KONRAD ADENAUER STIFTUNG

POLICY NOTE

Geopolitics and the Economics of Innovation: Different Strategies

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Geopolitics and the Economics of Innovation: Different Strategies

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International Politics

Reorientation of Multilateralism

This note reflects discussions of the CEBRI-KAS Project on the future directions of multilateralism.

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1 Introduction[1]

There are several ways to define the different "technological eras" since the original industrial revolution of the late XVIII century. Some authors focus on the continuity of the characteristics that define the industrial modernity, contrasting the technological developments of the past three centuries with the socio-, techno- and economic organization of the mostly agrarian world that preceded it.

Others identify successive waves of industrial or technological "revolutions", which would follow recurrent patterns of emergence and diffusion and yet create unique impacts on established structures.[2] Notwithstanding these different definitions, most authors agree that the digital innovations of the last 40 years have been exceptional: despite the risk of ample disruption (for incumbent firms, regions and nations), these innovations open up opportunities for widespread socio-economic development.

Nevertheless, associated with these opportunities is the risk of hegemonic conflicts. This policy note will discuss economic and political aspects and dynamic trends related to the diffusion of disruptive digital technologies amidst the process of globalization of value chains. It will take into account the offshoring of manufacturing capacity from the West to the East, the re-emergence of active industrial and innovation policies, and geopolitical aspects, which are exemplified by the trade and technological conflict between the US and China, exacerbated in the past few years.

It will be argued that the current SARS-CoV-19 pandemic has worked as a magnifying glass for such trends with important implications for the governance of the trade system and of the digital technologies as well as for the prospects for an innovation based sustainable global development path. The policy note ends with brief reflections on the repercussions for developing countries, in general, and for Brazil, in particular.

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2. Amongst the former, we can point to the book by Erik Brynjolfsson and Andrew McAfee (2014). Amongst the later, the work by Carlota Perez (2002), in the neo-Schumpeterian tradition, is of seminal importance. More recently, Johan Schot and Laur Kanger (2018) developed a framework that can be seen as providing a synthesis of the two approaches.

2 Disruptive digital technologies, globalization and national innovation strategies

Amidst the process of diffusion of disruptive digital technologies, a new global division of labour emerged in the 1990s, in which transnational electronics corporations decentralized their value chains, encouraging the creation of local networks of first and second-tier suppliers (manufacturers and service providers). With the intensification of trade and investment flows, globalization became deeper and wider.

Asian economies (with their ability to "govern the market" and to slowly climb the technological ladder, combined with low wages) were well positioned to benefit from these dynamics, which resulted in a tilted "playing field" towards the East – despite neoliberal policies that sought to *level* the playing field to all players, be they corporations or nations.

Some observers argue that the 2008 Global Financial Crisis (GFC) put a halt to this techno-economic cycle, leading to a phase of "secular stagnation". More thorough analysis shows that this is not the case. There are still plenty of opportunities for technological innovation and economic growth, especially related to the widespread adoption of digital technologies (*digital transformation*) and to the transition to socio-environmental sustainability (*green growth*). Still, the aftermath of the 2008 GFC was a time of reckoning for Western countries in general and the US in particular, as an important part of their manufacturing industrial base migrated to Asia, leaving behind an economic vacuum that affected individuals (workers) and whole regions.

Suddenly, the no-hands approach to industrial policy went out of fashion. Active industrial policies became the order of the day. Technological innovation and the innovation economy became centrepieces in policymakers' recipes for recovery. Following the enactment of the *American Recovery and Reinvestment Act* in 2009, the trend of industrial and innovation policy activism gained momentum with what appeared as a new wave of disruptive digital innovations – dubbed the "Fourth Industrial Revolution" (or "Industry 4.0") or the "Advanced Manufacturing" revolution. To seize the opportunities created by new "general purpose technologies" and address the challenges their economies were facing, more and more national governments launched industrial and innovation policy plans. The United States' *Advanced Manufacturing Partnership*, established in 2012; Germany's *New High Tech Strategy*, published in 2014; or the United Kingdom's *Industrial Strategy*, from 2017, are all examples of such impetus. But not only the West promoted active industrial and innovation strategies, Asian countries reacted, with China, Japan and South Korea all launching their own "advanced manufacturing" and digital innovation strategies.

3 The US x China trade and technological conflict

In spite of the 2008 GFC, China not only continued but also solidified its position at the centre of the current global division of labour and world trade system.

It is the first or second most important trade partner to the majority of developed and developing economies, one of the largest foreign capital investors in the world (and the largest foreign creditor of the US), and its companies are present in most manufacturing global value chains (from textiles through electronics to medical equipment). Representative of the Chinese consolidation in the global playing field is its surpassing of Japan as the second-largest economy in the world in 2010. In this context, the emergence of China became not only a matter of industrial and technological competition, but also of potential geopolitical conflict.

In 2013, China announced the policy of *One Belt One Road*, which in 2016 became known in the West as the *Belt and Road Initiative*[3]. The initiative focuses on Chinese infrastructure investments in almost 70 countries – from Asia and Oceania through the Middle East and Africa to South and North America – and was broadened to include a *digital* element as well. The new *Digital Silk Road* is thus based on four pillars (Cheney, 2019): investment in digital infrastructure abroad (5G cellular networks, fibre optic cables, data centres etc.); development of advanced technologies in the fields of artificial intelligence, telecommunications, cloud computing and data processing; e-commerce; and digital diplomacy and governance, which include a call for "cyber-sovereignty" over technological standards.

It is against this background that, in 2018, when the US trade deficit with China reached USD 419 billion, the President of the United States Donald Trump announced a "trade war" against China. This took the form of significant tariff barriers, amounting to US$ 250 billion – or almost half the value of US imports from China. The top five imported goods affected by the US tariffs were telecom equipment, computer circuit boards and processing units, metal furniture and computer parts. In retaliation, China imposed its own tariffs to US goods, amounting to US$ 110 billion – or US$ 10 billion short of what China imported from America in 2018. Trump then threated to further increase the tariffs, which he did in 2019 and was followed by another increase by China – leading also to a rhetorical escalation of the conflict. For instance, when Washington symbolically designated China as a "currency manipulator", Beijing reacted with a warning that this move would trigger turmoil in financial markets. Indeed, stock and currency markets fluctuated according to the last piece of news about the US-China trade dispute.

Aside from tariff barriers levied on Chinese imports, the United States also took other measures against China on the grounds of national security and human rights reasons. In October 2019, the "blacklist" of Chinese firms that were to seek explicit US government approval before purchasing US made components included several artificial intelligence and telecommunications corporations, amongst which the Chinese giant Huawei (officially designated as "backed by Chinese military"). A struggle also emerged around Taiwan Semiconductor Manufacturing Company (TSMC), the leading manufacturer – from the "rogue province" – of customized semiconductors, including for military use and 5G telecommunications, which would also need to seek an official US license before shipping its products to Chinese manufacturers (Huawei, in particular). Subsequently, TSMC announced plans to build a new USD 12 billion manufacturing facility in Arizona. The US also reacted to China's *Digital Silk Road* initiative by including digital governance aspects in its diplomatic and trade negotiations, and began to pressure its allies to ban Huawei's 5G equipment from national wireless networks.

3. Its official name can be actually translated as the *Silk Road Economic Belt and 21st-Century Maritime Silk Road Development Strategy.*

4 The outbreak of the SARS-CoV-19 pandemic as a magnifying glass of current trends

In December 2019 the conflict appeared to have suddenly cooled down, with the US and China announcing an initial trade deal to avoid further tariff impositions and later remove other trade barriers.

The US had dropped its (mainly symbolic) designation of China as a "currency manipulator". In that same month, however, a new coronavirus (CoV-19) associated with a severe acute respiratory syndrome (SARS) appeared in the Chinese city of Wuhan. Three months later the World Health Organization (WHO) declared the outbreak of "SARS-CoV-19" a pandemic, triggering a new rhetorical war between the United States and China, which blamed each other for the responsibility over the emergence of the virus.

The SARS-CoV-19 pandemic hit the world hard. As of September 2020, there are 28 million confirmed cases and 900 thousand deaths worldwide. The economic impact of the pandemic represents the most severe economic downturn since the Great Depression of the 1930s. With soaring unemployment, many countries were forced to relax their austerity measures, promote economic recovery plans, and implement unconditional basic income programmes.

The emergence of the new coronavirus pandemic magnifies four interrelated geopolitical and techno-economic trends from the past decade:

> **The manufacturing global value chains overly dependent on China became a central target of national policy.**

When China decided to shut down parts of the country (beginning with Wuhan), and kept its supply of medical equipment (personal protective equipment, pharmaceutical drugs and inputs, mechanical ventilators) for itself, the whole world faced the consequences of the fragile interdependent global system of production. Consequently, many countries began to discuss industrial development (or re-industrialization) as a key goal to achieve in the coming years, as a means for securing national sovereignty and security against other possible shocks to the system. Concerns over China-centred manufacturing chains spilled over into the electronic and digital value networks and the central role of China in setting standards for the digital economy.

> **Industrial and innovation policies became key national concerns and increasingly "mission oriented".**

The wave of national industrial and innovation strategies, which surged after the 2008 GFC and gained pace with the widespread diffusion of digital technologies,[4] was further accelerated with the pandemic. Recent industrial and innovation strategy plans present several common characteristics (Labrunie, Penna and Kupfer, 2020). Two of these characteristics are particularly relevant: they are conceived as a means to seize technological opportunities, and not just upgrade industrial structures and value chains and, secondly, they address persistent socioeconomic consequences of current societal challenges such as sustainability and demographic change. Upgrading industrial structures and reshoring of value chains are now "the flavour of the month" in the policymakers' menu of measures – calls for new "Marshall Plans" to reconstruct economies abound.

Using innovation policy to resolve societal challenges is what observers like economist Mariana Mazzucato call "mission-oriented" innovation policies (Mazzucato, 2018). The global race for a SARS-CoV-19 vaccine could be seen

4. It is also worth mentioning that, in itself, the adoption of digital technologies in areas such as e-commerce and home office, gained momentum and became a key strategy for survival during the SARS-CoV-19 pandemic.

from this perspective as a key example of mission-oriented initiative. Regions (such as the European Union), individual countries (Peru and Spain) and cities (Manchester, Valencia and Medellin) are currently developing their own mission oriented innovation strategies, in which the missions are *innovation driven* and related to environmental and health issues.

> **In what concerns the digital economy, the US-China competition sharpens the differences in technology strategies while creating divides between business models and firm choices making more difficult agreement over standards and practices. As a consequence, the policy space for multilateral governance is diminished.**

The widespread diffusion of digital technologies brings about the prospects of disruption of established structures – work relations, business models, trade patterns – all of which call for a realignment of institutions and the establishment of a new governance system. Historical observation shows that technological innovations also bring about negative externalities. Digital technologies create different regulatory problems (IEL et al, 2017):

- **ETHICAL:** right to privacy and data confidentiality
- **PROPRIETARY:** ownership and access to data
- **INDUSTRIAL DESIGN:** degree of autonomy of the machines, which could become an issue of economic and political power
- **NORMATIVE:** establishment of open vs. proprietary standards and of technical standards for tracking decisions, securing compatibility and retrofitting legacy systems
- **TECHNO-ECONOMIC:** support for the development of technical and organizational skills adapted to each production system
- **SOCIO-ENVIRONMENTAL:** rising unemployment due to robotization or the disposal of digital equipment, supplies and goods

All such problems call for regulations, and some of them may not be amenable to national regulations – they need a *global* framework if the problems are to be effectively addressed. However, current discourse of distrust over the action and mandates of existing multilateral institutions (the US pulling out of the WHO and WTO, for instance) is at odds with the prospects of international agreements in the regulation of the digital economy.

> **As it currently looks, the promotion of sustainability and green new deals seem to be one of the few areas open for global alliances and multilateral collaboration.**

While environmental issues lost momentum with the Trump Administration and any "green" motivations behind the American official industrial and innovation strategy disappeared, it remains a key commitment of civil society and corporate social responsibility, which recognizes the economic importance of a sustainability agenda born and consolidated as a multilateral task. National climate and sustainability agendas were and are built directly linked to the multilateral one, and parameters and instruments for monitoring and evaluating these agendas are "multilateral" in their roots.

The widespread recognition of the 2030 Agenda and its 17 Sustainable Development Goals (SDGs) is part of this trend. If, on the one hand, the main low carbon technologies (solar and wind energy, electric cars) are concentrated in a few agents (and countries) and may create a problem of access; on the other, it is increasingly clear that low-tech solutions are also important and perhaps of greatest impact from the point of view of developing countries with critical technological gaps in sanitation, waste management of solids, and public transportation.

It follows that while policy spaces for regulation of the digital economy are diminished by conflict and competition, the advent of the SARS-CoV-19 pandemic does not seem to have shut the window of opportunity for multilateral collaboration for innovations in the area of climate and sustainability, especially when considering the economic and social benefits of access to health services, sanitation or pharmaceutical drugs and vaccines.

5 Implications for Brazil and emerging economies

The current pandemic has shown that having manufacturing and innovative capacities are key not only for economic growth, but for sovereignty and security. The fact that Brazil has a network of top level health research institutions (federal public universities, the Fiocruz and official pharmaceutical labs) highlights this fact. Without this network, it is not unwarranted to speculate that the country would be in an even worse position in dealing with the SARS-CoV-19 pandemic.

The development of a strong scientific system (as Brazil experienced since the 1970s) is however not enough to seize the opportunities created by digital innovations. While the recent increase in innovative entrepreneurial activity in Brazil, beyond the São Paulo-Rio de Janeiro axis (to include states like Pernambuco, Santa Catarina and Goiás) has been fundamental, it is not economically sufficient or sustainable. There needs to be a vector that directs investments and technological development towards high value added areas.

What Brazil and other developing countries lack is an explicit industrial and innovation strategy that establishes a long-term development vision that recognizes its potential place in the global arena. Such strategy must contemplate the key role of public procurement for innovation and mission-oriented innovation programs as policy tools - as means to direct technological development towards digital transformation while addressing pressing environmental and social challenges that the country's society faces. It is only thus that developing countries may combine the opportunities of the digital economy to complete their development project.

The current US-China conflict diminishes the policy playing field for developing countries. Choosing sides risks limiting technology strategies and adopting technical standards that may not become dominant in the long run. Avoiding this divide is key for preparing institutions, the infrastructural base – and workers – for the adoption of what emerges as the *de facto* technical standard e.g. for 5G technologies. While the policy space is diminished for multilateral negotiations, it is collectively that developing countries may secure more bargaining power. Furthermore, explicit attention for technological aspects of trade agreements is key in this era of uncertainty regarding technological governance and regulations.

Windows of opportunity for technological innovation and socioeconomic development are moving targets shifting with political and economic dynamics. To seize the opportunity created by digital technologies, developing countries need to understand the recurrent and unique patterns of each technological cycle (Perez, 2001). Current disruptive digital innovations are characterised by the abundant use of data and the convergence of different fields of knowledge. Their diffusion to the global periphery is accelerated as a result of increasing production capacity and decreasing adoption prices (amidst exponential growth of technological performance and decreasing size of components).

For the global centre, such trends are aggravated by the threat of obsolescence not only for old technologies and firms with sunk investments in them, but also – and maybe more importantly – to workers and certain geographic areas, amidst the process of globalization of value chains. Confronted with the threat of disruption, nation-states turned back to active industrial and innovation policies. These dynamics exacerbate conflicts (not only between US and China) over trade and technological issues.

For the global south, taking sides in this conflict is unwarranted, while promoting new avenues for redirecting multilateral collaboration is increasingly vital.

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