new firms or startups, they are important in developing new products. However, this model is endangered by monopoly power because these big firms are increasingly using their portfolios of patents to stifle innovation or simply buying up any firm that could be potentially competitive.

Third, there is not enough financing available for startups, which jeopardizes the current venture capital system. Alongside the lack of federal investment, many firms driven by private equity and other predatory financial actors have become simply interested in pumping profits out of existing production, uninterested in investing.

Therefore, participants highlighted that the financialization, the pursuit of short-term profits, and the excessive power of existing monopolies are threatening the future of the U.S. economy and undercutting its potential dynamism. This results in internal battles within firms among scientists, engineers, lower and top-level managers. For this matter, infrastructure spending gains more importance because it can tip the balance of power in favor of those firms that are interested in actually producing innovative solutions and not simply extracting more profits.

The developmental bureaucratic state is particularly good at catching up, but when it comes to dealing with moving a production to the technological frontier to developing new products and processes, like what China is aspiring to do with the 14th five-year plan, the developmental network state is a more effective instrument.

3. What can be expected for Chinese and U.S. innovation and industrial policies in the future, as well as their bilateral relations? Will Biden administration innovation policies reverse the current scenario of lack of focus, mission-oriented drives, and investments? What are the opportunities for other countries, like Brazil?

According to participants, China and the United States are pushing each other towards a more extreme reliance on industrial policy. In the last 20 years, their political economies shifted from being ideologically committed to market-driven outcomes to accepting government steerage. Deepening upon the outlook, this could be either a race to the bottom, interpreting China's initiatives as forcing other countries to also step up government intervention in response, or a welcome shattering of the ideological hegemony of market fundamentalism and neoliberalism, as countries accept a more nuanced and diverse role for government in their economy. Although the relevant position of the United States and China continues similar to what it was before, since China was already carrying out an expensive, interventionist, and bold industrial policy, the pressure intensified due to the Trump and Biden administrations' measures. In particular, participants highlighted the so-called "Entity List", which prevents any U.S. supplier or technology from going into certain designated Chinese companies, including Huawei and SMIC. In response, Chinese industrial policy is becoming even more expensive, interventionist, and oriented towards national security. By contrast, the United States is being pushed to develop its small and not very successful industrial policy, which could lead up to new opportunities.

The Endless Frontier Act was partly sold as the United States responding to China's challenge. However, participants mentioned that the document goes beyond this anti-Chinese rhetoric because the U.S. Chamber of Commerce and private sector's lobbies have been pushing for this increased government research and development spending for a long time. Even during the Trump administration, when the federal budget significantly cut R&D spending, Congressional Republicans protected those programs by investing in them locally, making sure that government laboratories and the network of R&D programs would keep getting funded. Therefore, participants highlighted that there is already a significant continuity in this U.S. policy during the Biden administration. However, participants also stressed that there's another part of the Biden administration policy, which constitutes a major philosophical departure from the developmental network state model. Since the Obama administration and the U.S recovery act, U.S.

policy has been moving from a generalized light-touch innovation policy to directly support and finance manufacturers. However, the last report on supply chains from the Biden administration stated explicitly that semiconductors, pharmaceuticals, batteries, and materials need government funding to bring major sectors of global value chains back or for the first time to the United States. If this is carried out, this would be an innovation in the U.S. industrial policy since it mentions the main sectors.

Participants pinpointed two particular contingencies in the U.S. model. First, the infrastructure spending that the Biden administration wants to pursue over the next five to seven years, at the level of US$ 1-2 trillion, is essential to create the necessary demand and funding to support new firms to start up, as well as revitalize the U.S. innovation system. Second, there needs to be a significant advance in antitrust enforcement. The established firms became very powerful and they are acting as a block on future technological development. Participants stressed that a combination of congressional and federal action is required to open up the internet platforms to greater competition and to place restraints on the power of these dominant corporations. Although the U.S. innovation engine will likely be revitalized by the Biden administration, it is not certain. If it does not happen, the threat is the return of Trumpism and authoritarianism back in the United States.

Regarding technology, participants discussed China's ability to encourage on a broad scale the creativity required to innovate. In the United States, students are encouraged to question the existing paradigm, which creates space for creativity and innovation. In organizational terms, it is not clear whether Chinese science and engineering are encouraged to the same critical thinking. Participants highlighted that this difference is not a cultural characteristic of Chinese people, but rather a reflection of the communist party's imposition of ideological control on people, which has gotten worse in the last five years. Moreover, China's economic and technological success came from big companies that grew up outside of the framework of China's central government direction. Huawei, Alibaba, and Tencent are unique entrepreneur-driven companies that had enough space to grow up in the 1990s and 2000s. Thus, even though there are more resources for innovation than ever, China is making it harder for people not just to think critically, but also act innovatively and create interesting new products and services.

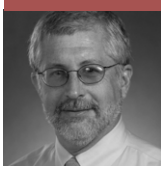
Lastly, participants also evaluated whether China and the United States are decoupling or not. On one hand, the decoupling is happening because not only there is a lack of trust between them, but they also actively distrust each other. In every recurrent interaction, Beijing and Washington seek ways to protect themselves from one another. On other hand, the degree of interdependence and interpenetration between these two countries is very high. Chinese exports to the United States increased fivefold from 2001 to 2017.

Although it peaked in that year, it is still at a very high level and U.S. private sectors are deeply entrenched, with the possibility of having new sectors, like Wall Street, becoming involved. This could represent that they are not decoupling because there is an enormous economic benefit from cooperation. Thus, Chinese indigenous innovation could pursue the creation of an innovative environment that contributes more to new discoveries and processes, whereas self-reliance implies a withdrawal a stepping back from global interactions. Participants discussed that there will be a prolonged period where both countries will remain cautious with each other, trying to figure out what they can afford to do together and what they can't. This potentially opens up many opportunities for other countries and actors, such as Vietnam, Mexico, and possibly Brazil.

> *Digital economy in China already represents 36% of the GDP, and e-currency may be one of the answers for its rapid expansion. Yet, the way e-Renminbi can be accepted and internationalized remains to be seen. For this purpose, there is a need for international standards and agreements to allow digital currencies to be implemented and used in all countries.*

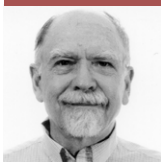
Attachments

Biographies



Barry Naughton

Barry Naughton is the So Kwanlok Professor at the School of Global Policy and Strategy, University of California, San Diego. Naughton's work on the Chinese economy focuses on market transition; industry and technology; foreign trade; and political economy. His most recent book is The Rise of China's Industrial Policy, 1978-2020. His first book, Growing Out of the Plan, won the Ohira Prize in 1996, and a new edition of his popular survey and textbook, The Chinese Economy: Adaptation and Growth, appeared in 2018. Naughton did his dissertation research in China in 1982, and received his Ph.D. in Economics from Yale University in 1986.



Fred Block

Fred Block is Research Professor of Sociology at the University of California at Davis. He is an economic and political sociologist who has sharply criticized the market fundamentalist ideas that have dominated U.S. politics in books that include The Vampire State (1996) and The Power of Market Fundamentalism: Karl Polanyi's Critique (with Margaret Somers, 2014). For the last fifteen years, he has been studying the complex web of government programs in the United States that move technologies from the laboratory to the marketplace. Some of this research is included in State of Innovation: The U.S. Government's Role in Technology Development (edited with Matthew R. Keller, 2011).

Adriano Proença

Senior Fellow at the Brazilian Center for International Relations (CEBRI) and Associate Professor at the Department of Industrial Engineering of the Polytechnic School and collaborator of the Production Engineering Program of COPPE, both at the Federal University of Rio de Janeiro (UFRJ). His teaching, research, development and innovation activities are focused on Strategic Management, Technology and Innovation. He has coordinated a research project on Innovation and Competitiveness in Chinese Industry (2010-11), among others, and has followed the evolution of the innovation effort since then. He is a member of the Scientific Council of IBRACH.

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Sanofi
Santander
Shell
Siemens Energy
SPIC Brasil
State Grid
Suzano
Tecnoil
Total E&P do Brasil
Vale
Veirano Advogados
Vinci Partners

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Director of Institutional Relations and Communications
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Projects Manager
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Projects Coordinator
Hugo Bras Martins da Costa

Projects Analyst
Gustavo Berlie

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Sofia da Silva Urech

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Partnerships Coordinator
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Caio Vidal

Special Projects Analyst
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Intern
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Communications and Events Manager
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Events Coordinator
Nana Villa Verde

Institutional Communication Coordinator
Renata Fraga

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Natasha Mastrangelo
Paula Reisdorf

Events Analysts
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Nana Maria Barbosa

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Rigmor Andersen

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Administrative-Financial Coordinator
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